Product Specifications

ROTOR CLIP®

Designed for Quality

Price: $2.00 U.S.

ROTOR CLIP COMPANY, INC.®

® Certified to ISO/TS 16949 • ISO 9001 • AS9100 • ISO 14001

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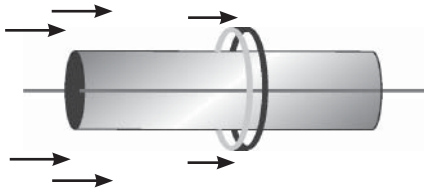

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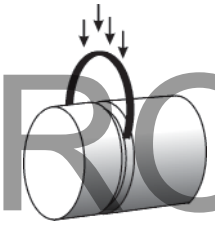
Self-Locking, Inch Tapered Section Retaining Rings

External Internal



Radially Installed

Axially Assembled, Metric Tapered Section Retaining Rings

Internal External

Radially Assembled, Metric Tapered Section Retaining Rings

External

Self-Locking, Metric Tapered Section Retaining Rings

External Internal

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External

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Internal External

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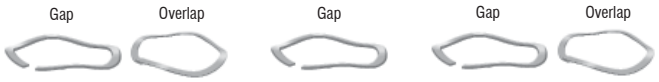

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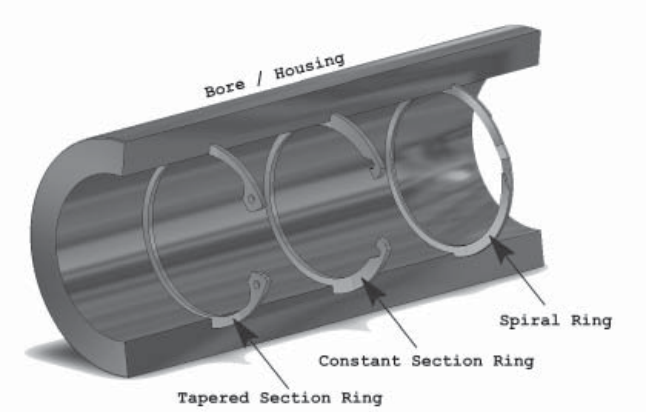
All Rings Have A Function...

A discussion of retaining rings must inevitably begin with a debunking of myths; namely, that one style retaining ring will function better than all other types in all instances. No one retaining ring style is “better” than another. Rather, the parameters of an application actually determine which retaining ring is best to use, and this can vary from assembly to assembly. Selecting the correct type of retaining ring based on variables such as installation/removal requirements, anticipated thrust load, and end play take-up can ensure the retaining ring you choose will perform reliably, while significantly reducing fastener costs.

There are three main types of retaining rings available to the designer: **tapered, constant section and spiral**. These are typically made from carbon steel, stainless steel or beryllium copper and feature a variety of finishes for corrosion protection (see accompanying table). Again, the final selection of a type and size retaining rings depends upon these and the previously mentioned parameters.



The following are some points to take into consideration when choosing a ring. Our engineers work with you to find the right type of ring for your design.

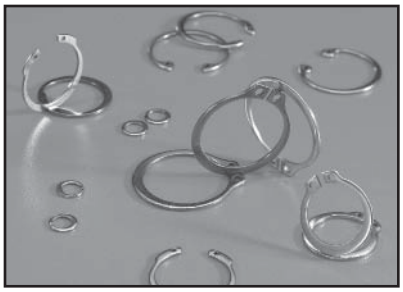
TAPERED SECTION
Tapered section rings make uniform contact with the groove, with a gap between the lugs.

CONSTANT SECTION
Constant section rings are elliptical when installed in the groove, making only 3-point contact as illustrated.

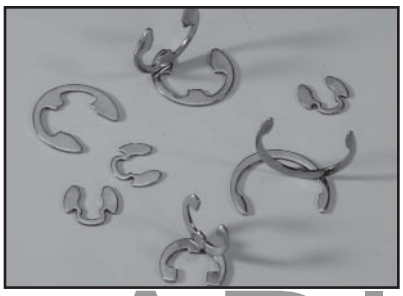
SPIRAL RINGS
Spiral rings make 360° contact with the groove.

For Technical Assistance, e-mail tech@rotorclip.com

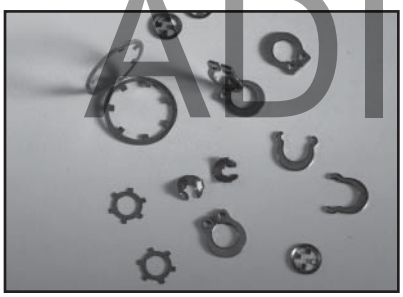
The Right Ring For Your Application



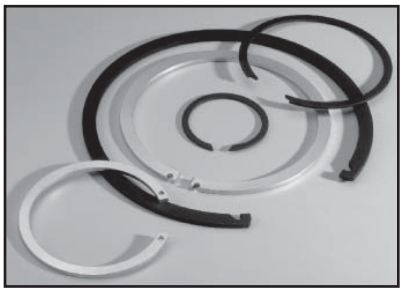
TAPERED SECTION RETAINING RINGS - Axially Assembled:
- Axially installed into machined grooves in housings/bores (internal) or on shafts (external)
- Have lug holes for ease of installation/removal
- Make uniform contact when released in a groove
- Can accommodate higher thrust loadings
- Provide more of a shoulder with which to retain a component or assembly than constant section or spiral retaining rings



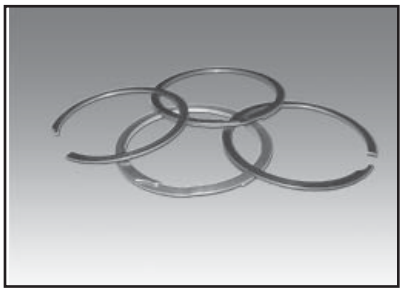
TAPERED SECTION RETAINING RINGS - Radially Assembled:
- Radially installed into machined grooves on shafts (external)
- Accommodate lower thrust loadings than axial retaining rings
- Do not have lug holes: Easy to install using retaining ring applicators
- Provide protruding “shoulders” for effective retention of assemblies
- Economical alternative to Axially Assembled external tapered section rings



TAPERED SECTION RETAINING RINGS - Self Locking:
- Can be installed on a shaft or in a housing/bore without a groove
- Save on machining time and costs since no groove is needed
- Can be used effectively and economically on small applications
- Accommodate low thrust loadings
- Difficult to remove once installed



CONSTANT SECTION RETAINING RINGS:
- Axially installed into machined grooves in housings/bores (internal)or on shafts (externally)
- Offer more clearance than a tapered section ring
- Accommodate less force than a tapered section ring
- Uniform material width is elliptical when installed in a groove, making 3 point contact
- More difficult to install/remove
- Economical alternative to tapered section rings depending on the application



SPIRAL RETAINING RINGS:
- Axially installed into machined grooves in housings/bores (internal) or on shafts (external)
- Make 360° contact with a groove in a housing/bore or shaft
- Accommodate less force than a tapered section ring
- Offer more clearance than a tapered section ring
- More difficult to install/remove

Part Numbers & Packaging

RETAINING RINGS

HO-50ST PA S

- **Identifies the ring TYPE**
- **Identifies the ring SIZE**
- **Identifies the ring MATERIAL**
- **Denotes the ring FINISH**
- **Denotes PACKAGING**

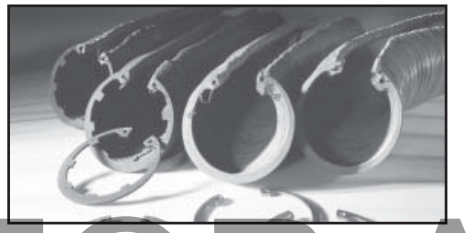
(Note: Bulk packaging has no code. Not all ring types can be stacked.)

Materials Codes:

ST	Carbon Steel
SS	Stainless Steel (PH15-7, PH17-7)
SG	Stainless Steel DIN 1.4122
SJ	Stainless Steel AISI 302
SU	Stainless Steel AISI 316
BC	Beryllium Copper
PB	Phosphor Bronze

Packaging Codes:

No Code	Bulk
S	Tape Stacked
R01	Plastic Shrink Wrapped
W01	Rod Stacked



NOTE: **Rings on Wire, or ROW** (pictured above) is standard bulk packaging for certain rings. Contact factory for more details.

Finishes Codes:

PA*	Phosphate
PD*	Phosphate & Oil
PAL*	Phosphate with Sealer
HPD*	Heavy Phosphate & Oil
ZD	Zinc Dichromate
ZDL	Zinc Dichromate with Sealer
ZF	Zinc Bright
Z3X*	Trivalent Chromate Zinc Plus Sealer
OIL*	Oil Over Steel (Constant Section Rings)
ZFF**	Zinc Flash
CF**	Copper Flash

** These finishes are RoHS compliant.*
*** For identification only. Does not provide corrosion protection.*

WAVE SPRINGS

WSL-50ST AF OIL

- **Identifies the spring TYPE**
- **Identifies the spring SIZE**
- **Identifies the spring MATERIAL**
- ***Identifies the number of spring TURNS**
- ****Designates a FLAT SHIM END**
- **Identifies the spring FINISH**

* Alphabetic designation for the number of turns according to catalog specifications. A, B, C, D...
** Designation to specify a Flat Shim End multi-turn wave spring. No code for a plain end multi-turn wave spring.

Materials Codes:

ST	Carbon Steel
SQ	Stainless Steel (17-7 PH/C)

Special Material Grades:
AISI 302 Stainless •AISI 316 Stainless • A286
Inconel X-750 • Elgiloy • Hastelloy C276 •Beryllium-Copper
Phosphor-Bronze
(Available upon request.)

Finishes Codes:

OIL*	Oil Dipped
No Code*	Vapor Degreased & Ultrasonic Cleaned (Stainless Steel)
SPP	Passivate
BO	Black Oxide
PD	Phosphate
ETM	Vibratory Deburr

** Standards*

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www.rotorclip.com

You can choose to use the automated check out feature in department stores and grocery markets. Why shouldn't you be able to automate your industrial purchases?

Now you can. As a current/prospective customer, Rotor Clip invites you to take advantage of our online ordering system to help you reduce your transaction costs and to make important information like order status, availability and quote status available to you when you want to see it. No need to make a phone call or wait for a customer service person to lookup your information. It can be available to you 24/7 on your computer.

To get things started, simply e-mail the name(s), e-mail addresses and location of the person(s) who would like to use the system to cs@rotorclip.com. We'll then set up an account, and e-mail login information to each. The system is pretty intuitive and you should be able to start using it immediately. However, if there are any questions, you can always contact Rotor Clip for help (+1 732-469-7333.)

"DOUBLE ENTRY" NOT A PROBLEM

No need to be concerned about "double entry"…having to enter the order into your system and ours. A simple conversation between our respective IT departments should solve this issue, usually by arranging to transmit a flat file. This eliminates the need to enter the order twice into our respective systems.

With Rotor Clip's online ordering system you can check stock and availability as well as place your order. You can also check the status of your order, submit, view or print quotes, and view and print invoices.

TO SIGN UP FOR ROTOR CLIP ONLINE ORDERING
CALL +1 732-469-7333 OR E-MAIL CS@ROTORCLIP.COM

Materials Tapered/Constant Section Rings

Standard material for Rotor Clip retaining rings is carbon spring steel (SAE 1060-1090/UNS G10600-G10900). Rings can also be produced in our standard stainless steel (PH 15-7 Mo/UNS S15700) with DIN 1.4122 as an option, and in our standard beryllium copper (Alloy #25/UNS C17200) with phosphor bronze (Alloy#5218/UNS C52180) as an option.
Please note that the availability of rings in the stainless steel and copper materials is subject to prior inquiry and acceptance of a formal quotation. Rotor Clip can also produce rings one gauge thicker or thinner than standard sizes. Again, such orders are subject to prior inquiry and acceptance of a formal quotation.

Characteristics of each material follow:

CARBON SPRING STEEL - This steel is known for its high strength, and reliability in retaining ring applications. Since carbon spring steel is subject to corrosion, Rotor Clip treats all such rings with a protective coating to ensure some corrosion resistance. For long-term corrosion protection, a zinc plating or non-metallic finish should be applied over the steel.(See "Finishes" section).

STAINLESS STEEL -

• ***PH 15-7 Mo*** is an extra strength corrosion-resistant steel, capable of preventing atmospheric oxidation at temperatures up to 900º F. It also offers the following advantages:

1. Minimal distortion due to unique heat-treating process.
2. A minimum of 225,000 psi for high ultimate tensile strength.
3. High creep strength.

Note: We reserve the right to substitute PH 17-7 stainless steel material for PH 15-7 Mo on larger rings.

• ***TYPE 420 -*** A less expensive alternative to PH 15-7. Since general corrosion resistance for this material is less than PH 15-7, use of this material depends upon the application. Contact Technical Sales for assistance.**

• ***DIN 1.4122 -*** A grade of stainless steel commonly used on DIN standard retaining rings.

BERYLLIUM COPPER ALLOY#25 - Applications that require conductivity are best served by this material. It is also characterized by excellent corrosion resistance and is particularly effective in sea air and seawater atmospheres.

PHOSPHOR BRONZE ALLOY#5218 - The least expensive copper material Rotor Clip offers. This type exhibits higher strength compared to standard phosphor bronze materials with the same tin percentages. It is also characterized by very good stress relaxation characteristics. (Note: Rotor Clip can also supply phosphor bronze material to DIN standard 17 662, Material Number 2.1020. Contact Rotor Clip Technical Sales for more information).

Material	Rotor Clip Code
Carbon Spring Steel	
SAE 1060-1090 (UNS G10600-G10900)	**ST**
Stainless Steel	
PH 15-7 Mo (Grade 632 - UNS S15700)	**SS**
17-7 PH (Grade 631 - UNS S17700)	**SS***
420 (UNS S42000)	**SC****
DIN 1.4122	**SG**
Beryllium Copper	
UNS C17200	**BC**
Phosphor Bronze	
UNS C52180	**PB**

*Note: Large stainless steel rings may be supplied from 17-7 due to material availability. Contact factory for details.
**Limited availability. Contact factory for details.

TEMPERATURE LIMITS FOR TAPERED SECTION RETAINING RINGS

Material	Ring Series & Size Range					Temp. Limits	
Carbon Spring Steel (SAE 1060-1090)	HO, VHO HOI, DHO	SH, VSH SHI, DSH	BHO, BSH LC, SHR	PO SHM C	RG, TI, TX SHF, EL DTX, DTI	MAX.F°	MIN.F°
	ALL SIZES THROUGH-300	ALL SIZES THROUGH-343	ALL SIZES WHERE AVAILABLE		- -	500	-100
	ALL DHO ALL SIZES -306 & OVER	ALL DSH ALL SIZES -350 & OVER	ALL DE & JE		ALL SIZES WHERE AVAILABLE	600	-100

This chart is for reference only. For Information regading performance of a retaining ring in a specific application, please contact technical sales: tech@rotorclip.com. Note: Temperature limits for all sizes of beryllium copper retaining rings (Alloy #25) are 650°F to -300°F. Temperature limits for all sizes of stainless steel retaining rings (PH 15-7 Mo or equivalent; AISI 632-AMS 5520) are 900°F to -100°F. For other materials, please contact Rotor Clip technical sales.

Tapered/Constant Section Rings **Finishes**

PHOSPHATE COATING (PA) - This standard finish is recommended over unfinished plain steel since it offers an extended shelf-life protection against rusting. RoHS compliant. **THERE IS NO ADDITIONAL CHARGE FOR THIS FINISH.**

PHOSPHATE AND OIL (PD) - This finish provides 8-hour salt spray protection. RoHS compliant.

PHOSPHATE WITH SEALER (PAL) - A coating is added to the finish to control loose phosphate crystals on the surface of the part. RoHS compliant.

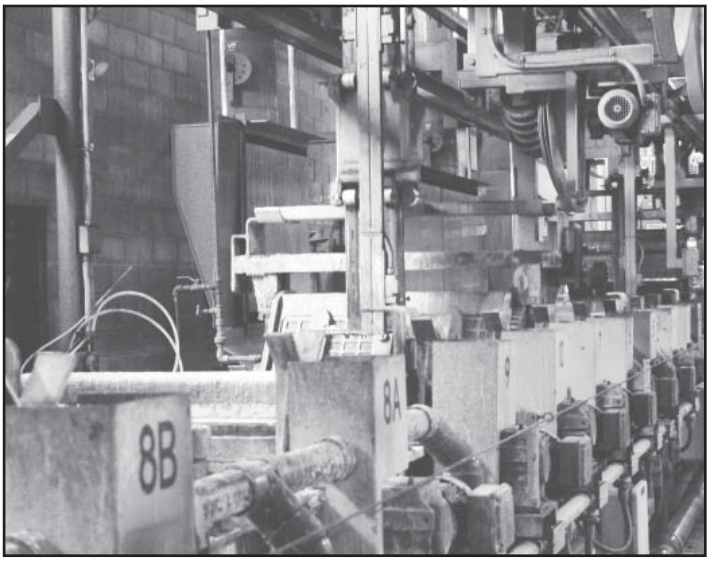
HEAVY PHOSPHATE AND OIL (HPD) - This finish provides 72 salt spray hours and can be used in place of costly stainless steel material in some applications. (Contact Rotor Clip Technical Sales for more information). RoHS compliant.

ZINC PLATING (ZD) - This coating features a yellow dichromate post plating finish. It affords the metal excellent salt spray protection (96 hours) and is particularly effective for applications exposed to seawater. Rotor Clip SAE 1060-1090 steel retaining rings are zinc plated using a mechanical plating process, which effectively eliminates hydrogen embrittlement.

ZINC BRIGHT (ZF) - Most of the dichromate is leeched out of this process, leaving a "bright" silver finish on the parts. ZF offers some corrosion protection (48 hours), but is widely used when the aesthetics of the part are a factor.

ZINC DICHROMATE w/SEALER (ZDL) - This improved finish offers corrosion protection of up to 240 hours of salt spray protection. (**Heavy Zinc Dichromate with Sealer - HZDL** - offers 480 hours of salt spray protection.) It is a low cost substitution for costly non-corrosive materials such as stainless steel in some applications. Call for additional information.

TRIVALENT CHROMATE over ZINC (Z3X) - This coating meets global requirements for hexavalent-free coatings. **Z3X**, trivalent with a sealer, affords 240 salt spray hours of protection. RoHS & ELV compliant.



GALVANIC ZINC PLATING (GZN) - This plating has a thickness of 5-8μm and blue chromate conversion coat. RoHS compliant. **GZY** is a yellow chromate conversion coat with the same thickness and contains hexavalent chromium. NOT RoHS compliant. Both provide 72 hours salt spray protection (red rust.) Available for certain global markets only.

OIL OVER STEEL (OIL) - Used for Constant Section Rings, an oil finish is applied over carbon steel to offer an extended shelf-life protection against rusting. No salt spray protection. RoHS compliant.

Finish	Code	Description	Salt Spray Hours	Color
Phosphate	PA	Shelf-Life	-	Black
	PD	Phosphate and Oil	8 (Red Rust)	Black
	PAL	Phosphate with Sealer	-	Black
	HPD	Heavy Phosphate and Oil	72 (Red Rust)	Black
Hexavalent Chrome	ZF	Zinc Bright	48 (Red Rust)	Silver
	ZD	Zinc Dichromate	96 (Red Rust)	Yellow
	ZDL	Zinc Dichromate Sealer	240 (Red Rust)	Yellow
	HZDL	Heavy Zinc Dichromate Sealer	480 (Red Rust)	Yellow
Trivalent	Z3X	Trivalent Chromate Zinc plus Sealer	96/240*	N/A
Galvanic Zinc Plating	GZN	Galvanic Zinc Plating - Blue Chromate	48/72*	Silver
	GZY	Galvanic Zinc Plating - Yellow Chromate	48/72*	Yellow
Optional Color Coding Finishes	ZFF	Zinc Flash	None	Silver
	CF	Copper Flash	None	Copper
	OIL	Oil Over Steel - Shelf Life	-	Black

* White Corrosion/Red Corrosion

Materials/Finishes Spiral Rings

Materials:

CARBON SPRING STEEL (ST)
This steel is known for its high strength and reliability in spiral ring applications. Since carbon steel is subject to corrosion, Rotor Clip rings are oil dipped to ensure some corrosion resistance.

STAINLESS STEEL - AISI 302 (SJ)
This general purpose stainless steel offers corrosion resistance and can be cold worked to high tensile strengths.

STAINLESS STEEL - AISI 316 (SU)
This type of stainless steel is heat resistant with superior corrosion resistance than other chromium nickel steels. It offers high creep strength at elevated temperatures and resistance to pitting.

STAINLESS STEEL - PH17-7 (SS)
A high strength corrosion-resistant steel with good workability, easy hardening and excellent mechanical properties at elevated temperatures. Can be heat treated at relatively low temperatures for high strength properties.

BERYLLIUM COPPER (BC)
Applications that require conductivity are best served by this material. It is also characterized by excellent corrosion resistance and is particularly effective in sea air and seawater atmospheres

Finishes:

OIL DIP
This standard finish for carbon steel spiral retaining rings offers an extended shelf-life protection against rusting.

PASSIVATION
The passivation process removes “free iron” contamination left behind on the surface of stainless steel due to the manufacturing process. Also, the passivation process facilitates the formation of a thin, transparent oxide film that protects the stainless steel from selective oxidation (corrosion).

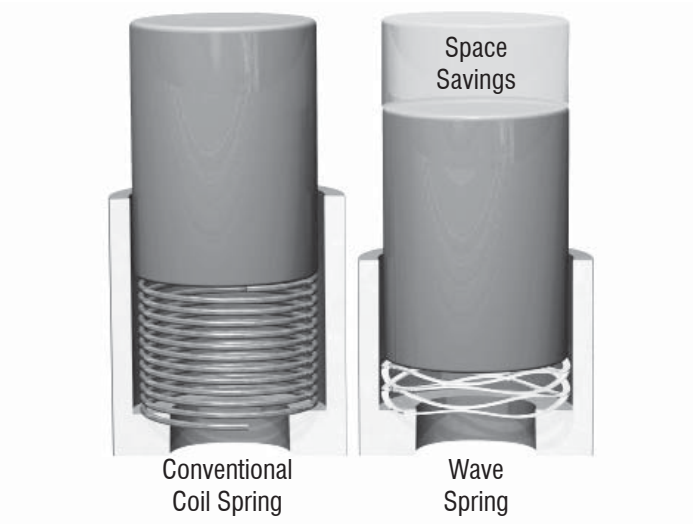
ZINC PHOSPHATE
This coating provides basic shelf life protection for single turn spiral rings (only.)

Material	Material Thickness (in)	Minimum Tensile Strength (psi)	Shear Strength (psi)	Maximum Recommended Operating Temperature °F	Modulus of Elasticity (psi)
CARBON STEEL OIL TEMPERED SAE 1070 - 1090	.006 - .014	269,000	153,000	250	30×10^6
	.0141 - .021	255,000	145,000		
	.0211 - .043	221,000	126,000		
	.0431 & larger	211,000	120,000		
CARBON STEEL HARD DRAWN SAE 1060 - 1075	.006 to .030	230,000	130,000		
	.0301 - .110	181,000	103,000		
	.1101 - .220	156,000	89,000		
AISI 302 AMS-5866	.002 - .022	210,000	119,000	400	28×10^6
	.0221 - .047	200,000	114,000		
	.0471 - .062	185,000	105,000		
	.0621 - .074	175,000	100,000		
	.0741 - .089	165,000	94,000		
	.0891 - .095	155,000	88,000		
AISI 316 ASTM A313	.002 - .023	195,000	111,000	400	28×10^6
	.0231 - .048	190,000	108,000		
	.0481 - .061	175,000	99,000		
	.0611 & larger	170,000	97,000		
17-7 PH/C CONDITION CH900 AMS-5529		240,000[2]	137,000[2]	650	29.5×10^6
BERYLLIUM COPPER TEMPER TH02 ASTM B197		185,000[2]	128,000[2]	400	18.5×10^6

Wave Springs

Wave Spring Advantage

TruWave flat wire wave springs help to save up to 50% of axial space in your application when compared to conventional coil springs. The result is more compact applications in which unnecessary space and therefore excess material of neighboring components can be reduced to a minimum. The flat wire effectively reduces the solid height of the wave spring so that with the same amount of turns one can visibly reduce the work height without compromising the load or spring deflection. Another advantage is that one can increase the number of turns of the spring design in order to decrease the deflection per turn when the wave spring is compressed.



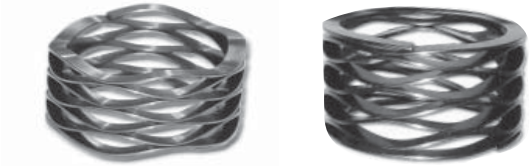
WAVE SPRING TYPES:

GAP SINGLE TURN/OVERLAP SINGLE TURN

Standard Inch (SST) / Narrow Inch (NST) / Metric (MST)

- Ideal for short deflection applications with low to medium forces.
- Offered in a number of waves and material thicknesses.
- Designed for a wide range of bore and rod diameters.
- Ideal for:
  - Narrow radial wall dimensions
  - Light duty applications
  - Low clearance applications
  - Ball or roller bearing applications

MULTI-TURN PLAIN ENDS/MULTI-TURN SHIM ENDS



Light (WSL-MWL) / Medium (WSM-MWM) / Heavy (WSR-MWR)

- Decreasing spring rate is proportional to the number of turns: More turns equals less force.
- Used for low force applications with large deflections.
- Utilizes nearly 1/2 the space as helical compression springs while producing the same force.
- Ideal for:
  - Medium & heavy duty applications
  - High thrust load capacity
  - Light & medium bearing series: double row, tapered bearing depending on the spring version.

WAVE SPRING MATERIALS:

Each application offers different operating conditions for a flat wire wave spring. Choosing the right material depends on operating temperature, contact with corrosive environments and the required number of load cycles. Rotor Clip's engineers will help you find the right material for your application. An overview of the materials used by Rotor Clip for flat wire wave springs can be found here:

Standard Material Grades

SAE 1070-1090 Carbon Steel (1.1231 - 1.1273)

- This pre hardened material is the standard material for wave springs.
- Less expensive option to Stainless Steel.

17-7 Stainless Steel (1.4568 – X7CrNiAl17-7)

- Used for high stress and fatigue applications.
- Can withstand much higher temperatures than SAE 1070-1090 and not lose its spring qualities.
- Higher corrosion resistance than SAE 1070-1090.

Special Material Grades

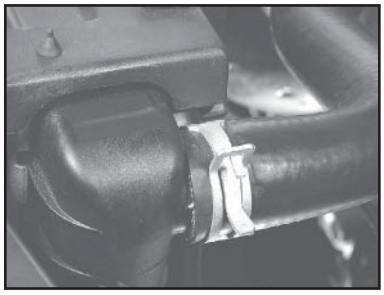
- AISI 302 Stainless (DIN Material No.: 1.4319)
- AISI 316 Stainless (DIN Material No.: 1.4401)
- A286 (DIN Material No.: 1.4980)
- Inconel X-750 (DIN Material No.: 2.4669)
- Elgiloy (DIN Material No.: 2.4711)
- Hastelloy C276 (DIN Material No.: 2.4819)
- Beryllium-Copper (DIN Material No.: 2.1247)
- Phosphor-Bronze (DIN Material No.: 2.1030)

To have Rotor Clip design engineers help you custom design a wave spring for your particular application, fill out the Custom Wave Spring Design Form available at **rotorclip.com/wave_spring_design_form** or use our online custom wave spring calculator on **rotorclip.com/wsc** .

Hose Clamps Self-Compensating

For Low Pressure Applications, Clamp It With Rotor Clamp

Rotor Clamp, Inc. produces a line of self-compensating hose clamps for low-pressure applications in single wire, double wire and constant tension band (CTB) configurations, including light band and narrow band clamps.



Self Compensating Hose Clamps simplify assembly/disassembly, reduce production time and lower costs. Ideal for replacing traditional screw/worm type clamps on low-pressure applications. Clamps also are a good alternative to gluing hoses to manifolds in spa applications, providing extremely effective clamping without the use of messy glues that could potentially clog the hose line.

Rotor Clamp Self-Compensating Hose Clamp	**Competition Screw/Worm Type Clamp**
• Expands/Contracts with hose in response to temperature changes.	• Must be manually adjusted as temperature changes
• Cannot be over/under tightened.	• Screw mechanism may be over/under tightened causing damage/leakage to the hose.
• Can be installed automatically eliminating Carpal Tunnel Syndrome (CTS), a nerve disorder of the hand and wrist.	• Must be manually installed.
• Less time for assembly lowering production cost.	• More time needed for assembly/ disassembly due to screw adjustment.

Single Wire (HC/HW)

Double Wire (DW)

Constant Tension Band (CTB)

Constant Tension Light Band (CTL)

Interchange Chart

Rotor Clip Products May Be Used Interchangeably With The Part Numbers Indicated Below.

INCH RETAINING RINGS

ROTOR CLIP®	Waldes Truarc®	IRR®	Anderton	Mil Standard
HO	N5000	3000	N1300	16625
HOI	5008	4000	N1308	16627
BHO	N5001	3001	1301	16629
VHO	N5002	-	N1302	16631
SH	5100	3100	N1400	16624
SHI	5108	4100	N1408	16626
SHR	5160	7200	N1460	3217
SHM	5560	-	-	-
BSH	5101	3101	1401	16628
VSH	5102	-	1402	16630
E	5133	1000	N1500	16633
RE	5144	1200	N1540	3215
BE	5131	1001	N1501	16634
C	5103	2000	N1800	16632
PO	5304	-	-	-
POL	T5304	-	-	-
EL	5139	-	-	3216
LC	5107	-	-	90708
SHF	5555	7100	N1440	90707
RG	5135	-	-	-
TX	5115	-	N1465	-
TY	5105	6100	N1405	-
TI	5005	R6000	N1305	-

SPIRAL RINGS/SHIMS

ROTOR CLIP®	Spirolox®	Smalley®	Mil Standard
KL	UR	VH	-
CL	US	VS	-
KM	RR	WH	MIL-DTL-27426/3
CM	RS	WS	MIL-DTL-27426/1
KR	RRT	WHT	-
CR	RST	WST	-
KG	RRN	WHM	MIL-DTL-27426/4
CG	RSN	WSM	MIL-DTL-27426/2
DKR	-	DNH	-
DCR	-	DNS	-
DKL	-	FH	-
DCL	-	FS	-
KLR	-	FHE	-
CLR	-	FSE	-
MKM	ZRM	-	-
MCM	ZSM	-	-
MKR	ZRT	-	-
MCR	ZST	-	-
MKG	ZRH	-	-
MCG	ZSH	-	-
KLM	-	VHM	-
CLM	-	VSM	-
MKA	-	EH	-
MCA	-	ES	-
NKG	-	WHW	-
NCG	-	WSW	-
KMS	-	SSRS	-

METRIC RETAINING RINGS

ROTOR CLIP®	Seeger®	Anderton	Ochiai
DHO DIN 472	J	D1300	-
DHI	JV	M1308	-
DHT DIN 984	JK	D2000	-
DHR	JS	D1360	-
DVH	JB	-	-
DSH DIN 471	A	D1400	-
DSI	AV	M1408	-
DST DIN 983	AK	D2100	-
DSR	AS	D1460	-
DVS	-	-	-
DE DIN 6799	RA	D1500	-
DC	H	M1800	-
DTX	ZA	M1465	-
DTI	ZJ	M1305	-
JE (JIS B 2805)	-	-	ETW

WAVE SPRINGS

ROTOR CLIP®	Spirolox®	Smalley®
SST	TR/TB	SSR
NST	-	SSR Size-N
MST	TR/TB	SSB
WSL	CML	C/CS
WSM	CMM	C/CS
WSR	CMH	C/CS
MWL	-	CM/CMS
MWM	-	CM/CMS
MWR	-	CM/CMS

RETAINING RING MATERIAL & PROCESS CODES

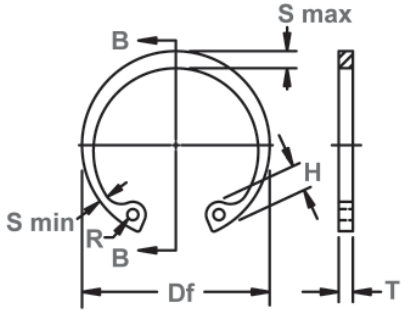
MATERIAL	ROTOR CLIP®	Waldes Truarc®	Anderton	IRR®	Smalley®
CARBON STEEL	ST	S	CS	ST	(NO CODE)
STAINLESS STEEL	SS	H	AS	SS2	S17
BERYLLIUM COPPER	BC	C	BC	BC	BEC
FINISHES	**ROTOR CLIP®**	**Waldes Truarc®**	**Anderton**	**IRR®**	**Smalley®**
PHOSPHATE	PA	PP	-	PA	PS
ZINC DICHROMATE	ZD	ZD	ZX	ZD	-
ZINC DICHROMATE LACQUER	ZDL	-	-	-	-
ZINC BRIGHT	ZF	ZF	ZE	-	-
PACKAGING	**ROTOR CLIP®**	**Waldes Truarc®**	**Anderton**	**IRR®**	**Smalley®**
BULK	(NO CODE)	B	BULK	BULK	(NO CODE)
STACKED	S	R (ROL-PAK)	STACKED	STACKED	-

Additional materials, finishes and packaging are available. Visit rotorclip.com or contact the factory.

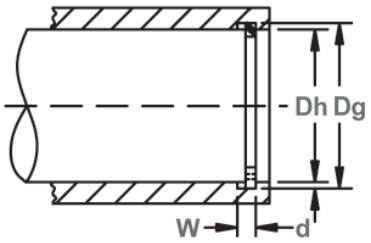
HO Housing Rings

Axially Assembled, Internal

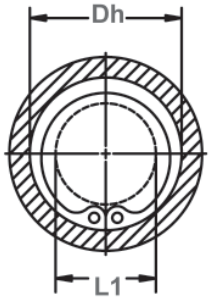
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



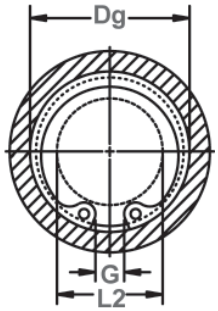
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



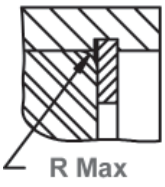
Clearance Diameter Compressed in Housing



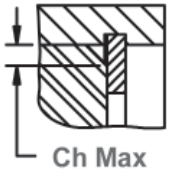
Clearance Diameter & Gap Width Released in Groove

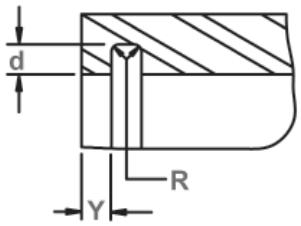
RING NO.	HOUSING DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD.(lbs.) Sqr. corner abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wght. Per 1000 Pcs.	Com-pressed in housing	Re-leased in groove	Ring Safety Factor of 4	Groove Safety Factor of 2
	Dh DEC	Dh FRAC	Dh mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L1	L2	Pr	Pg
HO-25	.250	1/4	6.4	.268	±.001	.020	+.002	.009	.280		.015		.08	.115	.133	426	190
HO-31	.312	5/16	7.9	.330	.0015*	.020	-.000	.009	.346		.015		.11	.173	.191	538	240
HO-37	.375	3/8	9.5	.397	±.002	.029		.011	.415		.025		.25	.204	.226	1066	350
HO-43	.438	7/16	11.1	.461	.002*	.029		.012	.482		.025		.37	.23	.254	1238	440
HO-45	.453	29/64	11.5	.477		.029		.012	.498		.025		.43	.25	.274	1299	460
HO-50	.500	1/2	12.7	.530		.039		.015	.548	+.010	.035		.70	.26	.290	2010	510
HO-51	.512	-	13.0	.542	±.002	.039		.015	.560	-.005	.035		.77	.27	.300	2060	520
HO-56	.562	9/16	14.3	.596	.004*	.039		.017	.620		.035		.86	.275	.305	2253	710
HO-62	.625	5/8	15.9	.665		.039		.020	.694		.035		1.0	.34	.380	2507	1050
HO-68	.688	11/16	17.5	.732		.039		.022	.763		.035		1.2	.40	.440	2741	1280
HO-75	.750	3/4	19.0	.796		.039	+.003	.023	.831		.035		1.3	.45	.490	3045	1460
HO-77	.777	-	19.7	.825		.046	-.000	.024	.859		.042		1.7	.475	.520	4618	1580
HO-81	.812	13/16	20.6	.862		.046		.025	.901		.042		1.9	.49	.540	4872	1710
HO-86	.866	-	22.0	.920	±.003	.046		.027	.961		.042		2.0	.54	.590	5177	1980
HO-87	.875	7/8	22.2	.931	.004*	.046		.028	.971		.042		2.1	.545	.600	5227	2080
HO-90	.901	-	22.9	.959		.046		.029	1.000	+.015	.042		2.2	.565	.620	5430	2200
HO-93	.938	15/16	23.8	1.000		.046		.031	1.041	-.010	.042	±.002	2.4	.61	.670	5684	2450
HO-100	1.000	1	25.4	1.066		.046		.033	1.111		.042		2.7	.665	.730	6039	2800
HO-102	1.023	-	26.0	1.091		.046		.034	1.136		.042		2.8	.69	.755	6141	3000
HO-106	1.062	1-1/16	27.0	1.130		.056		.034	1.180		.050		3.7	.685	.750	7562	3050
HO-112	1.125	1-1/8	28.6	1.197		.056		.036	1.249		.050		4.0	.745	.815	8019	3400
HO-118	1.181	-	30.0	1.255		.056		.037	1.319		.050		4.3	.79	.860	8526	3700
HO-118	1.188	1-3/16	30.2	1.262	±.004	.056		.037	1.319		.050		4.3	.80	.870	8526	3700
HO-125	1.250	1-1/4	31.7	1.330	.005*	.056		.040	1.388	+.025	.050		4.8	.875	.955	8932	4250
HO-125	1.259	-	32.0	1.339		.056		.040	1.388	-.020	.050		4.8	.885	.965	8932	4250
HO-131	1.312	1-5/16	33.3	1.396		.056		.042	1.456		.050		5.0	.93	1.01	9440	4700
HO-137	1.375	1-3/8	34.9	1.461		.056		.043	1.526		.050		5.1	.99	1.07	9846	5050
HO-137	1.378	-	35.0	1.464		.056	+.004	.043	1.526		.050		5.1	.99	1.07	9846	5050
HO-143	1.438	1-7/16	36.5	1.528		.056	-.000	.045	1.596		.050		5.8	1.06	1.15	10353	5500
HO-145	1.456	-	37.0	1.548		.056		.046	1.616		.050		6.4	1.08	1.17	10455	5700
HO-150	1.500	1-1/2	38.1	1.594		.056		.047	1.660		.050		6.5	1.12	1.21	10708	6000
HO-156	1.562	1-9/16	39.7	1.658		.068		.048	1.734		.062		8.9	1.14	1.23	13906	6350
HO-156	1.575	-	40.0	1.671		.068		.048	1.734		.062		8.9	1.15	1.24	13906	6350
HO-162	1.625	1-5/8	41.3	1.725	±.005	.068		.050	1.804	+.035	.062		10.0	1.15	1.25	14413	6900
HO-165	1.653	-	42.0	1.755	.005*	.068		.051	1.835	-.025	.062	±.003	10.4	1.17	1.27	14718	7200
HO-168	1.688	1-11/16	42.9	1.792		.068		.052	1.874		.062		10.8	1.23	1.33	15022	7450
HO-175	1.750	1-3/4	44.4	1.858		.068		.054	1.942		.062		10.3	1.26	1.36	15580	8050
HO-181	1.812	1-13/16	46.0	1.922		.068		.055	2.012		.062		11.5	1.34	1.38	16139	8450

* F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & HOUSING.
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
***FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.



Allowable Corner Radius and Chamfer





Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -25 thru -100; .010 for ring sizes 102 thru 1000

Alternate Lug Design
For Larger Sizes
(Manufacturer's Option)

Alternate Design
(Manufacturer's Option)

RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in Groove	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (lbs.)	EDGE MARGIN
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G Min	R max	Ch max	P'r	Y
HO-25	.065		.025	±.002	.015	±.002	.031		.047	.011	.0085	190	.027
HO-31	.066		.033		.018		.031		.055	.016	.013	190	.027
HO-37	.082	±.003	.040		.028		.041		.063	.023	.018	530	.033
HO-43	.098		.049	±.003	.029	±.003	.041		.063	.027	.021	530	.036
HO-45	.098		.050		.030		.047		.071	.027	.021	530	.036
HO-50	.114		.053		.035		.047		.090	.027	.021	1100	.045
HO-51	.114		.053		.035		.047		.092	.027	.021	1100	.045
HO-56	.132		.053	±.004	.035	±.004	.047	+.010	.095	.027	.021	1100	.051
HO-62	.132		.060		.035		.062	-.002	.104	.027	.021	1100	.060
HO-68	.132		.063		.036		.062		.118	.027	.021	1100	.066
HO-75	.142		.070		.040		.062		.143	.032	.025	1100	.069
HO-77	.146		.074		.044		.062		.145	.035	.028	1650	.072
HO-81	.155		.077		.044		.062		.153	.035	.028	1650	.075
HO-86	.155		.081		.045		.062		.172	.035	.028	1650	.081
HO-87	.155		.084		.045		.062		.179	.035	.028	1650	.084
HO-90	.155		.087	±.005	.047	±.005	.062		.188	.038	.030	1650	.087
HO-93	.155		.091		.050		.062		.200	.038	.030	1650	.093
HO-100	.155		.104		.052		.062		.212	.042	.034	1650	.099
HO-102	.155	±.005	.106		.054		.062		.220	.042	.034	1650	.102
HO-106	.180		.110		.055		.078		.213	.044	.035	2400	.102
HO-112	.180		.116		.057		.078		.232	.047	.036	2400	.108
HO-118	.180		.120		.058		.078		.226	.047	.036	2400	.111
HO-118	.180		.120		.058		.078		.245	.047	.036	2400	.111
HO-125	.180		.124		.062		.078		.265	.048	.038	2400	.120
HO-125	.180		.124	±.006	.062	±.006	.078		.290	.048	.038	2400	.120
HO-131	.180		.130		.062		.078		.284	.048	.038	2400	.126
HO-137	.180		.130		.063		.078	+.015	.297	.048	.038	2400	.129
HO-137	.180		.130		.063		.078	-.002	.305	.048	.038	2400	.129
HO-143	.180		.133		.065		.078		.313	.048	.038	2400	.135
HO-145	.180		.133		.065		.078		.320	.048	.038	2400	.138
HO-150	.180		.133		.066		.078		.340	.048	.038	2400	.141
HO-156	.202		.157		.078		.078		.338	.064	.050	3900	.144
HO-156	.202		.157		.078		.078		.374	.064	.050	3900	.144
HO-162	.227		.164		.082		.078		.339	.064	.050	3900	.150
HO-165	.230		.167	±.007	.083	±.007	.078		.348	.064	.050	3900	.153
HO-168	.230		.170		.085		.078		.357	.064	.050	3900	.156
HO-175	.230		.170		.083		.078		.372	.064	.050	3900	.162
HO-181	.230		.170		.084		.093		.382	.064	.050	3900	.165

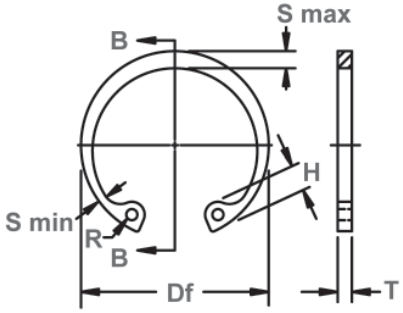
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION

Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

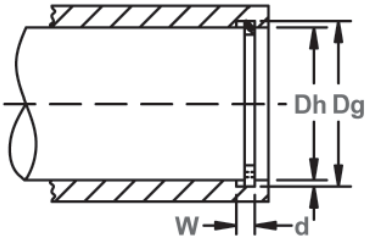
HO Housing Rings

Axially Assembled, Internal

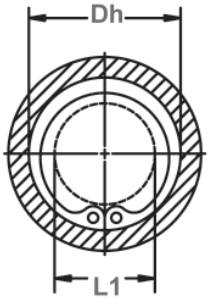
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



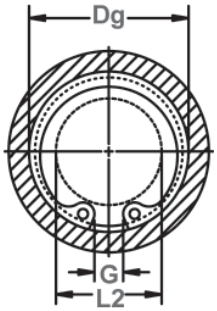
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



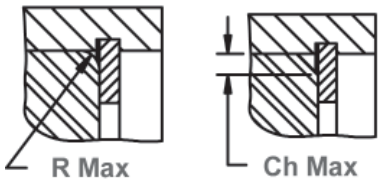
Clearance Diameter Compressed in Housing



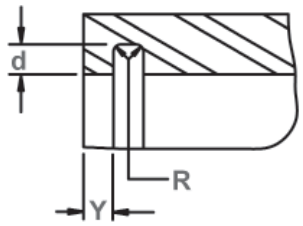
Clearance Diameter & Gap Width Released in Groove

RING NO.	HOUSING DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD. (lbs.) Sqr. corner abutment	
				DIAMETER		WIDTH		DEPTH	Free Diameter		Thickness***		Wght. Per 1000 Pcs.	Com-pressed in housing	Re-leased in groove	Ring Safety Factor of 4	Groove Safety Factor of 2
	Dh DEC	Dh FRAC	Dh mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L1	L2	Pr	Pg
HO-185	1.850	-	47.0	1.962		.068		.056	2.054		.062		12.8	1.35	1.46	16443	8750
HO-187	1.875	1-7/8	47.6	1.989	±.005	.068	+.004	.057	2.072	+.035	.062		12.8	1.37	1.48	16697	9050
HO-193	1.938	1-15/16	49.2	2.056	.005*	.068	-.000	.059	2.141	-.025	.062		13.3	1.46	1.58	17255	9700
HO-200	2.000	2	50.8	2.122		.068		.061	2.210		.062		14.0	1.52	1.64	17763	10300
HO-206	2.047	-	52.0	2.171		.086		.062	2.280		.078		18.0	1.52	1.64	23091	10850
HO-206	2.062	2-1/16	52.4	2.186		.086		.062	2.280		.078		18.0	1.54	1.66	23091	10850
HO-212	2.125	2-1/8	54.0	2.251		.086		.063	2.350		.078		19.4	1.58	1.70	23751	11350
HO-218	2.165	-	55.0	2.295		.086		.065	2.415		.078		19.6	1.63	1.75	24461	12050
HO-218	2.188	2-3/16	55.6	2.318		.086		.065	2.415		.078		19.6	1.66	1.79	24461	12050
HO-225	2.250	2-1/4	57.1	2.382		.086		.066	2.490		.078		21.8	1.67	1.80	25223	12600
HO-231	2.312	2-5/16	58.7	2.450		.086		.069	2.560		.078		22.6	1.73	1.93	25832	13550
HO-237	2.375	2-3/8	60.3	2.517		.086		.071	2.630		.078		23.2	1.79	1.86	26542	14300
HO-244	2.440	2-7/16	62.0	2.584		.086		.072	2.702	+.040	.078		25.4	1.86	2.00	27304	14900
HO-250	2.500	2-1/2	63.5	2.648		.086		.074	2.775	-.030	.078		25.5	1.91	2.05	28014	15650
HO-250	2.531	2-17/32	64.3	2.681		.086		.075	2.775		.078		25.5	1.94	2.09	28014	15650
HO-256	2.562	2-9/16	65.1	2.714		.103		.076	2.844		.093		34.0	1.93	2.08	34206	16500
HO-262	2.625	2-5/8	66.7	2.781	±.006	.103	+.005	.078	2.910		.093	±.003	34.5	2.02	2.17	35068	17350
HO-268	2.677	-	68.0	2.837	.006*	.103	-.000	.080	2.980		.093		35.0	2.05	2.21	35931	18250
HO-268	2.688	2-11/16	68.3	2.848		.103		.080	2.980		.093		35.0	2.06	2.22	35931	18250
HO-275	2.750	2-3/4	69.8	2.914		.103		.082	3.050		.093		35.5	2.12	2.28	36642	19200
HO-281	2.812	2-13/16	71.4	2.980		.103		.084	3.121		.093		36.0	2.18	2.34	37504	20050
HO-281	2.835	-	72.0	3.006		.103		.085	3.121		.093		36.0	2.21	2.38	37504	20050
HO-287	2.875	2-7/8	73.0	3.051		.103		.088	3.191		.093		41.0	2.24	2.41	38367	21500
HO-300	2.953	-	75.0	3.135		.103		.091	3.325		.093		42.5	2.32	2.50	40093	23150
HO-300	3.000	3	76.2	3.182		.103		.091	3.325		.093		42.5	2.37	2.55	40093	23150
HO-306	3.062	3-1/16	77.8	3.248		.120		.093	3.418		.109		53.0	2.41	2.59	47807	24100
HO-312	3.125	3-1/8	79.4	3.315		.120		.095	3.488		.109		56.0	2.47	2.66	48822	25200
HO-315	3.149	-	80.0	3.341		.120		.096	3.523		.109		57.0	2.49	2.68	49329	25700
HO-315	3.156	3-5/32	80.2	3.348		.120		.096	3.523		.109		57.0	2.50	2.69	49329	25700
HO-325	3.250	3-1/4	82.5	3.446		.120		.098	3.623	±.055	.109		60.0	2.54	2.73	50750	27000
HO-334	3.346	3-11/32	85.0	3.546		.120		.100	3.734		.109		65.0	2.63	2.83	52374	28300
HO-347	3.469	3-15/32	88.1	3.675		.120		.103	3.857		.109		69.0	2.76	2.96	54201	30200
HO-350	3.500	3-1/2	88.9	3.710		.120		.105	3.890		.109		71.0	2.79	3.00	54709	31200
HO-354	3.543	-	90.0	3.755		.120		.106	3.936		.109		72.0	2.83	3.04	55419	31800
HO-354	3.562	3-9/16	90.5	3.776		.120		.107	3.936		.109		72.0	2.85	3.06	55419	31800
HO-362	3.625	3-5/8	92.1	3.841		.120		.108	4.024		.109		73.0	2.91	3.12	56739	33200
HO-375	3.740	-	95.0	3.964		.120		.112	4.157	±.065	.109		78.0	3.02	3.24	58566	35600
HO-375	3.750	3-3/4	95.2	3.974		.120		.112	4.157		.109		78.0	3.03	3.25	58566	35600

*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & HOUSING.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

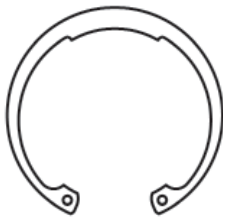


Allowable Corner Radius and Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -25 thru -100; .010 for ring sizes 102 thru 1000

Alternate Lug Design
For Larger Sizes
(Manufacturer's Option)



Alternate Design
(Manufacturer's Option)

RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in Groove	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (lbs.)	EDGE MARGIN
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G Min	R max	Ch max	P'r	Y
HO-185	.234		.170		.085		.093		.360	.064	.050	3900	.168
HO-187	.234		.170		.085		.093		.430	.064	.050	3900	.171
HO-193	.230		.170		.085		.093		.438	.064	.050	3900	.177
HO-200	.230		.170		.085		.093		.453	.064	.050	3900	.183
HO-206	.250		.186		.091		.093		.428	.078	.061	6200	.186
HO-206	.250		.186		.091		.093		.468	.078	.062	6200	.186
HO-212	.250		.195		.096		.093		.460	.078	.062	6200	.189
HO-218	.250		.199		.098		.093		.439	.078	.062	6200	.195
HO-218	.250		.199		.098		.093		.489	.078	.062	6200	.195
HO-225	.280		.203		.099		.093		.478	.078	.062	6200	.198
HO-231	.280	±.005	.206	±.007	.100	±.007	.093		.486	.078	.062	6200	.207
HO-237	.280		.207		.102		.093		.504	.078	.062	6200	.213
HO-244	.280		.209		.103		.110		.518	.078	.062	6200	.216
HO-250	.280		.210		.103		.110		.532	.078	.062	6200	.222
HO-250	.280		.210		.103		.110	+.015 -.002	.597	.078	.062	6200	.225
HO-256	.300		.222		.109		.110		.540	.088	.070	9000	.228
HO-262	.300		.226		.111		.110		.558	.088	.070	9000	.234
HO-268	.300		.230		.113		.110		.539	.090	.072	9000	.240
HO-268	.300		.230		.113		.110		.568	.090	.072	9000	.240
HO-275	.300		.234		.115		.110		.590	.092	.074	9000	.246
HO-281	.300		.230		.115		.110		.615	.088	.070	9000	.252
HO-281	.300		.230		.115		.110		.676	.088	.070	9000	.255
HO-287	.300		.240		.120		.110		.626	.092	.074	9000	.264
HO-300	.300		.250		.122		.110		.619	.092	.074	9000	.273
HO-300	.300		.250		.122		.110		.738	.092	.074	9000	.273
HO-306	.310		.254		.126		.125		.651	.097	.078	12000	.279
HO-312	.310		.259		.129		.125		.655	.099	.079	12000	.285
HO-315	.310		.262		.129		.125		.650	.100	.080	12000	.288
HO-315	.310		.262		.129		.125		.669	.100	.080	12000	.288
HO-325	.342		.269		.135		.125		.698	.104	.083	12000	.294
HO-334	.342	±.008	.276	±.008	.140	±.008	.125		.705	.108	.086	12000	.300
HO-347	.342		.286		.144		.125		.763	.108	.086	12000	.309
HO-350	.342		.289		.142		.125		.774	.110	.088	12000	.315
HO-354	.342		.292		.142		.125		.788	.110	.088	12000	.318
HO-354	.342		.292		.142		.125		.842	.110	.088	12000	.321
HO-362	.342		.299		.150		.125		.833	.116	.093	12000	.324
HO-375	.342		.309		.155		.125		.844	.120	.096	12000	.336
HO-375	.342		.309		.155		.125		.871	.120	.096	12000	.336

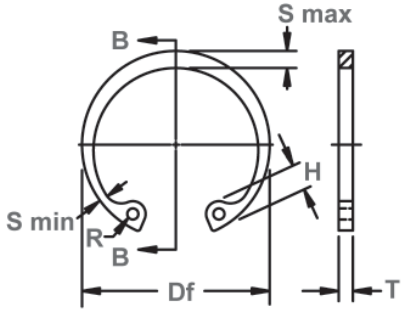
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION

Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

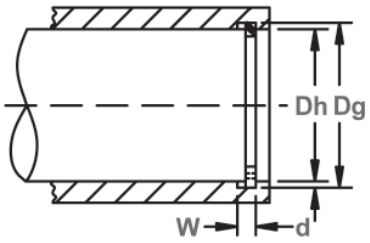
HO Housing Rings

Axially Assembled, Internal

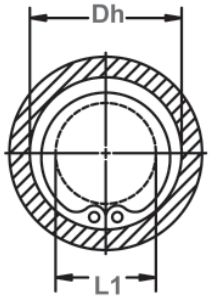
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



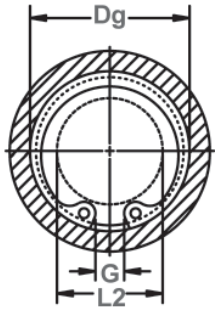
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



Clearance Diameter Compressed in Housing



Clearance Diameter & Gap Width Released in Groove

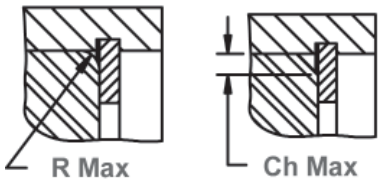
RING NO.	HOUSING DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEAR. DIA.		î THRUST LD. (lbs.) Sqr. corner abutment	
				DIAMETER		WIDTH		DEPTH	Free Diameter		Thickness***		Weight. Per 1000 Pcs.	Com-pressed in housing	Re-leased in groove	Ring Safety Factor of 4	Groove Safety Factor of 2
	Dh DEC	Dh FRAC	Dh mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L1	L2	Pr	Pg
HO-387	3.875	3-7/8	98.4	4.107		.120		.116	4.291		.109		87.0	3.11	3.34	60494	38000
HO-393	3.938	3-15/16	100.0	4.174		.120		.118	4.358		.109		88.0	3.17	3.40	61611	39300
HO-400	4.000	4	101.6	4.240		.120		.120	4.424		.109		93.0	3.23	3.47	62626	40700
HO-412	4.125	4-1/8	104.8	4.365		.120		.120	4.558		.109		97.0	3.36	3.60	64554	42000
HO-425	4.250	4-1/4	108.0	4.490	±.006	.120	+.005	.120	4.691		.109	±.003	101.0	3.48	3.72	66483	43200
HO-433	4.331	-	110.0	4.571	.006*	.120	-.000	.120	4.756		.109		105.0	3.50	3.74	67599	44500
HO-450	4.500	4-1/2	114.3	4.740		.120		.120	4.940		.109		111.0	3.66	3.90	70340	45800
HO-462	4.625	4-5/8	117.5	4.865		.120		.120	5.076	±.065	.109		117.0	3.79	4.03	72370	47000
HO-475	4.724	-	120.0	4.969		.120		.122	5.213		.109		124.0	3.88	4.12	74298	49000
HO-475	4.750	4-3/4	120.6	4.995		.120		.122	5.213		.109		124.0	3.90	4.14	74298	49000
HO-500	5.000	5	127.0	5.260		.120		.130	5.485		.109		136.0	4.08	4.34	78155	55000
HO-525	5.250	5-1/4	133.3	5.520		.139		.135	5.770		.125		174.0	4.35	4.62	94091	60000
HO-537	5.375	5-3/8	136.5	5.650	±.007	.139	+.006	.135	5.910		.125		179.0	4.45	4.72	96324	61500
HO-550	5.500	5-1/2	139.7	5.770	.006*	.139	-.000	.135	6.066		.125	±.004	183.0	4.57	4.84	98658	63300
HO-575	5.750	5-3/4	146.0	6.020		.139		.135	6.336		.125		192.0	4.82	5.09	103124	65900
HO-600	6.000	6	152.4	6.270		.139		.135	6.620		.125		202.1	5.07	5.34	107489	68600
HO-625	6.250	6-1/4	158.7	6.530		.174		.140	6.895		.156		266.0	5.24	5.52	139766	74100
HO-650	6.500	6-1/2	165.1	6.790		.174		.145	7.170		.156		281.0	5.49	5.78	145450	79900
HO-662	6.625	6-5/8	168.3	6.925		.174		.150	7.308	±.080	.156		305.0	5.60	5.90	148190	84200
HO-675	6.750	6-3/4	171.4	7.055		.174		.152	7.445		.156		325.0	5.68	5.98	151032	87000
HO-700	7.000	7	177.8	7.315		.174		.157	7.720		.156		344.0	5.91	6.22	156615	93100
HO-725	7.250	7-1/4	184.1	7.575		.209		.162	7.995		.187		428.0	6.11	6.43	194373	99600
HO-750	7.500	7-1/2	190.5	7.840	±.008	.209	+.008	.170	8.270		.187		485.0	6.36	6.70	201173	108100
HO-775	7.750	7-3/4	196.8	8.100	.006*	.209	-.000	.175	8.545		.187		520.0	6.58	6.93	207872	115000
HO-800	8.000	8	203.2	8.360		.209		.180	8.820		.187	±.005	555.0	6.83	7.19	214571	122000
HO-825	8.250	8-1/4	209.5	8.620		.209		.185	9.095		.187		603.0	7.04	7.41	221270	129300
HO-850	8.500	8-1/2	215.9	8.880		.209		.190	9.285	±.090	.187		634.0	7.29	7.67	227969	136900
HO-875	8.750	8-3/4	222.2	9.145		.209		.197	9.558		.187		653.0	7.38	7.77	233856	145500
HO-900	9.000	9	228.6	9.405		.209		.202	9.830		.187		732.0	7.63	8.03	241367	154100
HO-925	9.250	9-1/4	235.0	9.668		.209		.209	10.102		.187		767.0	7.88	8.30	248066	163600
HO-950	9.500	9-1/2	241.3	9.930		.209		.215	10.375		.187		803.0	7.98	8.41	254765	173100
HO-975	9.750	9-3/4	247.7	10.190		.209		.220	10.648		.187		833.0	8.23	8.67	261464	181900
HO-1000	10.000	10	254.0	10.450		.209		.225	10.920		.187		863.0	8.48	8.93	268163	190700

*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & HOUSING.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

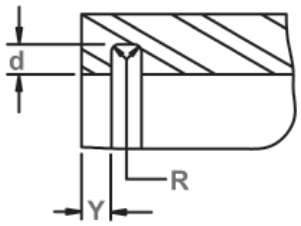
Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
HO	25&31	15N	82.5-86
	37-102	30N	63-69.5
	106+	C	44-51



Allowable Corner Radius and Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -25 thru -100; .010 for ring sizes 102 thru 1000

Alternate Lug Design
For Larger Sizes
(Manufacturer's Option)

Alternate Design
(Manufacturer's Option)

RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in Groove	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/R max or Ch max. (lbs.)	EDGE MARGIN
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G Min	R max	Ch max	P'r	Y
HO-387	.370		.319		.160		.125		.891	.123	.098	12000	.348
HO-393	.370		.324	±.008	.161	±.008	.125	+.015	.905	.124	.099	12000	.354
HO-400	.370		.330		.166		.125	-.002	.918	.128	.102	12000	.360
HO-412	.370		.330		.171		.125		.940	.130	.104	12000	.360
HO-425	.370		.335		.180		.125		.960	.138	.110	12000	.360
HO-433	.405	±.008	.343		.180		.156		1.000	.142	.114	12000	.360
HO-450	.405		.351		.181		.156		.980	.146	.117	12000	.360
HO-462	.405		.405		.183		.156		1.000	.151	.121	12000	.360
HO-475	.405		.370		.183		.156		.960	.154	.123	12000	.366
HO-475	.405		.370	±.009	.183	±.009	.156		1.030	.154	.123	12000	.366
HO-500	.435		.390		.186		.156		.970	.158	.126	12000	.390
HO-525	.435		.435		.198		.156		1.10	.168	.134	15000	.405
HO-537	.455		.408		.198		.156		1.12	.168	.134	15000	.405
HO-550	.435		.435		.198		.156		1.09	.168	.134	15000	.405
HO-575	.435		.435		.198		.156		1.11	.168	.134	15000	.405
HO-600	.435		.435		.198		.156		1.13	.168	.134	15000	.405
HO-625	.485		.485		.211		.187		1.16	.177	.142	23000	.420
HO-650	.485		.438		.219		.187		1.25	.181	.145	23000	.435
HO-662	.485		.485		.221		.187	+.020	1.28	.183	.146	23000	.450
HO-675	.530		.456		.224		.187	-.005	1.21	.188	.150	23000	.456
HO-700	.515		.515		.232		.187		1.26	.196	.157	23000	.471
HO-725	.545	±.010	.545		.238		.187		1.32	.202	.162	34000	.486
HO-750	.560		.507		.247		.187		1.39	.208	.166	34000	.510
HO-775	.560		.523		.255		.187		1.44	.214	.171	34000	.525
HO-800	.560		.560		.262		.187		1.50	.220	.176	34000	.540
HO-825	.600		.558	±.010	.270	±.010	.187		1.53	.229	.183	34000	.555
HO-850	.660		.573		.277		.187		1.71	.235	.188	34000	.570
HO-875	.660		.660		.286		.187		1.77	.241	.193	34000	.591
HO-900	.660		.609		.294		.187		1.83	.249	.199	34000	.606
HO-925	.660		.625		.299		.187		1.87	.253	.202	34000	.627
HO-950	.735		.642		.304		.187		1.91	.258	.206	34000	.645
HO-975	.735		.658		.309		.187		2.00	.263	.210	34000	.660
HO-1000	.735		.675		.315		.187		2.01	.270	.216	34000	.675

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
HO	25&31	15N	86-88
	37-51	30N	69.5-73
	56-77	30N	67.5-72
	81-102	30N	66-71
	106-347	C	47-52
	350-700	C	44-51
	725-1000	C	40-47

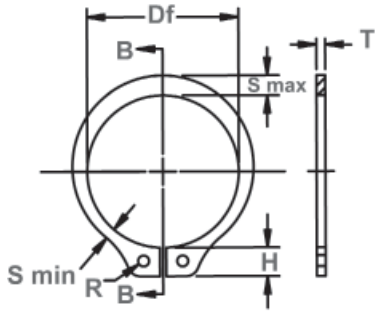
HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
HO	25&31	15N	77-82
	37-102	30N	54-62
	106+	C	34-43

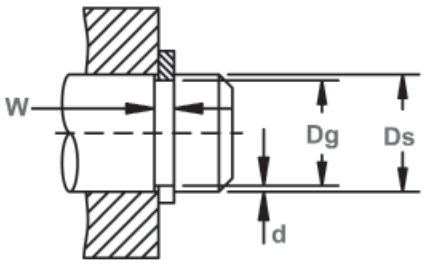
SH Shaft Rings

Axially Assembled, External

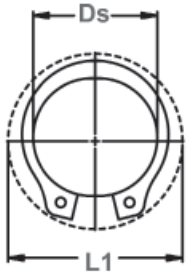
Once installed in the groove of a shaft, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



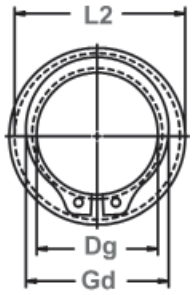
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



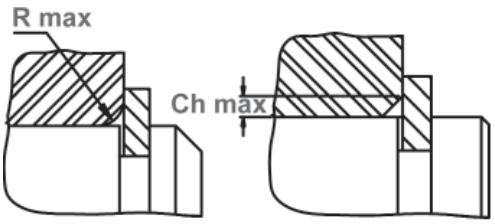
Clearance Diameter Expanded Over Shaft



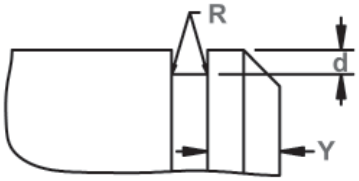
Clearance Diameter & Gaging Diameter Released in Groove.

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD.(lbs.) Sqr. Corner Abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight Per 1000 pcs.	Ex-panded over Shaft	Re-leased in Groove	Ring Safety Factor of 4	Groove Safety Factor of 2
	Ds DEC	Ds FRAC	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L1	L2	Pr	Pg
**SH-12	.125	1/8	3.2	.117		.012		.004	.112		.010	±.001	.018	.222	.214	112	35
**SH-15	.156	5/32	4.0	.146		.012		.005	.142		.010		.037	.27	.260	132	55
**SH-18	.188	3/16	4.8	.175	±.0015	.018	+.002	.006	.168	+.002	.015		.059	.298	.286	244	80
**SH-19	.197	-	5.0	.185	.0015*	.018	-.000	.006	.179	-.004	.015		.063	.319	.307	254	85
**SH-21	.219	7/32	5.6	.205		.018		.007	.196		.015		.074	.338	.324	284	110
**SH-23	.236	15/64	6.0	.222		.018		.007	.215		.015		.086	.355	.341	315	120
SH-25	.250	1/4	6.4	.230		.029		.010	.225		.025		.21	.45	.43	599	175
SH-27	.276	-	7.0	.255		.029		.010	.250		.025		.23	.48	.46	660	195
SH-28	.281	9/32	7.1	.261		.029		.010	.256		.025		.24	.49	.47	670	200
SH-31	.312	5/16	7.9	.290		.029		.011	.281		.025		.27	.54	.52	751	240
SH-34	.344	11/32	8.7	.321	±.002	.029		.011	.309		.025		.31	.57	.55	812	265
SH-35	.354	-	9.0	.330	.002*	.029		.012	.320	+.002	.025		.35	.59	.57	832	300
SH-37	.375	3/8	9.5	.352		.029		.012	.338	-.005	.025		.39	.61	.59	883	320
SH-39	.394	-	10.0	.369		.029		.012	.354		.025		.42	.62	.60	954	335
SH-40	.406	13/32	10.3	.382		.029		.012	.366		.025		.43	.63	.61	964	350
SH-43	.438	7/16	11.1	.412		.029		.013	.395		.025		.50	.66	.64	1035	400
SH-46SP1	.461	-	11.7	.435		.029		.013	.420		.025		.51	.68	.66	1110	460
SH-46	.469	15/32	11.9	.443		.029		.013	.428		.025	±.002	.54	.68	.66	1117	450
SH-50	.500	1/2	12.7	.468	±.002	.039	+.003	.016	.461		.035		.91	.77	.74	1675	550
SH-55	.551	-	14.0	.519	.004*	.039	-.000	.016	.509		.035		.90	.81	.78	1800	600
SH-56	.562	9/16	14.3	.530		.039		.016	.521		.035		1.1	.82	.79	1878	650
SH-59	.594	19/32	15.1	.559		.039		.017	.550		.035		1.2	.86	.83	1979	750
SH-62	.625	5/8	15.9	.588		.039		.018	.579		.035		1.3	.90	.87	2091	800
SH-66	.669	-	17.0	.629		.039		.020	.621	+.005	.035		1.4	.93	.89	2233	950
SH-66	.672	43/64	17.1	.631		.039		.020	.621	-.010	.035		1.4	.93	.89	2233	950
SH-68	.688	11/16	17.5	.646		.046		.021	.635		.042		1.8	1.01	.97	3451	1000
SH-75	.750	3/4	19.0	.704	±.003	.046		.023	.693		.042		2.1	1.09	1.05	3756	1200
SH-78	.781	25/32	19.8	.733	.004*	.046		.024	.722		.042		2.2	1.12	1.08	3959	1300
SH-81	.812	13/16	20.6	.762		.046		.025	.751		.042		2.5	1.15	1.10	4060	1450
SH-84	.844	-	21.4	.791		.046		.026	.780		.042		2.7	1.18	1.13	4200	1500
SH-87	.875	7/8	22.2	.821		.046		.027	.810		.042		2.8	1.21	1.16	4365	1650
SH-93	.938	15/16	23.8	.882		.046		.028	.867		.042		3.1	1.34	1.29	4720	1850
SH-98	.984	63/64	25.0	.926		.046		.029	.910		.042		3.5	1.39	1.34	4923	2000
SH-100	1.000	1	25.4	.940		.046		.030	.925		.042		3.6	1.41	1.35	5024	2100
SH-102	1.023	-	26.0	.961		.046		.031	.946		.042		3.9	1.43	1.37	5126	2250
SH-106	1.062	1-1/16	27.0	.998	±.004	.056	+.004	.032	.982	+.010	.050		4.8	1.50	1.44	6293	2400
SH-112	1.125	1-1/8	28.6	1.059	.005*	.056	-.000	.033	1.041	-.015	.050		5.1	1.55	1.49	6699	2600

**SIZES -12 THRU -23 STANDARD MATERIAL- CARBON STEEL; OPTIONAL MATERIAL- BERYLLIUM COPPER.
* F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & SHAFT.
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
***FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), sharp corners for ring sizes -12 thru -23; .003 for ring sizes -25 thru -35; .005 for sizes -37 thru -100; .010 for ring sizes -102 thru -1000

Lug Design For Sizes SH-12 thru SH-23

Alternate Design Manufacturer's Option

RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAGING DIA.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (lbs.)	EDGE MARGIN	R.P.M. LIMITS Standard Material
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	Gd Max	R max	Ch max	P'r	Y	RPM
**SH-12	.046		.018	±.0015	.011	±.0015	.026		.148	.010	.006	45	.012	80000
**SH-15	.054		.026		.016		.026		.189	.015	.009	45	.015	80000
**SH-18	.050	±.002	.025		.016		.025		.218	.014	.0085	105	.018	80000
**SH-19	.056		.026	±.002	.016	±.002	.026		.229	.0145	.009	105	.018	80000
**SH-21	.056		.028		.017		.026		.252	.015	.009	105	.021	80000
**SH-23	.056		.030		.019		.026		.272	.0165	.010	105	.021	80000
SH-25	.080		.035		.025		.041		.290	.018	.011	470	.030	80000
SH-27	.081		.035		.024		.041		.315	.0175	.0105	470	.031	76000
SH-28	.080		.038		.025		.041		.326	.020	.012	470	.030	74000
SH-31	.087		.040		.026		.041		.357	.020	.012	470	.033	70000
SH-34	.087		.042		.0265		.041		.390	.021	.0125	470	.033	64000
SH-35	.087		.046	±.003	.029	±.003	.041		.405	.023	.014	470	.036	62000
SH-37	.088		.050		.0305		.041	+.010	.433	.026	.0155	470	.036	60000
SH-39	.087	±.003	.052		.031		.041	-.002	.452	.027	.016	470	.037	56500
SH-40	.087		.054		.033		.041		.468	.0285	.017	470	.036	55000
SH-43	.088		.055		.033		.041		.501	.029	.0175	470	.039	50000
SH-46SP1	.092		.064		.038		.041		.540	.015	.017	470	.039	42000
SH-46	.088		.060		.035		.041		.540	.031	.018	470	.039	42000
SH-50	.108		.065		.040		.047		.574	.034	.020	910	.048	40000
SH-55	.108		.053		.036		.047		.611	.027	.0165	910	.048	36000
SH-56	.108		.072		.041		.047		.644	.038	.023	910	.048	35000
SH-59	.109		.076	±.004	.043	±.004	.047		.680	.0395	.0235	910	.052	32000
SH-62	.110		.080		.045		.047		.715	.0415	.025	910	.055	30000
SH-66	.110		.082		.043		.047		.756	.040	.024	910	.060	29000
SH-66	.110		.082		.043		.047		.758	.040	.024	910	.060	29000
SH-68	.136		.084		.048		.052		.779	.042	.025	1340	.063	28000
SH-75	.136		.092		.051		.052		.850	.046	.0275	1340	.069	26500
SH-78	.136		.094		.052		.052		.883	.047	.028	1340	.072	25500
SH-81	.136		.096		.054		.052		.914	.047	.028	1340	.075	24500
SH-84	.137		.100		.057		.052		.950	.047	.028	1340	.078	24000
SH-87	.137	±.004	.104	±.005	.057	±.005	.052		.987	.051	.0305	1340	.081	23000
SH-93	.166		.110		.063		.078		1.054	.055	.033	1340	.084	21500
SH-98	.167		.114		.064		.078		1.106	.056	.0335	1340	.087	20500
SH-100	.167		.116		.065		.078	+.015	1.122	.057	.034	1340	.090	20000
SH-102	.168		.118		.066		.078	-.002	1.147	.058	.035	1340	.093	19500
SH-106	.181		.122	±.006	.069	±.006	.078		1.192	.060	.036	1950	.096	19000
SH-112	.182		.128		.071		.078		1.261	.063	.038	1950	.099	18800

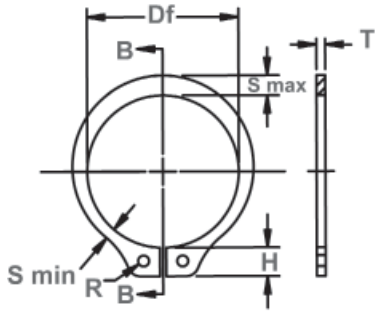
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.

Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

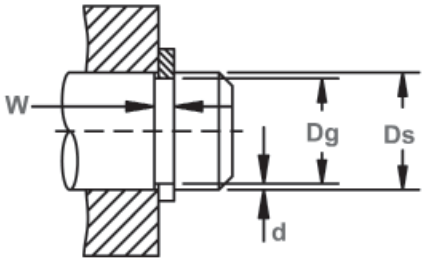
SH Shaft Rings

Axially Assembled, External

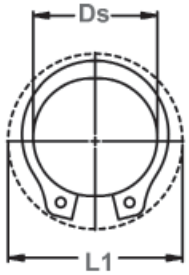
Once installed in the groove of a shaft, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



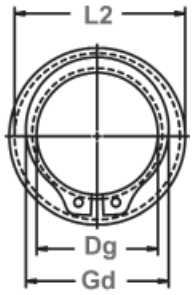
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



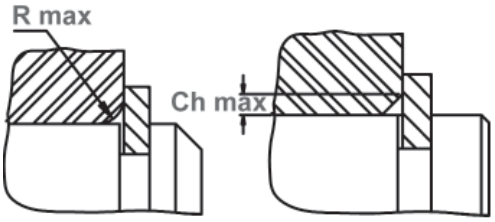
Clearance Diameter Expanded Over Shaft



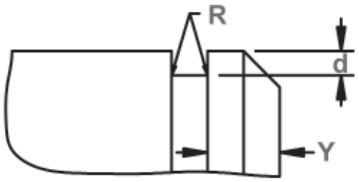
Clearance Diameter & Gaging Diameter Released in Groove.

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD.(lbs.) Sqr. Corner Abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight Per 1000 pcs.	Ex-panded over Shaft	Re-leased in Groove	Ring Safety Factor of 4	Groove Safety Factor of 2
	Ds DEC	Ds FRAC	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L1	L2	Pr	Pg
SH-118	1.188	1-3/16	30.2	1.118		.056		.035	1.098		.050		5.6	1.61	1.54	7105	2950
SH-125	1.250	1-1/4	31.7	1.176		.056		.037	1.156		.050		5.9	1.69	1.62	7460	3250
SH-131	1.312	1-5/16	33.3	1.232	±.004	.056		.040	1.214	+.010	.050	±.002	6.8	1.75	1.67	7866	3700
SH-137	1.375	1-3/8	34.9	1.291	.005*	.056		.042	1.272	-.015	.050		7.2	1.80	1.72	8222	4100
SH-143	1.438	1-7/16	36.5	1.350		.056		.044	1.333		.050		8.1	1.87	1.79	8628	4500
SH-150	1.500	1-1/2	38.1	1.406		.056		.047	1.387		.050		9.0	1.99	1.90	8932	5000
SH-156	1.562	1-9/16	39.7	1.468		.068		.047	1.446		.062		12.4	2.10	2.01	11571	5200
SH-162	1.625	1-5/8	41.3	1.529		.068	+.004	.048	1.503		.062		13.2	2.17	2.08	12028	5500
SH-168	1.688	1-11/16	42.9	1.589		.068	-.000	.049	1.560		.062		14.8	2.24	2.15	12535	5850
SH-175	1.750	1-3/4	44.4	1.650	±.005	.068		.050	1.618	+.013	.062		15.3	2.31	2.21	12992	6200
SH-177	1.772	-	45.0	1.669	.005*	.068		.051	1.637	-.020	.062		15.4	2.33	2.23	13144	6400
SH-181	1.812	1-13/16	46.0	1.708		.068		.052	1.675		.062		15.6	2.38	2.28	13449	6650
SH-187	1.875	1-7/8	47.6	1.769		.068		.053	1.735		.062		17.3	2.44	2.34	13906	7000
SH-196	1.969	1-31/32	50.0	1.857		.068		.056	1.819		.062		18.0	2.57	2.46	14565	7800
SH-200	2.000	2	50.8	1.886		.068		.057	1.850		.062		19.0	2.60	2.49	14819	8050
SH-206	2.062	2-1/16	52.4	1.946		.086		.058	1.906		.078		25.0	2.68	2.57	19234	8450
SH-212	2.125	2-1/8	54.0	2.003		.086		.061	1.964		.078		26.1	2.78	2.66	19793	9150
SH-215	2.156	2-5/32	54.8	2.032		.086		.062	1.993		.078		26.3	2.81	2.69	20097	9450
SH-225	2.250	2-1/4	57.1	2.120		.086		.065	2.081	+.015	.078	±.003	27.7	2.88	2.76	21011	10350
SH-231	2.312	2-5/16	58.7	2.178		.086		.067	2.139	-.025	.078		28.0	2.94	2.81	21518	10950
SH-237	2.375	2-3/8	60.3	2.239		.086		.068	2.197		.078		29.2	3.06	2.93	22127	11400
SH-243	2.438	2-7/16	61.9	2.299		.086		.069	2.255		.078		29.5	3.07	2.94	22736	11900
SH-250	2.500	2-1/2	63.5	2.360		.086		.070	2.313		.078		29.7	3.17	3.03	23345	12350
SH-255	2.559	-	65.0	2.419		.086		.070	2.377		.078		33.9	3.18	3.04	23853	12650
SH-262	2.625	2-5/8	66.7	2.481	±.006	.086	+.005	.072	2.428		.078		35.0	3.30	3.16	24462	13350
SH-268	2.688	2-11/16	68.3	2.541	.006*	.086	-.000	.073	2.485		.078		36.0	3.37	3.23	25071	13850
SH-275	2.750	2-3/4	69.8	2.602		.103		.074	2.543		.093		42.5	3.48	3.34	30551	14400
SH-287	2.875	2-7/8	73.0	2.721		.103		.077	2.659		.093		48.5	3.60	3.45	31973	15650
SH-293	2.938	2-15/16	74.6	2.779		.103		.079	2.717	+.020	.093		50.0	3.66	3.51	32683	16400
SH-300	3.000	3	76.2	2.838		.103		.081	2.775	-.030	.093		52.0	3.60	3.44	33394	17200
SH-306	3.062	3-1/16	77.8	2.898		.103		.082	2.832		.093		47.5	3.74	3.58	34003	17750
SH-312	3.125	3-1/8	79.4	2.957		.103		.084	2.892		.093		58.0	3.85	3.69	34815	18550
SH-315	3.156	3-5/32	80.2	2.986		.103		.085	2.920		.093		59.0	3.88	3.71	35119	18950
SH-325	3.250	3-1/4	82.5	3.076		.103		.087	3.006		.093		62.0	3.93	3.76	36134	20000
SH-334	3.346	3-11/32	85.0	3.166		.103		.090	3.092		.093		64.0	4.02	3.85	37251	21000
SH-343	3.438	3-7/16	87.3	3.257		.103		.090	3.179		.093		66.0	4.14	3.96	38266	21900
SH-350	3.500	3-1/2	88.9	3.316		.120		.092	3.237		.109		72.0	4.16	3.98	45574	22800

*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), sharp corners for ring sizes -12 thru -23; .003 for ring sizes -25 thru -35; .005 for sizes -37 thru -100; .010 for ring sizes -102 thru -1000

Lug Design For Sizes SH-12 thru SH-23

Alternate Design Manufacturer's Option

RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAGING DIA.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (lbs.)	EDGE MARGIN	R.P.M. LIMITS Standard Material
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	Gd Max.	R max	Ch max	P'r	Y	RPM
SH-118	.182		.132		.072		.078		1.325	.064	.0385	1950	.105	18000
SH-125	.183		.140		.076		.078		1.396	.068	.041	1950	.111	17000
SH-131	.183		.146		.076		.078		1.458	.068	.041	1950	.120	16500
SH-137	.184		.152		.082		.078		1.529	.072	.043	1950	.126	16000
SH-143	.184		.160		.086		.078		1.600	.076	.045	1950	.132	15000
SH-150	.214	±.004	.168	±.006	.091	±.006	.120		1.668	.079	.047	1950	.141	14800
SH-156	.235		.172		.093		.125		1.740	.082	.049	3000	.141	14000
SH-162	.235		.180		.097		.125		1.812	.087	.052	3000	.144	13200
SH-168	.235		.184		.099		.125		1.877	.090	.054	3000	.148	13000
SH-175	.237		.188		.101		.125		1.945	.091	.054	3000	.150	12200
SH-177	.237		.190		.102		.125		1.967	.092	.055	3000	.154	11700
SH-181	.262		.192		.102		.125		2.010	.092	.055	3000	.156	11500
SH-187	.262		.196		.104		.125		2.076	.094	.056	3000	.159	11000
SH-196	.262		.200		.106		.125		2.170	.094	.056	3000	.168	10500
SH-200	.262		.204		.108		.125		2.205	.096	.057	3000	.171	10000
SH-206	.267		.208		.111		.125		2.275	.098	.059	5000	.174	9600
SH-212	.280		.212		.113		.125	+.015 -.002	2.337	.098	.059	5000	.183	9500
SH-215	.280		.212		.113		.125		2.366	.097	.058	5000	.186	9400
SH-225	.280		.220		.116		.125		2.466	.100	.060	5000	.195	9200
SH-231	.280		.222		.118		.125		2.528	.100	.060	5000	.201	9000
SH-237	.292		.224		.119		.125		2.591	.100	.060	5000	.204	8800
SH-243	.268	±.005	.228	±.007	.120	±.007	.125		2.657	.102	.061	5000	.207	8600
SH-250	.292		.232		.122		.125		2.724	.104	.062	5000	.210	8400
SH-255	.292		.238		.125		.125		2.792	.108	.065	5000	.210	8200
SH-262	.292		.242		.127		.125		2.860	.1095	.066	5000	.216	8000
SH-268	.292		.292		.129		.125		2.926	.1115	.067	5000	.219	7900
SH-275	.324		.248		.131		.125		2.992	.112	.067	7350	.222	7600
SH-287	.324		.256		.133		.125		3.122	.115	.069	7350	.231	7300
SH-293	.324		.260		.136		.125		3.187	.116	.070	7350	.237	7200
SH-300	.264		.264		.138		.125		3.252	.117	.070	7350	.243	6700
SH-306	.300		.300		.131		.125		3.294	.107	.064	7350	.246	6600
SH-312	.324		.272		.141		.125		3.383	.120	.072	7350	.252	6600
SH-315	.324		.274		.143		.125		3.415	.1205	.072	7350	.255	6500
SH-325	.300		.300	±.008	.145	±.008	.125		3.515	.123	.074	7350	.261	6400
SH-334	.300		.300		.147		.125		3.613	.126	.076	7350	.270	6000
SH-343	.300		.300		.148		.125		3.712	.129	.077	7350	.270	5900
SH-350	.285		.285		.148		.125		3.764	.122	.073	10500	.276	5900

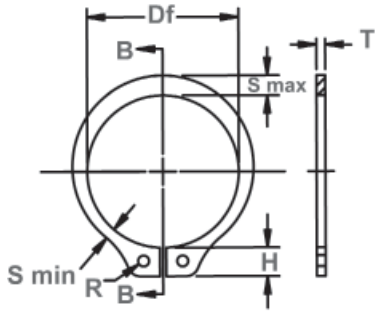
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.

Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

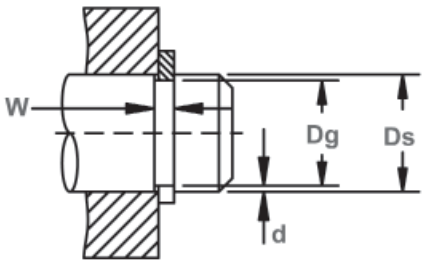
SH Shaft Rings

Axially Assembled, External

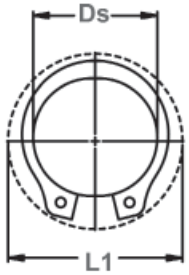
Once installed in the groove of a shaft, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



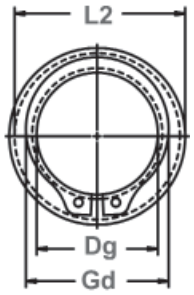
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



Clearance Diameter Expanded Over Shaft



Clearance Diameter & Gaging Diameter Released in Groove.

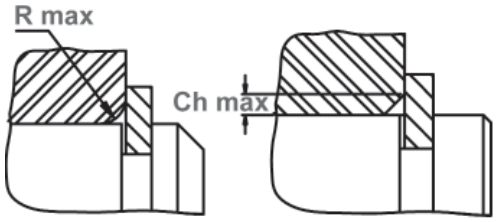
RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD.(lbs.) Sqr. Corner Abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight Per 1000 pcs.	Ex-panded over Shaft	Re-leased in Groove	Ring Safety Factor of 4	Groove Safety Factor of 2
	Ds DEC	Ds FRAC	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L1	L2	Pr	Pg
SH-354	3.543	-	90.0	3.357		.120		.093	3.277		.109		73.0	4.25	4.07	46183	23300
SH-362	3.625	3-5/8	92.1	3.435		.120		.095	3.352		.109		76.0	4.36	4.17	47299	24300
SH-368	3.688	3-11/16	93.7	3.493		.120		.097	3.410		.109		80.0	4.33	4.31	48010	25300
SH-375	3.750	3-3/4	95.2	3.552	±.006	.120	+.005	.099	3.468	+.020	.109	±.003	83.0	4.52	4.33	48822	26200
SH-387	3.875	3-7/8	98.40	3.673	.006*	.120	-.000	.101	3.584	-.030	.109		88.0	4.64	4.44	50446	27700
SH-393	3.938	3-15/16	100.0	3.734		.120		.102	3.642		.109		95.0	4.70	4.50	51359	28400
SH-400	4.000	4	101.6	3.792		.120		.104	3.700		.109		101.0	4.76	4.56	52171	29400
SH-412	4.125	4-1/8	104.8	3.915		.120		.105	3.800		.109		101.2	5.00	4.78	53200	29800
SH-425	4.250	4-1/4	108.0	4.065		.120		.092	3.989		.109		112.0	4.98	4.80	55419	27600
SH-437	4.375	4-3/8	111.1	4.190		.120		.092	4.106		.109		115.0	5.22	5.04	57043	28400
SH-450	4.500	4-1/2	114.3	4.310		.120		.095	4.223		.109		132.0	5.37	5.18	58667	30200
SH-475	4.750	4-3/4	120.6	4.550		.120		.100	4.458		.109		113.0	5.74	5.52	61915	33600
SH-500	5.000	5	127.0	4.790		.120		.105	4.692		.109		149.0	5.85	5.64	65163	37100
SH-525	5.250	5-1/4	133.3	5.030		.139		.110	4.927		.125		190.0	6.17	5.95	78460	40800
SH-550	5.500	5-1/2	139.7	5.265	±.007	.139	+.006	.117	5.162	+.020	.125	±.004	202.5	6.63	6.39	82215	45500
SH-575	5.750	5-3/4	146.0	5.505	.006*	.139	-.000	.122	5.396	-.040	.125		220.0	6.93	6.69	85971	49600
SH-600	6.000	6	152.4	5.745		.139		.127	5.631		.125		210.0	7.21	6.95	89625	53800
SH-625	6.250	6-1/4	158.7	5.985		.174		.132	5.866		.156		282.0	7.48	7.22	116522	58300
SH-650	6.500	6-1/2	165.1	6.225		.174		.137	6.100	+.020	.156		330.0	7.80	7.45	121191	62900
SH-675	6.750	6-3/4	171.4	6.465		.174		.142	6.335	-.050	.156		356.0	8.10	7.82	125860	67700
SH-700	7.000	7	177.8	6.705		.174		.147	6.570		.156		371.0	8.23	7.94	130529	72700
SH-725	7.250	7-1/4	184.2	6.942		.209		.154	6.775		.187		510.0	8.70	8.40	162096	78900
SH-750	7.500	7-1/2	190.5	7.180		.209		.160	7.009		.187		534.0	8.98	8.66	167678	84800
SH-775	7.750	7-3/4	196.9	7.420	±.008	.209	+.008	.165	7.243	+.050	.187	±.005	545.0	9.21	8.88	173261	90450
SH-800	8.000	8	203.2	7.660	.006*	.209	-.000	.170	7.478	-.130	.187		640.0	9.61	9.26	178843	96100
SH-825	8.250	8-1/4	209.6	7.900		.209		.175	7.712		.187		665.0	9.87	9.52	184426	102100
SH-850	8.500	8-1/2	215.9	8.140		.209		.180	7.947		.187		692.0	10.12	9.76	190008	108100
SH-875	8.750	8-3/4	222.3	8.380		.209		.185	8.181		.187		712.0	10.40	10.00	195591	114450
SH-900	9.000	9	228.6	8.620		.209		.190	8.415		.187		737.0	10.60	10.22	201173	120800
SH-925	9.250	9-1/4	234.9	8.860		.209		.195	8.650		.187		760.0	10.85	10.50	206756	128225
SH-950	9.500	9-1/2	241.3	9.100		.209		.200	8.885		.187		785.0	11.10	10.70	212338	134200
SH-975	9.750	9-3/4	247.6	9.338		.209		.206	9.120		.187		845.0	11.35	10.95	217921	142000
SH-1000	10.000	10	254.0	9.575		.209		.212	9.355		.187		910.0	11.60	11.20	223503	149800

*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

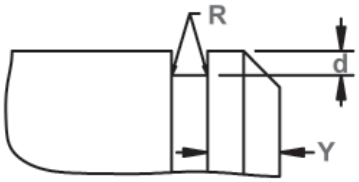
Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SH	25-81	30N	63-69.5
	87+	C	44-51



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), sharp corners for ring sizes -12 thru -23; .003 for ring sizes -25 thru -35; .005 for sizes -37 thru -100; .010 for ring sizes -102 thru -1000

Lug Design For Sizes SH-12 thru SH-23

Alternate Design Manufacturer's Option

RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAGING DIA.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (lbs.)	EDGE MAR-GIN	R.P.M. LIMITS Stan-dard Material
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	Gd Max.	R max	Ch max	P'r	Y	RPM
SH-354	.310		.310		.149		.125		3.809	.123	.074	10500	.279	5800
SH-362	.310		.310		.153		.125		3.898	.127	.076	10500	.285	5700
SH-368	.310		.310		.156		.125	+.015	3.966	.130	.078	10500	.291	5600
SH-375	.342	±.005	.342	±.008	.160	±.008	.125	-.002	4.037	.133	.080	10500	.297	5500
SH-387	.310		.310		.163		.125		4.169	.137	.082	10500	.303	5100
SH-393	.310		.310		.163		.125		4.230	.137	.082	10500	.306	5200
SH-400	.342		.342		.163		.125		4.288	.135	.081	10500	.312	5000
SH-412	.380		.318		.165		.125		4.410	.135	.081	10500	.315	4900
SH-425	.342		.342		.176		.125		4.558	.146	.088	10500	.276	4800
SH-437	.342		.342		.176		.125		4.683	.146	.088	10500	.276	4700
SH-450	.405		.405		.185		.125		4.860	.102	.061	10500	.285	4500
SH-475	.405		.405		.136		.125		4.996	.115	.069	10500	.300	4200
SH-500	.405	±.008	.405	±.010	.194	±.010	.156		5.346	.165	.099	10500	.315	4000
SH-525	.435		.435		.211		.156		5.605	.169	.101	13500	.330	3900
SH-550	.497		.435		.209		.156		5.867	.175	.105	13500	.351	3700
SH-575	.518		.435		.220		.156		6.134	.184	.110	13500	.366	3500
SH-600	.540		.435		.211		.156		6.302	.143	.086	13500	.381	3400
SH-625	.561		.485		.176		.156		6.568	.148	.089	21000	.396	3100
SH-650	.586		.485		.236		.156		6.905	.191	.114	21000	.411	3000
SH-675	.608		.515		.246		.187	+.020	7.172	.200	.120	21000	.426	3000
SH-700	.530		.515		.256		.187	-.005	7.439	.208	.125	21000	.441	2900
SH-725	.660		.545		.267		.187		7.700	.214	.128	30000	.460	2800
SH-750	.676		.545		.277		.187		7.963	.220	.132	30000	.480	2700
SH-775	.660	±.012	.560	±.015	.285	±.015	.187		8.228	.227	.136	30000	.495	2600
SH-800	.735		.560		.294		.187		8.493	.235	.141	30000	.510	2500
SH-825	.735		.580		.304		.187		8.758	.242	.146	30000	.525	2400
SH-850	.735		.580		.314		.187		9.023	.250	.150	30000	.540	2300
SH-875	.735		.591		.322		.187		9.280	.258	.155	30000	.555	2200
SH-900	.735		.609		.333		.187		9.557	.267	.160	30000	.570	2200
SH-925	.735		.625		.341		.187		9.830	.274	.164	30000	.585	2100
SH-950	.735		.642		.350		.187		10.086	.281	.168	30000	.600	2100
SH-975	.735		.658		.358		.187		10.340	.287	.172	30000	.618	2000
SH-1000	.735		.675		.367		.187		10.610	.294	.176	30000	.636	2000

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SH	12-23	15N	84-86
	25-46	30N	69.5-73
	50-81	30N	66-71
	84-102	C	47-53
	106-343	C	47-52
	350-700	C	44-51
	725-1000	C	40-47

HARDNESS RANGES: BERYLLIUM COPPER RINGS

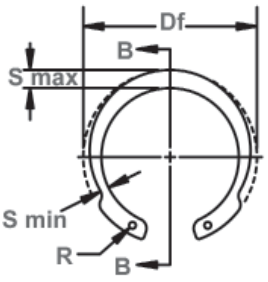
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SH	12-23	15N	77-82*
	25-102	30N	56.5-62
	106+	C	37-43

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

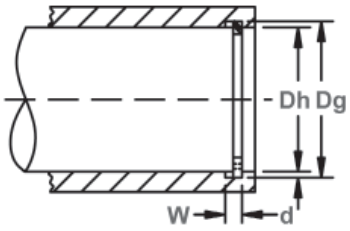
HOI Housing Rings

Axially Assembled, Internal Inverted

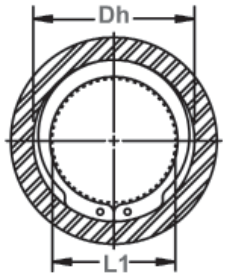
Functions like an HO ring in a housing/bore, only the lugs are "reversed." This version reduces the distance the lugs of the standard HO extend into the inner circumference of the housing/bore and allows for another assembly to pass through unimpeded.



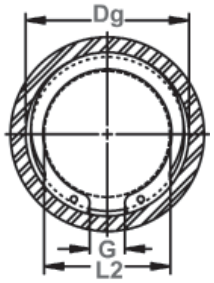
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



Clearance Diameter Compressed in Housing



Clearance Diameter & Gap Width Released in Groove

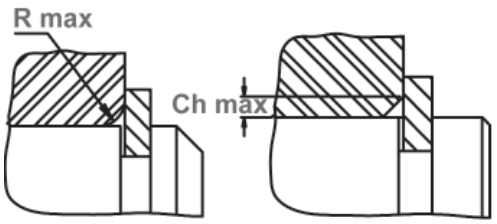
RING NO.	HOUSING DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD. (lbs.) Sqr. Corner Abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wght. Per 1000 Pcs.	Com-pressed in housing	Released in groove	Ring Safety Factor of 4	Groove Safety Factor of 2
	Dh DEC	Dh FRACT	Dh mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L1	L2	Pr	Pg
HOI-62	.625	5/8	15.9	.665	±.002	.029		.020	.675		.025		0.7	.47	.51	1015	450
HOI-75	.750	3/4	19.0	.796	.004*	.039		.023	.808		.035		1.3	.56	.605	1675	600
HOI-81	.812	13/16	20.6	.862		.046	+.003	.025	.877	+.010	.042		2.0	.62	.665	2639	700
HOI-87	.875	7/8	22.2	.931	±.003	.046	-.000	.028	.944	-.005	.042		2.2	.65	.705	2893	850
HOI-93	.938	15/16	23.8	1.000	.004*	.046		.031	1.015		.042		2.8	.70	.755	3147	1000
HOI-100	1.000	1	25.4	1.066		.046		.033	1.081		.042		2.9	.75	.81	3350	1150
HOI-106	1.062	1-1/16	27.0	1.130		.056		.034	1.150		.050		3.8	.80	.87	4212	1250
HOI-112	1.125	1-1/8	28.6	1.197		.056		.036	1.217		.050		4.4	.86	.93	4466	1400
HOI-118	1.188	1-3/16	30.2	1.262		.056		.037	1.283	+.015	.050	±.002	4.9	.91	.98	4720	1600
HOI-125	1.250	1-1/4	31.7	1.330	±.004	.056		.040	1.351	-.010	.050		5.0	.97	1.05	4974	1750
HOI-131	1.312	1-5/16	33.3	1.396	.005*	.056		.042	1.418		.050		5.3	1.02	1.10	5227	1950
HOI-137	1.375	1-3/8	34.9	1.461		.056	+.004	.043	1.486		.050		5.9	1.08	1.16	5481	2100
HOI-143	1.438	1-7/16	36.5	1.528		.056	-.000	.045	1.552		.050		6.3	1.13	1.22	5735	2300
HOI-150	1.500	1-1/2	38.1	1.594		.056		.047	1.622		.050		6.8	1.18	1.27	5938	2500
HOI-156	1.562	1-9/16	39.7	1.658		.068		.048	1.688		.062		8.9	1.21	1.30	7714	2650
HOI-162	1.625	1-5/8	41.3	1.725		.068		.050	1.756		.062		10.4	1.27	1.37	8019	2850
HOI-168	1.688	1-11/16	42.9	1.792	±.005	.068		.052	1.823	+.020	.062		11.9	1.32	1.42	8374	3100
HOI-175	1.750	1-3/4	44.4	1.858	.005*	.068		.054	1.891	-.013	.062		11.8	1.38	1.49	8678	3300
HOI-187	1.875	1-7/8	47.6	1.989		.068		.057	2.025		.062		14.8	1.47	1.58	9287	3750
HOI-200	2.000	2	50.8	2.122		.068		.061	2.160		.062		17.4	1.55	1.67	9896	4300
HOI-206	2.062	2-1/16	52.4	2.186		.086		.062	2.224		.078		23.2	1.59	1.71	12840	4500
HOI-212	2.125	2-1/8	54.0	2.251	±.006	.086	+.005	.063	2.295		.078		24.3	1.65	1.77	13246	4700
HOI-237	2.375	2-3/8	60.3	2.517	.006*	.086	-.000	.071	2.567	+.025	.078	±.003	28.6	1.86	2.00	14718	5900
HOI-243	2.438	2-7/16	61.9	2.584		.086		.072	2.634	-.015	.078		30.6	1.91	2.05	15124	6200
HOI-250	2.500	2-1/2	63.5	2.648		.086		.074	2.700		.078		32.1	1.96	2.10	15530	6500
HOI-262	2.625	2-5/8	66.7	2.781		.103		.078	2.840		.093		45.6	2.06	2.21	19488	7200
HOI-275	2.750	2-3/4	69.8	2.914		.103		.082	2.975		.093		47.8	2.16	2.32	20300	7900
HOI-283	2.812	2-13/16	71.4	2.980		.103		.084	3.063		.093		49.5	2.21	2.37	20808	8300
HOI-283	2.835	-	72.0	3.006		.103		.086	3.063		.093		49.5	2.23	2.39	20808	8550
HOI-287	2.875	2-7/8	73.0	3.051		.103		.088	3.105	+.030	.093		50.1	2.26	2.43	21315	8900
HOI-300	3.000	3	76.2	3.182		.103		.091	3.245	-.020	.093		52.6	2.36	2.53	22229	9600
HOI-315	3.156	3-5/32	80.2	3.348		.120		.096	3.408		.109		69.4	2.50	2.69	27405	10600
HOI-325	3.250	3-1/4	82.5	3.446		.120		.098	3.509		.109		72.6	2.58	2.77	28217	11200
HOI-334	3.346	3-11/32	85.0	3.546		.120		.100	3.611		.109		75.6	2.67	2.87	29029	11700
HOI-350	3.500	3-1/2	88.9	3.710		.120		.105	3.780		.109		80.2	2.82	3.03	30349	12900
HOI-356	3.562	3-9/16	90.5	3.776		.120		.107	3.850		.109		82.4	2.88	3.09	30958	13400
HOI-400	4.000	4	101.6	4.240		.120		.120	4.350		.109		97.4	3.29	3.53	34713	16900

***F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND HOUSING.**
î BASED ON HOUSING/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
***** FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

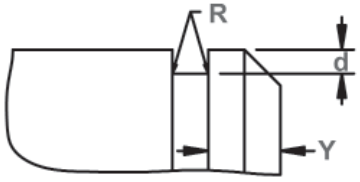
Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

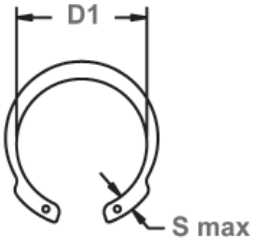
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
HOI	62-100	30N	63-69.5
	106+	C	44-51



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y) Maximum bottom radii (R), .005 for ring sizes -62 thru -100; .010 for ring sizes -106 thru -400



Measuring Free Diameter (Df) HOI Series
Df = D1 + 2(S max)

Alternate Design Manufacturer's Option

RING NO.	MAXIMUM SECTION Including lug		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in groove	Allowable Corner Radii & Chamfers		MAX LOAD W/R Max or Ch Max	EDGE MARGIN
	S max	Tol.	S min.	Tol.	R	Tol.	G Min	R max	Ch max	P'r	Y
HOI-62	.072	±.004	.036	±.004	.030		.15	.042	.028	400	.060
HOI-75	.085		.042		.042		.175	.050	.031	850	.069
HOI-81	.092		.044		.042		.175	.054	.034	1250	.075
HOI-87	.099		.047		.042		.20	.057	.036	1250	.084
HOI-93	.106	±.005	.051	±.005	.042	+.010	.21	.060	.038	1250	.093
HOI-100	.113		.054		.042	-.002	.225	.064	.040	1250	.099
HOI-106	.120		.057		.050		.24	.069	.043	1800	.102
HOI-112	.123		.059		.050		.24	.070	.044	1800	.108
HOI-118	.126		.060		.050		.27	.071	.045	1800	.111
HOI-125	.129	±.006	.061	±.006	.050		.29	.071	.045	1800	.120
HOI-131	.132		.063		.050		.29	.072	.045	1800	.126
HOI-137	.135		.065		.050		.33	.074	.046	1800	.129
HOI-143	.144		.069		.076		.35	.079	.050	1800	.135
HOI-150	.148		.070		.076		.33	.081	.051	1800	.141
HOI-156	.158		.074		.076		.36	.088	.055	2900	.144
HOI-162	.162		.077		.076		.385	.090	.056	2900	.150
HOI-168	.166	±.007	.079	±.007	.076	+.015	.405	.091	.057	2900	.156
HOI-175	.170		.082		.076	-.002	.42	.093	.058	2900	.162
HOI-187	.188		.090		.076		.44	.105	.066	2900	.171
HOI-200	.208		.100		.076		.48	.118	.074	2900	.183
HOI-206	.218		.106		.094		.485	.125	.078	4600	.186
HOI-212	.223		.108		.094		.49	.128	.080	4600	.189
HOI-237	.243		.115		.094		.55	.138	.086	4600	.213
HOI-243	.248		.117		.094		.57	.141	.088	4600	.216
HOI-250	.254		.120		.094		.59	.144	.090	4600	.222
HOI-262	.266		.128		.109		.60	.150	.094	6700	.234
HOI-275	.278		.134		.109		.63	.157	.098	6700	.246
HOI-283	.286		.139		.109		.61	.162	.102	6700	.252
HOI-283	.286		.139		.109		.67	.162	.102	6700	.258
HOI-287	.290		.139		.109		-	.162	.101	6700	.264
HOI-300	.302		.143		.109		.705	.169	.106	6700	.273
HOI-315	.314		.149		.125		.76	.174	.109	9000	.288
HOI-325	.318		.151		.125		-	.176	.110	9000	.294
HOI-334	.321	±.008	.155	±.008	.125		.81	.177	.111	9000	.300
HOI-350	.324		.154		.125		.84	.175	.110	9000	.315
HOI-356	.326		.155		.125		.86	.175	.110	9000	.321
HOI-400	.338		.161		.125		.93	.174	.108	9000	.360

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
HOI	62 & 75	30N	67.5-72
	81-100	30N	66-71
	106-343	C	47-52
	350+	C	45-50

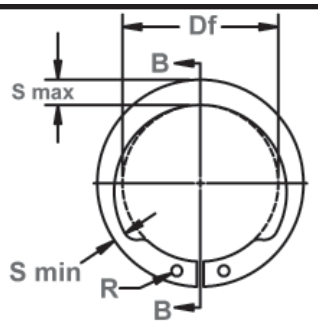
HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
HOI	62-100	30N	56.5-62
	106+	C	37-43

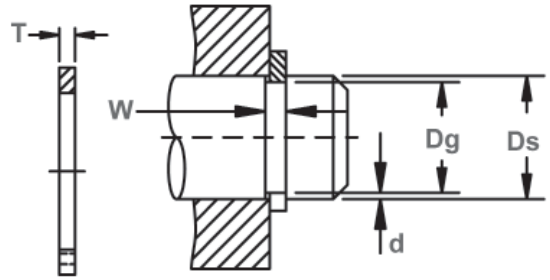
SHI Shaft Rings

Axially Assembled, External Inverted

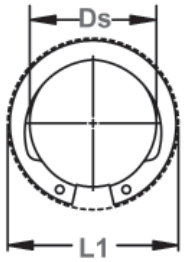
Functions like an SH ring on a shaft, only the lugs are "reversed." This version reduces the distance the lugs of the standard SH extend beyond the circumference of the shaft. The shaft can then be used in an application where clearance is minimal.



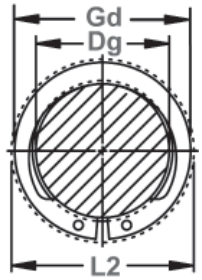
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



Clearance Diameter Expanded Over Shaft



Clearance Diameter & Gaging Diameter Released in Groove

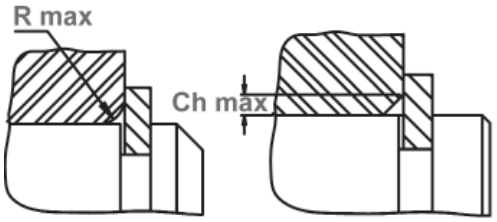
RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEAR. DIA.		î THRUST LD. (lbs.) Sqr. corner abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight Per 1000 Pcs.	Expanded over shaft	Released in groove	Ring Safety factor of 4	Groove Safety factor of 2
	Ds DEC	Ds FRACT	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L1	L2	Pr	Pg
SHI-50	.500	1/2	12.7	.468	±.002	.039		.016	.461		.035		1.0	.67	.645	1117	280
SHI-56	.562	9/16	14.3	.530	.004*	.039		.016	.521		.035		1.4	.75	.72	1269	320
SHI-59	.594	19/32	15.1	.559		.039		.017	.550		.035		1.6	.79	.76	1320	370
SHI-62	.625	5/8	15.9	.588		.039		.018	.579		.035		1.6	.83	.80	1421	400
SHI-68	.688	11/16	17.5	.646		.046		.021	.635		.042		2.5	.91	.87	2335	500
SHI-75	.750	3/4	19.0	.704	±.003	.046	+.003	.023	.693	+.005	.042		2.8	.99	.95	2538	600
SHI-78	.781	25/32	19.8	.733	.004*	.046	-.000	.024	.722	-.010	.042		3.1	1.04	1.00	2639	650
SHI-81	.812	13/16	20.6	.762		.046		.025	.751		.042		3.3	1.08	1.03	2690	700
SHI-87	.875	7/8	22.2	.821		.046		.027	.810		.042		3.8	1.15	1.10	2893	850
SHI-93	.938	15/16	23.8	.882		.046		.028	.867		.042		4.5	1.23	1.18	3147	900
SHI-100	.984	63/64	25.0	.926		.046		.029	.925		.042	±.002	4.8	1.30	1.25	3350	1000
SHI-100	1.000	1	25.4	.940		.046		.030	.925		.042		4.8	1.31	1.26	3350	1050
SHI-106	1.062	1-1/16	27.0	.998		.056		.032	.982		.050		6.2	1.38	1.32	4212	1200
SHI-112	1.125	1-1/8	28.6	1.059		.056		.033	1.041		.050		6.7	1.45	1.39	4466	1300
SHI-118	1.188	1-3/16	30.2	1.118		.056		.035	1.098	+.010	.050		7.2	1.52	1.46	4720	1450
SHI-125	1.250	1-1/4	31.7	1.176	±.004	.056	+.004	.037	1.156	-.015	.050		7.6	1.59	1.52	4974	1600
SHI-131	1.312	1-5/16	33.3	1.232	.005*	.056	-.000	.040	1.214		.050		8.2	1.66	1.58	5227	1850
SHI-137	1.375	1-3/8	34.9	1.291		.056		.042	1.272		.050		8.4	1.73	1.65	5481	2050
SHI-143	1.438	1-7/16	36.5	1.350		.056		.044	1.333		.050		9.1	1.80	1.72	5735	2200
SHI-150	1.500	1-1/2	38.1	1.406		.056		.047	1.387		.050		9.8	1.87	1.78	5938	2500
SHI-156	1.562	1-9/16	39.7	1.468		.068		.047	1.446		.062		12.9	1.95	1.86	7714	2600
SHI-162	1.625	1-5/8	41.3	1.529		.068		.048	1.503		.062		13.4	2.02	1.93	8019	2750
SHI-177	1.750	1-3/4	44.4	1.650		.068		.050	1.637		.062		16.1	2.18	2.08	8628	3100
SHI-177	1.772	-	45.0	1.669	±.005	.068		.051	1.637	+.013	.062		16.1	2.20	2.10	8628	3200
SHI-181	1.812	1-13/16	46.0	1.708	.005*	.068		.052	1.675	-.020	.062		17.3	2.24	2.14	8983	3300
SHI-196	1.969	1-31/32	50.0	1.857		.068		.056	1.819		.062		20.5	2.43	2.32	9693	3900
SHI-200	2.000	2	50.8	1.886		.068		.057	1.850		.062		20.7	2.47	2.36	9896	4000
SHI-215	2.125	2-1/8	54.0	2.003		.086		.061	1.993		.078	±.003	30.0	2.62	2.50	13195	4550
SHI-215	2.156	2-5/32	54.8	2.032		.086		.062	1.993	+.015	.078		30.0	2.65	2.53	13195	4700
SHI-250	2.500	2-1/2	63.5	2.360		.086		.070	2.313	-.025	.078		43.5	3.05	2.92	15530	6200
SHI-275	2.750	2-3/4	69.8	2.602	±.006	.103	+.005	.074	2.543		.093		57.9	3.34	3.20	20402	7200
SHI-287	2.875	2-7/8	73.0	2.721	.006*	.103	-.000	.077	2.659		.093		64.5	3.49	3.34	21315	7800
SHI-315	3.156	3-5/32	80.2	2.986		.103		.085	2.920	+.020	.093		77.0	3.82	3.66	23447	9400
SHI-325	3.250	3-1/4	82.5	3.076		.103		.087	3.006	-.030	.093		77.5	3.93	3.76	24056	10000
SHI-350	3.500	3-1/2	88.9	3.316		.120		.092	3.237		.109		107.0	4.22	4.04	30349	11500
SHI-393	3.938	3-15/16	100.0	3.734		.120		.102	3.642		.109		123.0	4.71	4.51	34206	14000

*** F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM RING THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

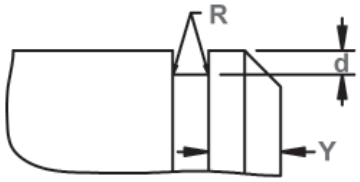
Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

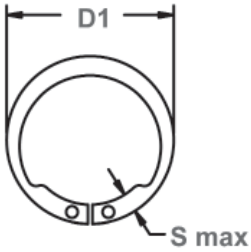
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHI	50-81	30N	63-69.5
	87+	C	44-51



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -50 thru -100; .010 for ring sizes -106 thru -393



Measuring Free Diameter (Df) SHI Series
Df = D1 - 2(S max)

Alternate Design Manufacturer's Option

RING NO.	MAXIMUM SECTION (Including Lug)		MINIMUM SECTION		HOLE DIAMETER		GAGING DIAMETER	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/R max or Ch max (in lbs.)	EDGE MARGIN	R.P.M. LIMITS Standard material
	S max	Tol.	S min	Tol.	R	Tol.	Gd Max	R max	Ch max	P'r	Y	
SHI-50	.080		.041		.042		.64	.051	.032	680	.048	40000
SHI-56	.088	±.004	.043	±.004	.042		.715	.057	.036	680	.048	35000
SHI-59	.092		.046		.042		.75	.059	.037	680	.052	32000
SHI-62	.096		.048		.042	+.010	.79	.062	.039	680	.055	30000
SHI-68	.104		.052		.042	-.002	.87	.066	.042	1000	.063	28000
SHI-75	.112		.056		.042		.945	.071	.045	1000	.069	26500
SHI-78	.116		.057		.042		.98	.073	.046	1000	.072	25500
SHI-81	.120	±.005	.060	±.005	.050		1.02	.076	.048	1000	.075	24500
SHI-87	.128		.064		.050		1.095	.080	.051	1000	.081	23000
SHI-93	.136		.068		.050		1.17	.086	.054	1000	.084	21500
SHI-100	.144		.072		.050		1.24	.091	.057	1000	.087	20000
SHI-100	.144		.072		.050		1.25	.091	.057	1000	.090	20000
SHI-106	.147		.073		.078		1.31	.092	.058	1460	.096	19000
SHI-112	.150		.075		.078		1.38	.093	.059	1460	.099	18800
SHI-118	.153		.076		.078		1.45	.094	.059	1460	.105	18000
SHI-125	.157	±.006	.079	±.006	.078	+.015	1.52	.096	.060	1460	.111	17000
SHI-131	.161		.080		.078	-.002	1.58	.097	.061	1460	.120	16500
SHI-137	.165		.082		.078		1.65	.098	.061	1460	.126	16000
SHI-143	.169		.085		.078		1.715	.100	.063	1460	.132	15000
SHI-150	.173		.086		.078		1.775	.100	.063	1460	.141	14800
SHI-156	.178		.089		.078		1.85	.104	.066	2250	.141	14000
SHI-162	.183		.092		.078		1.92	.108	.067	2250	.144	13200
SHI-177	.196		.098		.078		2.07	.116	.073	2250	.150	11700
SHI-177	.196		.098		.078		2.09	.116	.073	2250	.153	11700
SHI-181	.199		.100		.078		2.13	.117	.074	2250	.156	11500
SHI-196	.212		.106		.078		2.31	.124	.078	2250	.168	10500
SHI-200	.216		.108		.078		2.35	.127	.080	2250	.171	10000
SHI-215	.229		.117		.120		2.49	.133	.084	3750	.183	9400
SHI-215	.229	±.007	.117	±.007	.120		2.52	.133	.084	3750	.186	9400
SHI-250	.250		.130		.120		2.91	.151	.095	3750	.210	8400
SHI-275	.280		.140		.120		3.19	.165	.103	5500	.222	7600
SHI-287	.290		.145		.120		3.33	.170	.107	5500	.231	7300
SHI-315	.316		.159		.120		3.65	.185	.116	5500	.255	6500
SHI-325	.324	±.008	.162	±.008	.120		3.75	.190	.118	5500	.261	6400
SHI-350	.345		.173		.125		4.03	.202	.127	7850	.276	5900
SHI-393	.368		.183		.125		4.50	.212	.133	7850	.306	5200

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHI	50-81	30N	66-71
	87-102	C	47-53
	106-343	C	47-52
	350+	C	45-50

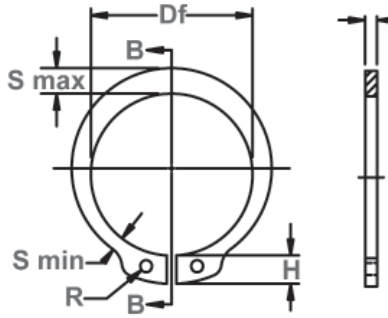
HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHI	50-81	30N	56.5-62
	87+	C	37-43

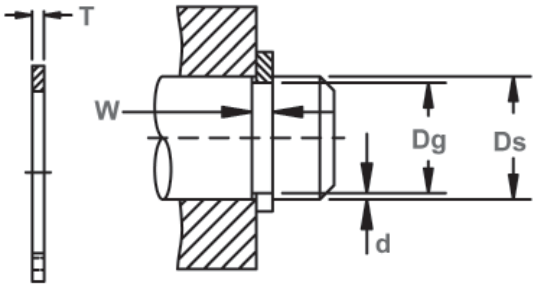
SHR Shaft Rings

Axially Assembled, External Reinforced

The SHR is an extra thick version of a regular SH retaining ring. As such, it is stronger and can withstand greater thrust loads than its standard counterpart.

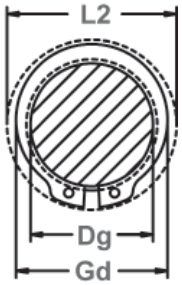


Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions

Clearance Diameter Expanded Over Shaft

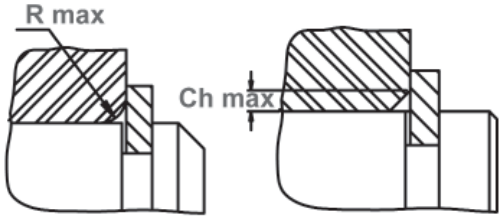


Clearance Diameter & Gaging Diameter Released in Groove

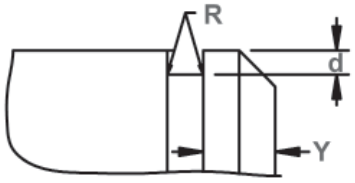
RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEAR. DIA.		î THRUST LD. (lbs.) Sqr. corner abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight Per 1000 pcs.	Ex-panded over shaft	Re-leased in groove	Ring Safety factor of 4	Groove Safety factor of 2
	Ds DEC	Ds FRAC	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L1	L2	Pr	Pg
SHR-39	.394	-	10.0	.368	+.001	.039		.013	.362	+.003	.035		.70	.61	.58	2030	700
SHR-42	.428	-	10.9	.402	-.002	.039	+.003	.013	.394	-.008	.035		.86	.65	.62	2335	800
SHR-47	.473	-	12.0	.444	.002*	.046	-.000	.015	.435		.042		1.4	.69	.66	3045	1000
SHR-50	.500	1/2	12.7	.468		.056		.016	.460		.050	±.002	1.6	.75	.72	3959	1100
SHR-59	.591	-	15.0	.555		.056	+.004	.018	.543		.050		2.2	.86	.83	4568	1500
SHR-62	.625	5/8	15.9	.588		.056	-.000	.019	.575		.050		2.3	.90	.86	4872	1600
SHR-66	.669	-	17.0	.629		.056		.020	.616	+.005	.050		2.6	.94	.90	5278	1900
SHR-75	.750	3/4	19.0	.704	+.001	.086		.023	.689	-.010	.078		5.6	1.12	1.08	9135	2400
SHR-75	.787	-	20.0	.740	-.003	.086		.024	.689		.078		5.6	1.16	1.12	9135	2400
SHR-87	.875	7/8	22.2	.821	.002*	.086		.027	.804		.078		7.5	1.25	1.20	10556	3300
SHR-98	.984	63/64	25.0	.925		.086		.030	.906		.078		7.8	1.36	1.30	11673	4000
SHR-98	1.000	1	25.4	.938		.086		.031	.906		.078		7.8	1.37	1.31	11673	4000
SHR-106	1.062	1-1/16	27.0	.998		.103		.032	.978		.093		11.5	1.52	1.46	15225	4800
SHR-112	1.125	1-1/8	28.6	1.059		.103	+.005	.033	1.036		.093	±.003	12.5	1.58	1.52	16240	5200
SHR-118	1.181	-	30.0	1.111		.103	-.000	.035	1.087	+.010	.093		13.5	1.64	1.57	16748	5600
SHR-118	1.188	1-3/16	30.2	1.111	+.002	.103		.038	1.087	-.015	.093		13.5	1.64	1.57	16748	5600
SHR-125	1.250	1-1/4	31.7	1.174	-.004	.103		.038	1.150		.093		14.9	1.70	1.63	17763	6500
SHR-131	1.312	1-5/16	33.3	1.234	.004*	.103		.039	1.208		.093		16.0	1.77	1.69	18270	7400
SHR-137	1.375	1-3/8	34.9	1.291		.103		.042	1.268		.093		17.8	1.83	1.75	19793	8200
SHR-137	1.378	-	35.0	1.291		.103		.044	1.268		.093		17.8	1.83	1.75	19793	8200
SHR-150	1.500	1-1/2	38.1	1.406		.120		.047	1.380		.109		27.0	2.08	1.98	24868	10000
SHR-156	1.562	1-9/16	39.7	1.468		.120		.047	1.437		.109		31.0	2.14	2.05	26390	10400
SHR-156	1.575	-	40.0	1.480		.120		.048	1.437		.109		31.0	2.15	2.06	26930	10400
SHR-175	1.750	1-3/4	44.4	1.650		.120		.050	1.608		.109		33.4	2.34	2.25	29435	12400
SHR-175	1.772	-	45.0	1.669	+.003	.120		.052	1.608	+.013	.109		33.4	2.37	2.27	29435	12400
SHR-193	1.938	1-15/16	49.2	1.826	-.004	.139		.056	1.782	-.020	.125	±.004	48.0	2.58	2.48	37555	15300
SHR-193	1.969	1-31/32	50.0	1.850	.004*	.139	+.006	.060	1.782		.125		48.0	2.61	2.50	37555	15300
SHR-200	2.000	2	50.8	1.880		.139	-.000	.060	1.840		.125		50.6	2.64	2.53	38570	17000

*** F.I.M.(FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
***** FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS.MAXIMUM RING THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

Square Corner Abutment



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)Maximum bottom radii (R), .005 for ring sizes -39 thru -98; -010 for ring sizes -106 thru -200

Alternate Design (Manufacturer's Option)

RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAGING DIA.	ALLOWABLE CORNER RADII & CHAMFERS		MAX LOAD w/ R max or Ch max (in lbs.)	EDGE MARGIN	R.P.M. LIMITS Stan-dard material
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	Gd Max	R max	Ch max	P'r	Y	
SHR-39	.101		.068		.039		.042		.479	.047	.039	450	.039	80000
SHR-42	.101		.076	±.004	.043	±.004	.042		.525	.057	.046	530	.039	72000
SHR-47	.101	±.004	.088		.053		.042	+.010	.589	.070	.058	550	.045	69000
SHR-50	.120		.090		.050		.050	-.002	.613	.070	.058	650	.048	65000
SHR-59	.130		.102		.057		.050		.719	.070	.058	750	.054	52500
SHR-62	.130		.106	±.005	.059	±.005	.050		.758	.074	.062	750	.057	49000
SHR-66	.130		.112		.062		.050		.808	.077	.064	900	.060	45000
SHR-75	.180		.127		.077		.078		.913	.089	.074	2500	.069	40500
SHR-75	.180		.127		.077		.078		.949	.089	.074	2500	.072	38000
SHR-87	.180		.148	±.006	.083	±.006	.078		1.056	.100	.083	2500	.081	34000
SHR-98	.180		.151		.084		.078		1.164	.100	.083	2500	.090	30000
SHR-98	.180		.151		.084		.078		1.177	.100	.083	2500	.093	30000
SHR-106	.220		.161		.090		.093		1.256	.106	.088	4000	.096	27000
SHR-112	.220		.169		.095		.093		1.329	.112	.093	4000	.099	26000
SHR-118	.220		.176		.098		.093		1.391	.112	.093	4000	.105	24000
SHR-118	.220	±.005	.176	±.007	.098	±.007	.093		1.391	.112	.093	4000	.114	24000
SHR-125	.220		.185		.103		.093		1.468	.112	.093	4000	.114	23000
SHR-131	.220		.192		.106		.093		1.538	.128	.107	4000	.117	21500
SHR-137	.220		.200		.110		.093		1.607	.128	.107	4000	.126	20500
SHR-137	.220		.200		.110		.093		1.607	.128	.107	4000	.132	20500
SHR-150	.280		.218		.123		.109	+.015	1.752	.128	.107	5000	.141	18500
SHR-156	.280		.228		.127		.109	-.002	1.829	.128	.107	5000	.141	17000
SHR-156	.280		.228		.127		.109		1.841	.128	.107	5000	.144	17000
SHR-175	.290		.254	±.008	.140	±.008	.109		2.050	.128	.107	5000	.150	15500
SHR-175	.290		.254		.140		.109		2.069	.128	.107	5000	.156	15500
SHR-193	.314		.280		.154		.125		2.265	.153	.128	6000	.168	14300
SHR-193	.314	±.006	.280		.154		.125		2.289	.153	.128	6000	.180	14100
SHR-200	.314		.290		.160		.125		2.334	.153	.128	6000	.180	14000

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHR	39-42	30N	63-69.5
	47+	C	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHR	39-42	30N	54-62
	47+	C	34-43

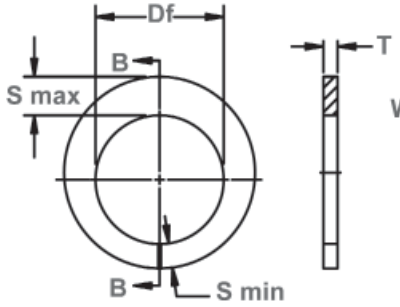
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHR	39-62	30N	67.5-72
	66+	C	47-52

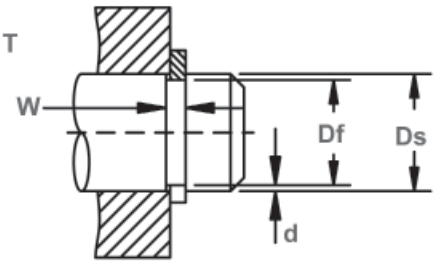
SHM Shaft Rings

Axially Assembled, External Tamper-Proof

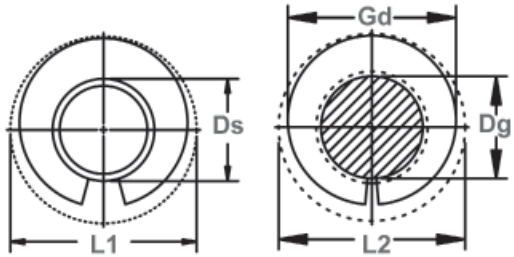
The SHM also functions like an SH retaining ring, but in "smaller" applications. It is also a tamper proof ring which does not have any lugs and can not be easily removed once installed.



Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



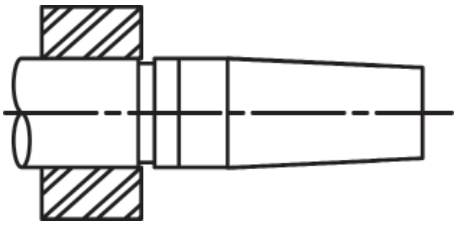
Clearance Diameter & Gaging Diameter

RING NO.	SHAFT DIAMETER inches			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD. (lbs.) Sqr. Corner Abutment Groove w/90° wall	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight. Per 1000 Pcs.	Ex-panded over shaft	Re-leased in groove	Ring Safety Factor of 4	Groove Safety Factor of 2
	Ds DEC	Tol.	Ds FRACT	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L1	L2	Pr	Pg
SHM-10	.101		-	.093	±.001	.024		.004	.090		.020		.036	.160	.152		30
SHM-12	.125	±.001	1/8	.115	.0015*	.024	+.002	.005	.112		.020		.050	.186	.176		40
SHM-13	.134		-	.124		.024	-.000	.005	.120	±.002	.020		.059	.197	.187		45
SHM-15	.156		5/32	.144		.029		.006	.140		.025		.122	.252	.240	**	65
SHM-18	.188		3/16	.174		.029		.007	.168		.025		.179	.297	.283	SEE	90
SHM-20	.203		13/64	.189		.029		.007	.180		.025	±.002	.167	.302	.288	NOTE	100
SHM-22	.219		7/32	.205		.039		.007	.200	±.003	.035		.334	.345	.331	BELOW	110
SHM-25	.250		1/4	.232	±.0015	.039		.009	.224		.035		.386	.384	.366	**	160
SHM-26	.266		17/64	.248	+.002*	.039	+.003	.009	.240		.035		.467	.406	.388		170
SHM-31	.312	±.0015	5/16	.292		.039	-.000	.010	.284		.035		.626	.478	.458		220
SHM-32	.328		21/64	.308		.039		.010	.300		.035		.688	.498	.480		230
SHM-37	.375		3/8	.351	±.002.002*	.046		.012	.340		.042		1.035	.567	.543		315

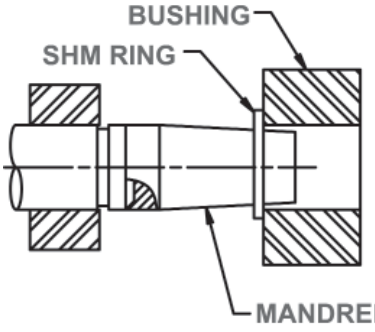
*F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
***FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.
**CALL FOR INFORMATION: +1 732-469-7333

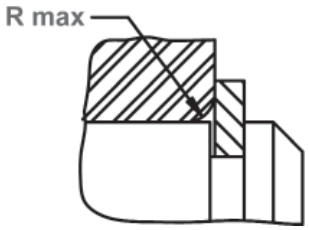
INSTALLATION OF ROTOR CLIP SHM RINGS

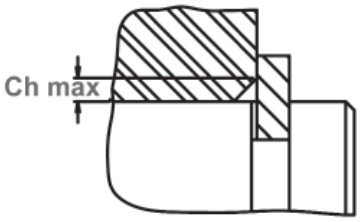
Rotor Clip SHM retaining rings can be installed by means of a tapered mandrel and a bushing. The mandrel can be eliminated in applications where the shaft can be easily tapered, as illustrated below.



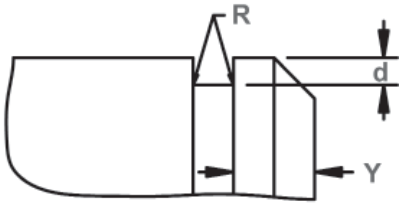
To install, place ring on mandrel and position bushing as shown. Ring can be pushed or tapped into groove.







Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R). Sharp corners-
no radii for ring sizes -10 thru -37.

RING NO.	S Max.	S Min.	GAGING DIA.	ALLOWABLE CORNER RADII &		MAX. LOAD w/ R max or Ch max. (in lbs.)	EDGE MAR-GIN	R.P.M. LIMITS Stand-ard material	RING NO.	MANDREL					BUSHING		
	Ref.	Ref.	Gd Max	R max	Ch max	î P'r (lbs.)	Y			Dp	Tol.	W ref.	G	Tol.	I.D.	Tol.	O.D.
SHM-10	.027	.017	.143	.013	.010		.012	80000	SHM-10	.102		.036	.750		.104		3/8
SHM-12	.028	.018	.167	.013	.010		.015	80000	SHM-12	.126		.059	.750		.128		3/8
SHM-13	.029	.019	.178	.014	.011		.015	80000	SHM-13	.135		.069	.750		.137		3/8
SHM-15	.045	.027	.222	.021	.017		.018	80000	SHM-15	.157		.078	.875		.159		1/2
SHM-18	.052	.032	.264	.024	.019	SEE NOTE	.021	80000	SHM-18	.189		.110	.875		.191		1/2
SHM-20	.046	.030	.272	.023	.018	ON	.021	80000	SHM-20	.204	+.000	.125	.875	±.005	.206	+.002	1/2
SHM-22	.058	.036	.308	.028	.022	PREVIOUS PAGE	.021	80000	SHM-22	.221	-.0015	.129	1.000		.223	-.000	1/2
SHM-25	.063	.037	.340	.028	.022		.027	80000	SHM-25	.252		.101	1.000		.254		5/8
SHM-26	.065	.037	.359	.027	.022		.027	80000	SHM-26	.268		.176	1.000		.270		5/8
SHM-31	.078	.050	.431	.038	.030		.030	80000	SHM-31	.314		.223	1.000		.316		5/8
SHM-32	.080	.050	.448	.038	.030		.030	80000	SHM-32	.330		.238	1.000		.332		5/8
SHM-37	.090	.058	.511	.042	.033		.036	80000	SHM-37	.377		.286	1.000		.379		5/8

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHM	10-15	15N	82.5-86.0*
	18+	30N	63.0-69.5

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHM	10-15	15N	77.0-82.0*
	18+	30N	54-62

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

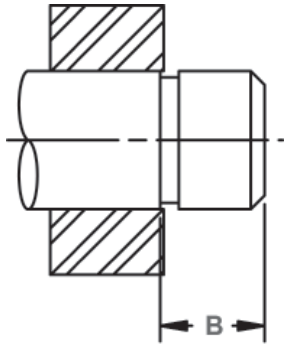
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHM	10-15	15N	85.5-87.4*
	18+	30N	68.5-72

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

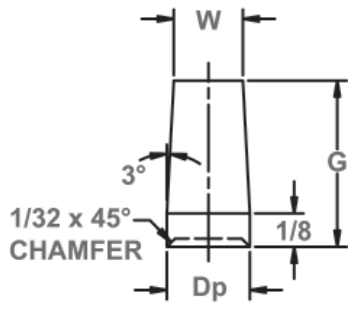
PRODUCTION OF MANDREL AND BUSHING

Specifications for the production of a mandrel and bushing for installing SHM rings are listed in the above charts.
Recommended material is high carbon spring steel, heat treated.

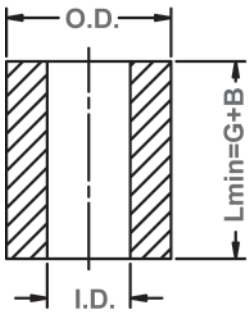


b=Edge margin plus groove width

Mandrel



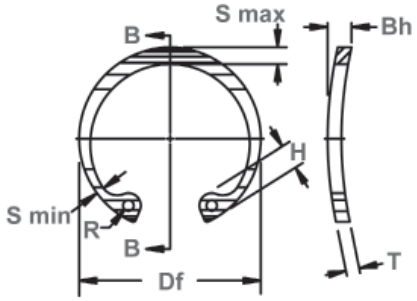
Bushing



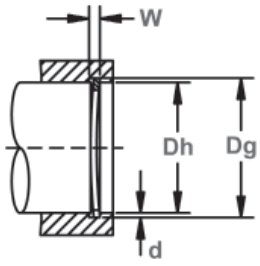
BHO Housing Rings

Axially Assembled, Internal Bowed

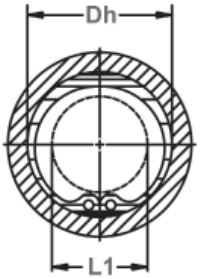
Compensating for accumulated tolerances is what a BHO retaining ring is designed to do in a housing/bore. Once snapped into the groove, bowed rings exert a force or "preload" on the retained parts for the range specified.



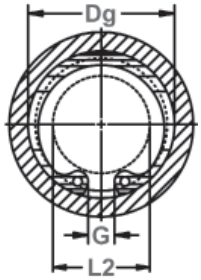
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



Clearance Diameter Compressed in Housing



Clearance Diameter &Gap Width Released in Groove

RING NO.	HOUSING DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT							CLEAR.DIA.		î THRUST LD. (lbs.) Sqr. Corner Abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		BOW HEIGHT		Weight Per 1000 Pcs.	Com-pressed in housing	Re-leased in groove	Ring Safety factor of 4	Groove Safety factor of 2
	Dh DEC	Dh FRACT	Dh mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	Bh	Tol.	lbs.	L1	L2	Pr	Pg
BHO-25	.250	1/4	6.4	.268	±.001	.030	+.002	.009	.280		.015		.036		.08	.115	.133	426	190
BHO-31	.312	5/16	7.9	.330	.0015*	.030	-.000	.009	.346		.015		.036		.11	.173	.191	538	240
BHO-37	.375	3/8	9.5	.397		.040		.011	.415		.025		.047		.25	.204	.226	1066	350
BHO-43	.438	7/16	11.1	.461	±.002	.040		.012	.482	±.010	.025		.047	±.006	.37	.23	.254	1238	440
BHO-45	.453	29/64	11.5	.477	.002*	.040		.012	.498		.025		.047		.43	.25	.274	1299	460
BHO-50	.500	1/2	12.7	.530		.055		.015	.548		.035		.063		.70	.26	.29	2010	510
BHO-51	.512	-	13.0	.542	±.002	.055	+.003	.015	.560		.035		.063	±.007	.77	.27	.30	2060	520
BHO-56	.562	9/16	14.3	.596	.004*	.055	-.000	.017	.620		.035		.063		.86	.275	.305	2253	710
BHO-62	.625	5/8	15.9	.665		.055		.020	.694		.035		.063		1.0	.34	.38	2507	1050
BHO-68	.688	11/16	17.5	.732		.055		.022	.768		.035		.063		1.2	.40	.44	2741	1280
BHO-75	.750	3/4	19.0	.796		.055		.023	.831		.035		.063		1.3	.45	.49	3045	1460
BHO-77	.777	-	19.7	.825		.062		.024	.859		.042		.073		1.7	.475	.52	4618	1580
BHO-81	.812	13/16	20.6	.862		.062		.025	.901		.042		.073		1.9	.49	.54	4872	1710
BHO-86	.866	-	22.0	.920		.062		.027	.961		.042		.073		2.0	.54	.59	5177	1980
BHO-87	.875	7/8	22.2	.931		.062		.028	.971		.042		.073		2.1	.545	.60	5227	2080
BHO-90	.901	-	22.9	.959	±.003	.062		.029	1.000	±.015	.042	±.002	.073	±.008	2.2	.565	.62	5430	2200
BHO-93	.938	15/16	23.8	1.000	.004*	.062		.031	1.041		.042		.073		2.4	.61	.67	5684	2450
BHO-100	1.000	1	25.4	1.066		.062		.033	1.111		.042		.073		2.7	.665	.73	6039	2800
BHO-102	1.023	-	26.0	1.091		.062		.034	1.136		.042		.073		2.8	.69	.755	6141	3000
BHO-106	1.062	1-1/16	27.0	1.130		.070		.034	1.180		.050		.085		3.7	.685	.75	7562	3050
BHO-112	1.125	1-1/8	28.6	1.197		.070		.036	1.249		.050		.085		4.0	.745	.815	8019	3400
BHO-118	1.181	-	30.0	1.255		.070		.037	1.319		.050		.085		4.3	.79	.86	8526	3700
BHO-118	1.188	1-3/16	30.2	1.262		.070		.037	1.319		.050		.085		4.3	.80	.87	8526	3700
BHO-125	1.250	1-1/4	31.7	1.330	±.004	.070		.040	1.388	±.025	.050		.085	±.012	4.8	.875	.955	8932	4250
BHO-125	1.259	-	32.0	1.339	.005*	.070		.040	1.388		.050		.085		4.8	.885	.965	8932	4250
BHO-131	1.312	1-5/16	33.3	1.396		.070		.042	1.456		.050		.085		5.0	.93	1.01	9440	4700
BHO-137	1.375	1-3/8	34.9	1.461		.070		.043	1.526		.050		.085		5.1	.99	1.07	9846	5050
BHO-137	1.378	-	35.0	1.464		.070		.043	1.526		.050		.085		5.1	.99	1.07	9846	5050
BHO-143	1.438	1-7/16	36.5	1.528		.070		.045	1.596		.050		.085		5.8	1.06	1.15	10353	5500
BHO-145	1.456	-	37.0	1.548		.070		.046	1.616		.050		.085		6.4	1.08	1.17	10455	5700
BHO-150	1.500	1-1/2	38.1	1.594		.070		.047	1.660		.050		.085		6.5	1.12	1.21	10708	6000
BHO-156	1.562	1-9/16	39.7	1.658		.100		.048	1.734		.062		.115		8.9	1.14	1.23	13906	6350
BHO-156	1.575	-	40.0	1.671	±.005	.100	+.005	.048	1.734	+.035	.062	±.003	.115	±.015	8.9	1.15	1.24	13906	6350
BHO-162	1.625	1-5/8	41.3	1.725	.005*	.100	-.000	.050	1.804	-.025	.062		.115		10.0	1.15	1.25	14413	6900
BHO-175	1.750	1-3/4	44.4	1.858		.100		.054	1.942		.062		.115		10.3	1.26	1.36	15580	8050

***F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND HOUSING.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
***** FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS.**

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
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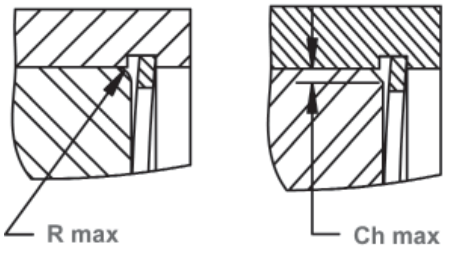
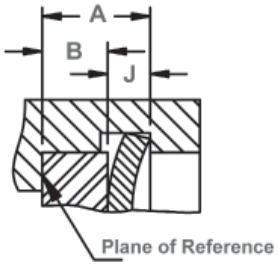
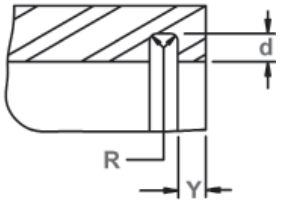
	106+	C	44-51



Maximum Corner Radius & Chamfer



Outer Groove Location
A max = B min + J max
A min = B max + J min



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -25 thru -100; .010 for ring sizes -102 and over

RING NO.	DISTANCE Outer groove wall to face of retained part		TAKE UP Resilient take up of tolerances of A&B	FORCE Needed to flatten rings	ALLOWABLE CORNER RADII & CHAMFERS		MAX LOAD w/ R max or Ch max (in lbs.)	EDGE MARGIN	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in groove
	J min	J max	J max-J min	lbs.	R max	Ch max	P'r	Y	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G min.
BHO-25	.020	.028		20	.011	.0085	190	.027	.065		.025	±.002	.015	±.002	.031		.047
BHO-31	.020	.028		20	.016	.013	190	.027	.066		.033		.018		.031		.055
BHO-37	.030	.038	.008	45	.023	.018	530	.033	.082	±.003	.040		.028		.041		.063
BHO-43	.030	.038		40	.027	.021	530	.036	.098		.049	±.003	.029	±.003	.041		.063
BHO-45	.030	.038		40	.027	.021	530	.036	.098		.050		.030		.047		.071
BHO-50	.042	.053		120	.027	.021	1100	.045	.114		.053		.035		.047		.090
BHO-51	.042	.053		115	.027	.021	1100	.045	.114		.053		.035		.047		.092
BHO-56	.042	.053		100	.027	.021	1100	.051	.132		.053		.035		.047		.095
BHO-62	.042	.053		85	.027	.021	1100	.060	.132		.060	±.004	.035	±.004	.062	+.010	.104
BHO-68	.042	.053		65	.027	.021	1100	.066	.132		.063		.036		.062	-.002	.118
BHO-75	.042	.053		45	.032	.025	1100	.069	.142		.070		.040		.062		.143
BHO-77	.049	.060		80	.035	.028	1650	.072	.146		.074		.044		.062		.145
BHO-81	.049	.060		75	.035	.028	1650	.075	.155		.077		.044		.062		.153
BHO-86	.049	.060		70	.035	.028	1650	.081	.155		.081		.045		.062		.172
BHO-87	.049	.060		70	.035	.028	1650	.084	.155		.084		.045		.062		.179
BHO-90	.049	.060		65	.038	.030	1650	.087	.155		.087	±.005	.047	±.005	.062		.188
BHO-93	.049	.060		60	.038	.030	1650	.093	.155		.091		.050		.062		.200
BHO-100	.049	.060	.011	55	.042	.034	1650	.099	.155		.104		.052		.062		.212
BHO-102	.049	.060		50	.042	.034	1650	.102	.155		.106		.054		.062		.220
BHO-106	.057	.068		70	.044	.035	2400	.102	.180	±.005	.110		.055		.078		.213
BHO-112	.057	.068		65	.047	.036	2400	.108	.180		.116		.057		.078		.232
BHO-118	.057	.068		60	.047	.036	2400	.111	.180		.120		.058		.078		.226
BHO-118	.057	.068		60	.047	.036	2400	.111	.180		.120		.058		.078		.245
BHO-125	.057	.068		55	.048	.038	2400	.120	.180		.124		.062		.078		.265
BHO-125	.057	.068		55	.048	.038	2400	.120	.180		.124		.062		.078		.290
BHO-131	.057	.068		50	.048	.038	2400	.126	.180		.130	±.006	.062	±.006	.078	+.015	.284
BHO-137	.057	.068		45	.048	.038	2400	.129	.180		.130		.063		.078	-.002	.297
BHO-137	.057	.068		45	.048	.038	2400	.129	.180		.130		.063		.078		.305
BHO-143	.057	.068		40	.048	.038	2400	.135	.180		.133		.065		.078		.313
BHO-145	.057	.068		35	.048	.038	2400	.138	.180		.133		.065		.078		.320
BHO-150	.057	.068		35	.048	.038	2400	.141	.180		.133		.066		.078		.340
BHO-156	.075	.095		40	.064	.050	3900	.144	.202		.157		.078		.078		.338
BHO-156	.075	.095	.020	40	.064	.050	3900	.144	.202		.157	±.007	.078	±.007	.078		.374
BHO-162	.075	.095		40	.064	.050	3900	.150	.227		.164		.082		.078		.339
BHO-175	.075	.095		35	.064	.050	3900	.162	.234		.171		.083		.078		.372

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
BHO	25&31	15N	86-88
	37-51	30N	69.5-73
	56-77	30N	67.5-72
	81-102	30N	66-71
	106+	C	47-52

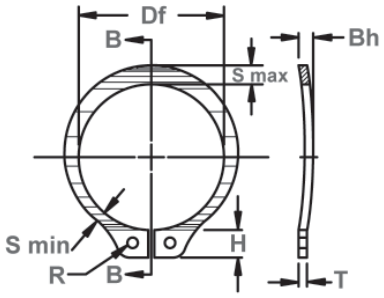
HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
BHO	25&31	15N	77-82
	37-102	30N	54-62
	106+	C	34-43

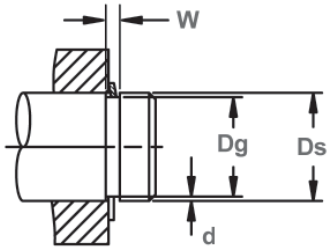
BSH Shaft Rings

Axially Assembled, External Bowed

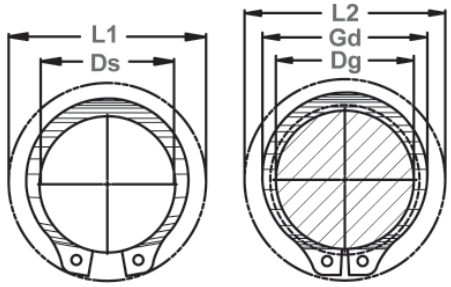
Compensating for accumulated tolerances is what a BSH "bowed" retaining ring is designed to do on a shaft. Once snapped into the groove, bowed rings exert a force or a "preload" on the retained parts for the range specified.



Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



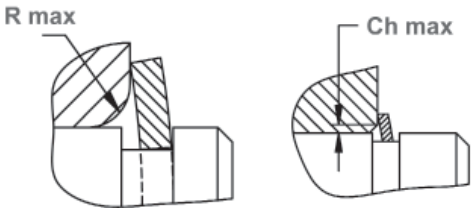
Clearance Diameter & Gaging Diameter

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT							CLEAR. DIA.		ì THRUST LD. (lbs.) Sqr. Corner Abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS ***		BOW HEIGHT		Wght. Per 1000 Pcs.	Ex-panded over shaft	Re-leased in groove	RING Safety Factor of 4	GROOVE Safety Factor of 2
	Ds DEC	Ds FRACT	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	Bh	Tol.	lbs.	L1	L2	Pr	Pg
BSH-25	.250	1/4	6.4	.230	±.0015.0015*	.040		.010	.225	+.002-.004	.025		.047		.21	.45	.43	599	175
BSH-27	.276	-	7.0	.255		.040		.010	.250		.025		.047		.23	.48	.46	660	195
BSH-28	.281	9/32	7.1	.261		.040		.010	.256		.025		.047		.24	.49	.47	670	200
BSH-31	.312	5/16	7.9	.290		.040		.011	.281		.025		.047		.27	.54	.52	751	240
BSH-34	.344	11/32	8.7	.321		.040		.011	.309		.025		.047		.31	.57	.55	812	265
BSH-35	.354	-	9.0	.330	±.002	.040		.012	.320	+.002	.025		.047	±.006	.35	.59	.57	832	300
BSH-37	.375	3/8	9.5	.352	.002*	.040		.012	.338	-.005	.025		.047		.39	.61	.59	883	325
BSH-39	.394	-	10.0	.369		.040		.012	.354		.025		.047		.42	.62	.60	954	335
BSH-40	.406	13/32	10.3	.382		.040		.012	.366		.025		.047		.43	.63	.61	964	350
BSH-43	.438	7/16	11.1	.412		.040		.013	.395		.025		.047		.50	.66	.64	1035	400
BSH-46	.469	15/32	11.9	.443		.040		.013	.428		.025		.047		.54	.68	.66	1117	450
BSH-50	.500	1/2	12.7	.468	±.002	.055		.016	.461		.035		.063		.91	.77	.74	1675	550
BSH-55	.551	-	14.0	.519	.004*	.055		.016	.509		.035		.063		.90	.81	.78	1827	600
BSH-56	.562	9/16	14.3	.530		.055		.016	.521		.035		.063		1.1	.82	.79	1878	650
BSH-59	.594	19/32	15.1	.559		.055		.017	.550		.035		.063	±.007	1.2	.86	.83	1979	750
BSH-62	.625	5/8	15.9	.588		.055		.018	.579		.035	±.002	.063		1.3	.90	.87	2091	800
BSH-66	.669	-	17.0	.629		.055	+.003	.020	.621		.035		.063		1.4	.93	.89	2233	950
BSH-66	.672	43/64	17.1	.631		.055	-.000	.020	.621		.035		.063		1.4	.93	.89	2233	950
BSH-68	.688	11/16	17.5	.646	±.003	.062		.021	.635	+.005	.042		.073		1.8	1.01	.97	3451	1000
BSH-75	.750	3/4	19.0	.704	.004*	.062		.023	.693	-.010	.042		.073		2.1	1.09	1.05	3756	1200
BSH-78	.781	25/32	19.8	.733		.062		.024	.722		.042		.073		2.2	1.12	1.08	3959	1300
BSH-81	.812	13/16	20.6	.762		.062		.025	.751		.042		.073		2.5	1.15	1.10	4060	1450
BSH-87	.875	7/8	22.2	.821		.062		.027	.810		.042		.073	±.008	2.8	1.21	1.16	4365	1650
BSH-93	.938	15/16	23.8	.882		.062		.028	.867		.042		.073		3.1	1.34	1.29	4720	1850
BSH-98	.984	63/64	25.0	.926		.062		.029	.910		.042		.073		3.5	1.39	1.34	4923	2000
BSH-100	1.000	1	25.4	.940		.062		.030	.925		.042		.073		3.6	1.41	1.35	5024	2100
BSH-102	1.023	-	26.0	.961		.062		.031	.946		.042		.073		3.9	1.43	1.37	5126	2250
BSH-106	1.062	1-1/16	27.0	.998		.070		.032	.982		.050		.085		4.8	1.50	1.44	6293	2400
BSH-112	1.125	1-1/8	28.6	1.059		.070		.033	1.041		.050		.085		5.1	1.55	1.49	6699	2600
BSH-118	1.188	1-3/16	30.2	1.118		.070		.035	1.098		.050		.085		5.6	1.61	1.54	7105	2950
BSH-125	1.250	1-1/4	31.7	1.176	±.004	.070		.037	1.156	+.010	.050		.085	±.012	5.9	1.69	1.62	7460	3250
BSH-131	1.312	1-5/16	33.3	1.232	.005*	.070		.040	1.214	-.015	.050		.085		6.8	1.75	1.67	7866	3700
BSH-137	1.375	1-3/8	34.9	1.291		.070		.042	1.272		.050		.085		7.2	1.80	1.72	8222	4100
BSH-143	1.438	1-7/16	36.5	1.350		.070		.044	1.333		.050		.085		8.1	1.87	1.79	8628	4500
BSH-150	1.500	1-1/2	38.1	1.406		.070		.047	1.387		.050		.085		9.0	1.99	1.90	8932	5000
BSH-162	1.625	1-5/8	41.3	1.529	±.005	.096	+.005	.048	1.503	+.013	.062	±.003	.115	±.015	13.2	2.17	2.08	12028	5500
BSH-175	1.750	1-3/4	44.4	1.650	.005*	.096	-.000	.050	1.618	-.020	.062		.115		15.3	2.31	2.21	12992	6200

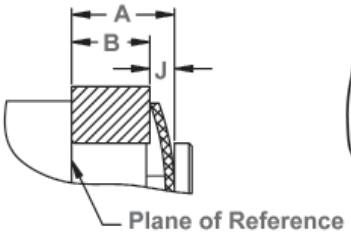
***F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
ì BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
*****FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS.**

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

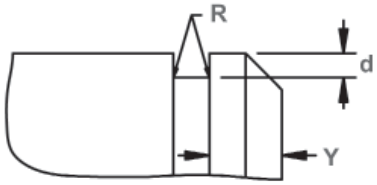
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
BSH	25-81	30N	63-69.5
	87+	C	44-51



Maximum Corner Radius & Chamfer



Outer Groove Location
A max = B min + J max
A min = B max + J min



Exploded Groove Profile & Edge Margin (Y) Maximum bottom radii (R), square corners For ring sizes -25 thru -35; .005 For ring sizes -37 thru -100; .010 For ring sizes -102 and over.

RING NO.	DISTANCE Outer groove wall to face of retained part		TAKE-UP Resilient take-up of tolerances	FORCE Needed to flatten rings	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (in lbs.)	EDGE MARGIN	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAGING DIA.	R.P.M LIMITS Standard material
	J min	J max	J max J min	lbs.	R max	Ch max	P'r (lbs.)	Y	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	Gd Max	
BSH-25	.030	.038		50	.018	.011	470	.030	.080		.035		.025		.041		.290	80000
BSH-27	.030	.038		50	.0175	.0105	470	.031	.081		.035		.024		.041		.315	76000
BSH-28	.030	.038		50	.020	.012	470	.030	.080		.038		.0255		.041		.326	74000
BSH-31	.030	.038		50	.020	.012	470	.033	.087		.040		.026		.041		.357	70000
BSH-34	.030	.038		45	.021	.0125	470	.033	.087		.042		.0265		.041		.390	64000
BSH-35	.030	.038	.008	45	.023	.014	470	.036	.087	±.003	.046	±.003	.029	±.003	.041	+.010	.405	62000
BSH-37	.030	.038		45	.026	.0155	470	.036	.088		.050		.0305		.041	-.002	.433	60000
BSH-39	.030	.038		40	.027	.016	470	.037	.087		.052		.031		.041		.452	56500
BSH-40	.030	.038		40	.0285	.017	470	.036	.087		.054		.033		.041		.468	55000
BSH-43	.030	.038		35	.029	.0175	470	.039	.088		.055		.033		.041		.501	50000
BSH-46	.030	.038		35	.031	.018	470	.039	.088		.060		.035		.041		.540	42000
BSH-50	.042	.053		90	.034	.020	910	.048	.108		.065		.040		.047		.574	40000
BSH-55	.042	.053		85	.027	.0165	910	.048	.108		.053		.036		.047		.611	36000
BSH-56	.042	.053		80	.038	.023	910	.048	.108		.072	±.004	.041	±.004	.047		.644	35000
BSH-59	.042	.053		70	.0395	.0235	910	.052	.109		.076		.043		.047		.680	32000
BSH-62	.042	.053		60	.0415	.025	910	.055	.110		.080		.045		.047		.715	30000
BSH-66	.042	.053		50	.040	.024	910	.060	.110		.082		.043		.047		.756	29000
BSH-66	.042	.053		50	.040	.024	910	.060	.110		.082		.043		.047		.758	29000
BSH-68	.049	.060		70	.042	.025	1340	.063	.136		.084		.048		.052		.779	28000
BSH-75	.049	.060		65	.046	.0275	1340	.069	.136		.092		.051		.052		.850	26500
BSH-78	.049	.060	.011	60	.047	.028	1340	.072	.136		.094		.052		.052		.883	25500
BSH-81	.049	.060		55	.047	.028	1340	.075	.136		.096		.054		.052		.914	24500
BSH-87	.049	.060		45	.051	.035	1340	.081	.137		.104	±.005	.057	±.005	.052		.987	23000
BSH-93	.049	.060		40	.055	.033	1340	.084	.166		.110		.063		.078		1.054	21500
BSH-98	.049	.060		40	.056	.0335	1340	.087	.167		.114		.0645		.078		1.106	20500
BSH-100	.049	.060		35	.057	.034	1340	.090	.167	±.004	.116		.065		.078		1.122	20000
BSH-102	.049	.060		35	.058	.035	1340	.093	.168		.118		.066		.078		1.147	19500
BSH-106	.057	.068		60	.060	.036	1950	.096	.181		.122		.069		.078		1.192	19000
BSH-112	.057	.068		55	.063	.038	1950	.099	.182		.128		.071		.078		1.261	18800
BSH-118	.057	.068		50	.064	.0385	1950	.105	.182		.132		.072		.078	+.015	1.325	18000
BSH-125	.057	.068		45	.068	.041	1950	.111	.183		.140		.076		.078	-.002	1.396	17000
BSH-131	.057	.068		40	.068	.041	1950	.120	.183		.146	±.006	.0765	±.006	.078		1.458	16500
BSH-137	.057	.068		35	.072	.043	1950	.126	.184		.152		.082		.078		1.529	16000
BSH-143	.057	.068		30	.076	.045	1950	.132	.184		.160		.086		.078		1.600	15000
BSH-150	.057	.068		30	.079	.047	1950	.141	.214		.168		.091		.120		1.668	14800
BSH-162	.069	.094	.025	55	.087	.052	3000	.144	.235		.180		.097		.125		1.812	13200
BSH-175	.069	.094		50	.091	.054	3000	.150	.237		.188		.101		.125		1.945	12200

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
BSH	25-46	30N	69.5-73
	50-81	30N	66-71
	87-102	C	47-53
	106+	C	47-52

HARDNESS RANGES: BERYLLIUM COPPER RINGS

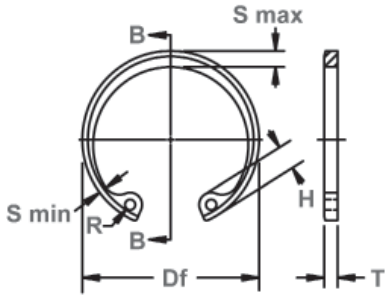
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
BSH	18-23	15N	77-82*
	25-102	30N	54-62
	106+	C	34-43

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

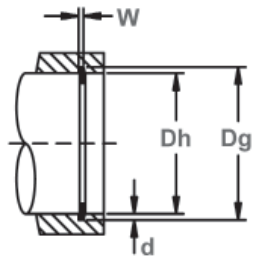
VHO Housing Rings

Axially Assembled, Internal Beveled

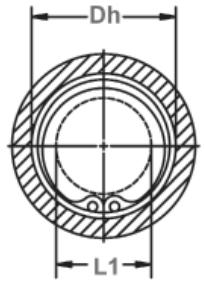
These rings look exactly like their HO counterpart, only they have a 15° angle on the outer edge. This combines with a complementary groove angle to eliminate endplay by wedging itself between the groove and the retained part.



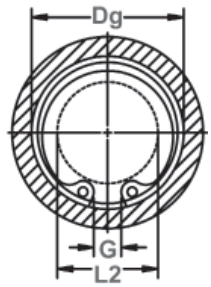
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



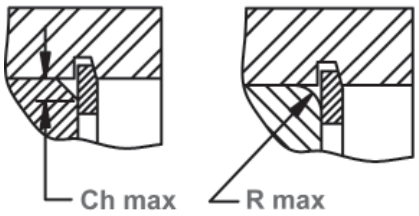
Clearance Diameter Compressed in Housing



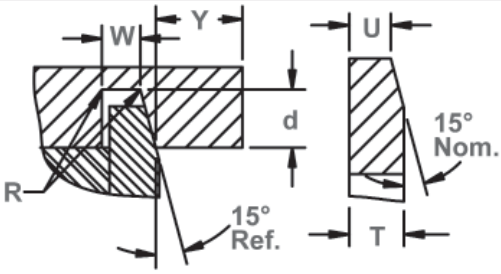
Clearance Diameter & Gap Width Released in Groove

RING NO.	HOUSING DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT							CLEARANCE DIA.	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		THICKNESS BEVELED END		Weight. Per 1000 Pcs.	Com-pressed in housing	Re-leased in groove
	Dh DEC	Dh FRACT	Dh mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	U	Tol.	lbs.	L1	L2
VHO-100	1.000	1	25.4	1.076	+.003	.036		.038	1.111	+.015	.042		.033		2.7	.665	.70
VHO-102	1.023	-	26.0	1.101	-.000	.036		.039	1.136	-.010	.042		.033		2.8	.69	.725
VHO-106	1.062	1-1/16	27.0	1.138	.004*	.044		.038	1.180		.050		.041		3.7	.685	.72
VHO-112	1.125	1-1/8	28.6	1.205		.043		.040	1.249		.050		.040		4.0	.745	.78
VHO-118	1.181	-	30.0	1.265		.043		.042	1.319		.050		.040		4.3	.66	.69
VHO-118	1.188	1-3/16	30.2	1.272		.043		.042	1.319		.050		.040		4.3	.67	.70
VHO-125	1.250	1-1/4	31.7	1.342		.042		.046	1.388	+.025	.050	±.002	.039		4.8	.875	.92
VHO-125	1.259	-	32.0	1.351	+.004	.042		.046	1.388	-.020	.050		.039		4.8	.885	.93
VHO-131	1.312	1-5/16	33.3	1.408	-.000	.042		.048	1.456		.050		.039		5.0	.93	.97
VHO-137	1.375	1-3/8	34.9	1.475	.005*	.041		.050	1.526		.050		.038		5.1	.99	1.03
VHO-137	1.378	-	35.0	1.478		.041	+.005	.050	1.526		.050		.038	±.001	5.1	.99	1.03
VHO-143	1.438	1-7/16	36.5	1.542		.040	-.000	.052	1.596		.050		.037		5.8	1.06	1.11
VHO-145	1.456	-	37.0	1.562		.040		.053	1.616		.050		.037		6.4	1.08	1.13
VHO-150	1.500	1-1/2	38.1	1.604		.040		.052	1.660		.050		.037		6.5	1.12	1.17
VHO-156	1.562	1-9/16	39.7	1.674		.052		.056	1.734		.062		.048		8.9	1.10	1.15
VHO-156	1.575	-	40.0	1.687		.052		.056	1.734		.062		.048		8.9	1.11	1.16
VHO-162	1.625	1-5/8	41.3	1.743		.051		.059	1.804		.062		.047		10.0	1.16	1.22
VHO-165	1.653	-	42.0	1.773		.051		.060	1.835		.062		.047		10.4	1.17	1.22
VHO-168	1.688	1-11/16	42.9	1.810	+.005	.050		.061	1.874	+.035	.062		.046		10.8	1.21	1.27
VHO-175	1.750	1-3/4	44.4	1.878	-.000	.050		.064	1.942	-.025	.062		.046		10.3	1.27	1.32
VHO-181	1.812	1-13/16	46.0	1.944	.005*	.050		.066	2.012		.062	±.003	.046		11.5	1.34	1.40
VHO-185	1.850	-	47.0	1.984		.050		.067	2.054		.062		.046		12.8	1.36	1.43
VHO-185	1.875	1-7/8	47.6	2.011		.050		.068	2.054		.062		.046		12.8	1.38	1.45
VHO-193	1.938	1-15/16	49.2	2.082		.049		.072	2.141		.062		.045		13.3	1.46	1.53
VHO-200	2.000	2	50.8	2.144		.048		.072	2.210		.062		.044		14.0	1.52	1.59
VHO-206	2.047	-	52.0	2.195		.065		.074	2.280		.078		.060		18.0	1.52	1.59
VHO-206	2.062	2-1/16	52.4	2.210	+.006	.065	+.007	.074	2.280	+.040	.078		.060		18.0	1.54	1.61
VHO-212	2.125	2-1/8	54.0	2.279	-.000	.065	-.000	.077	2.350	-.030	.078		.060	±.0015	19.4	1.60	1.67
VHO-218	2.165	-	55.0	2.327	.006*	.064		.081	2.415		.078		.059		19.6	1.63	1.71
VHO-218	2.188	2-3/16	55.6	2.350		.064		.081	2.415		.078		.059		19.6	1.66	1.74

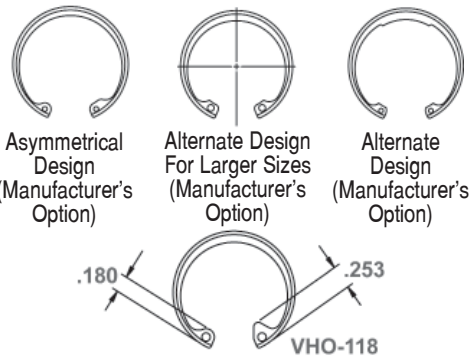
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL.
NOTE: CONTACT ROTOR CLIP FOR AVAILABILITY OF SIZES LISTED.
* F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND HOUSING.
***FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS (T) AND BEVELED END THICKNESS (U) VALUES.



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes
-100 thru -200; .010 for ring sizes -206 thru -1000



RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (in lbs.)	EDGE MARGIN	END-PLAY TAKE-UP	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in groove	ĵ THRUST LD. (lbs.) Sqr. corner abutment	
															Ring Safety factor of 4	Groove Safety factor of 2
	R max	Ch max	P'r	Y	In.	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G min	Pr	Pg
VHO-100	.042	.034	1650	.057	.005	.155		.104	±.005	.052	±.005	.062	+.010	.145	6039	1600
VHO-102	.042	.034	1650	.058	.005	.155		.106		.054		.062	-.002	.150	6141	1700
VHO-106	.044	.035	2400	.057	.005	.180		.110		.055		.078		.143	7562	1700
VHO-112	.047	.036	2400	.060	.005	.180		.116		.057		.078		.157	8019	1900
VHO-118	.047	.036	2400	.063	.0055	.180		.120		.058		.078		.150	8526	2100
VHO-118	.047	.036	2400	.063	.0055	.180		.120		.058		.078		.169	8526	2100
VHO-125	.048	.038	2400	.069	.006	.180		.124	±.006	.062	±.006	.078		.184	8932	2400
VHO-125	.048	.038	2400	.069	.006	.180		.124		.062		.078		.209	8932	2400
VHO-131	.048	.038	2400	.072	.006	.180		.130		.062		.078		.198	9440	2650
VHO-137	.048	.038	2400	.075	.0065	.180		.130		.063		.078		.211	9846	2900
VHO-137	.048	.038	2400	.075	.0065	.180		.130		.063		.078		.219	9846	2900
VHO-143	.048	.038	2400	.078	.007	.180		.133		.065		.078		.221	10353	3100
VHO-145	.048	.038	2400	.078	.007	.180		.133		.065		.078		.226	10455	3250
VHO-150	.048	.038	2400	.078	.007	.180	±.005	.133		.066		.078	+.015	.238	10708	3300
VHO-156	.064	.050	3900	.084	.0075	.202		.157		.078		.078	-.002	.238	13906	3600
VHO-156	.064	.050	3900	.084	.0075	.202		.157		.078		.078		.275	13906	3600
VHO-162	.064	.050	3900	.088	.008	.230		.164		.082		.078		.242	14413	4000
VHO-165	.064	.050	3900	.090	.008	.230		.167		.083		.078		.245	14718	4200
VHO-168	.064	.050	3900	.091	.008	.230		.170		.085		.078		.255	15022	4300
VHO-175	.064	.050	3900	.096	.0085	.230		.171		.083		.078		.267	15580	4700
VHO-181	.064	.050	3900	.099	.009	.230		.170	±.007	.084	±.007	.093		.277	16139	5050
VHO-185	.064	.050	3900	.100	.009	.234		.170		.085		.093		.245	16443	5200
VHO-185	.064	.050	3900	.102	.009	.234		.170		.085		.093		.310	16697	5400
VHO-193	.064	.050	3900	.108	.0095	.230		.170		.085		.093		.328	17255	5900
VHO-200	.064	.050	3900	.108	.0095	.230		.170		.085		.093		.332	17763	6100
VHO-206	.076	.061	6200	.111	.0095	.250		.186		.091		.093		.311	23091	6500
VHO-206	.078	.062	6200	.111	.0095	.250		.186		.091		.093		.349	23091	6500
VHO-212	.078	.062	6200	.115	.010	.250		.195		.096		.093		.345	23751	7000
VHO-218	.078	.062	6200	.121	.010	.250		.199		.098		.093		.323	24462	7450
VHO-218	.078	.062	6200	.121	.010	.250		.199		.098		.093		.373	24462	7450

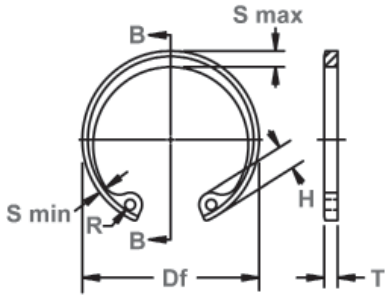
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.

Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

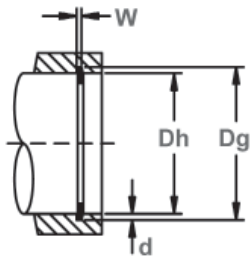
VHO Housing Rings

Axially Assembled, Internal Beveled

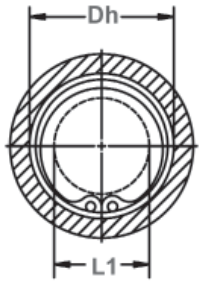
These rings look exactly like their HO counterpart, only they have a 15° angle on the outer edge. This combines with a complementary groove angle to eliminate endplay by wedging itself between the groove and the retained part.



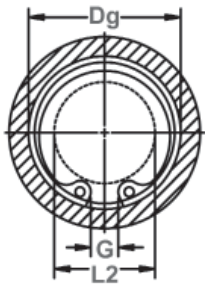
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



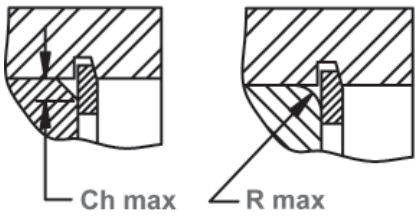
Clearance Diameter Compressed in Housing



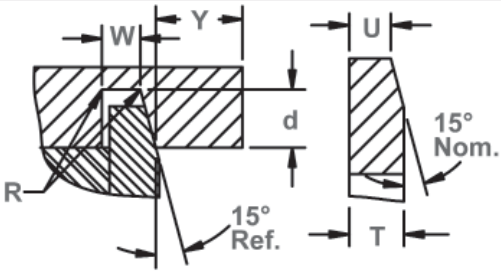
Clearance Diameter & Gap Width Released in Groove

RING NO.	HOUSING DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT							CLEARANCE DIA.	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		THICKNESS BEVELED END		Weight. Per 1000 Pcs.	Com-pressed in housing	Re-leased in groove
	Dh DEC	Dh FRACT	Dh mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	U	Tol.	lbs.	L1	L2
VHO-225	2.250	2-1/4	57.1	2.420		.064		.085	2.490		.078		.059		21.8	1.67	1.75
VHO-231	2.312	2-5/16	58.7	2.484		.063		.086	2.560		.078		.058		22.6	1.73	1.80
VHO-237	2.375	2-3/8	60.3	2.552		.063		.089	2.630		.078		.058	±.0015	23.2	1.79	1.87
VHO-244	2.440	2-7/16	62.0	2.618		.062		.089	2.702		.078		.057		25.4	1.86	1.94
VHO-250	2.500	2-1/2	63.5	2.684		.062		.092	2.775		.078		.057		25.5	1.91	2.00
VHO-250	2.531	2-17/32	64.3	2.717		.062		.093	2.775		.078		.057		25.5	1.94	2.03
VHO-256	2.562	2-9/16	65.1	2.750		.078	+.007	.094	2.844	+.040	.093		.072		34.0	1.93	2.02
VHO-262	2.625	2-5/8	66.7	2.820		.077	-.000	.097	2.910	-.030	.093		.071		34.5	2.02	2.11
VHO-268	2.677	-	68.0	2.876		.077		.099	2.980		.093		.071		35.0	2.05	2.15
VHO-268	2.688	2-11/16	68.3	2.887		.077		.099	2.980		.093		.071		35.0	2.06	2.16
VHO-275	2.750	2-3/4	69.8	2.955		.076		.102	3.050		.093		.070	±.002	35.5	2.12	2.21
VHO-281	2.812	2-13/16	71.4	3.020		.076		.104	3.121		.093		.070		36.0	2.18	2.27
VHO-281	2.835	-	72.0	3.043	+.006	.076		.104	3.121		.093		.070		36.0	2.21	2.31
VHO-287	2.875	2-7/8	73.0	3.085	-.000	.076		.105	3.191		.093	±.003	.070		41.0	2.24	2.34
VHO-300	2.953	-	75.0	3.178	.006*	.074		.112	3.325		.093		.068		42.5	2.32	2.43
VHO-300	3.000	3	76.2	3.225		.074		.112	3.325		.093		.068		42.5	2.37	2.48
VHO-306	3.062	3-1/16	77.8	3.290		.089		.114	3.418		.109		.082		53.0	2.41	2.51
VHO-312	3.125	3-1/8	79.4	3.355		.089		.115	3.488		.109		.082		56.0	2.47	2.58
VHO-315	3.149	-	80.0	3.381		.089		.116	3.523		.109		.082		57.0	2.49	2.60
VHO-315	3.156	3-5/32	80.2	3.388		.089		.116	3.523		.109		.082		57.0	2.50	2.61
VHO-325	3.250	3-1/4	82.5	3.489		.089		.119	3.623	±.055	.109		.082		60.0	2.54	2.65
VHO-334SP1	3.346	3-11/32	85.0	3.591		.089	+.008	.122	3.734		.109		.082		65.0	2.63	2.74
VHO-347	3.469	3-15/32	88.1	3.726		.089	-.000	.128	3.857		.109		.082	±.0025	69.0	2.76	2.88
VHO-350	3.500	3-1/2	88.9	3.760		.089		.130	3.890		.109		.082		71.0	2.79	2.91
VHO-354SP1	3.543	-	90.0	3.806		.089		.132	3.936		.109		.082		72.0	2.83	2.95
VHO-354SP1	3.562	3-9/16	90.5	3.830		.089		.134	3.936		.109		.082		72.0	2.85	2.97
VHO-362	3.625	3-5/8	92.1	3.900		.089		.137	4.024		.109		.082		73.0	2.91	3.03
VHO-375	3.740	-	95.0	4.030		.089		.145	4.157		.109		.082		78.0	3.02	3.15
VHO-375	3.750	3-3/4	95.2	4.040		.089		.145	4.157		.109		.082		78.0	3.03	3.17
VHO-387	3.875	3-7/8	98.4	4.171		.089		.148	4.291	±.065	.109		.082		87.0	3.11	3.25
VHO-393	3.938	3-15/16	100.0	4.236		.089		.149	4.358		.109		.082		88.0	3.17	3.31
VHO-400	4.000	4	101.6	4.302		.089		.151	4.424		.109		.082		93.0	3.23	3.37

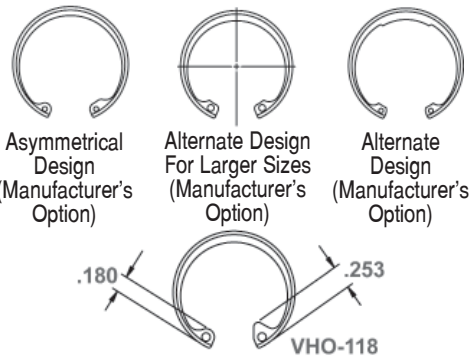
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL.
NOTE: CONTACT ROTOR CLIP FOR AVAILABILITY OF SIZES LISTED.
* F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND HOUSING.
***FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS (T) AND BEVELED END THICKNESS (U) VALUES.



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes
-100 thru -200; .010 for ring sizes -206 thru -1000



RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (in lbs.)	EDGE MAR-GIN	END-PLAY TAKE-UP	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in groove	î THRUST LD. (lbs.) Sqr. corner abutment	
															Ring Safety factor of 4	Groove Safety factor of 2
	R max	Ch max	P'r	Y	In.	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G min	Pr	Pg
VHO-225	.078	.062	6200	.127	.0105	.280		.203		.099		.093		.368	25223	8050
VHO-231	.078	.062	6200	.129	.011	.280		.206		.100		.093		.362	25832	8400
VHO-237	.078	.062	6200	.133	.0115	.280		.207		.102		.093		.374	26542	8900
VHO-244	.078	.062	6200	.133	.012	.280		.209		.103		.110		.386	27304	9100
VHO-250	.078	.062	6200	.138	.012	.280		.210		.103		.110		.398	28014	9600
VHO-250	.078	.062	6200	.139	.0125	.280		.210		.103		.110		.460	28014	9600
VHO-256	.088	.070	9000	.141	.0125	.300	±.005	.222	±.007	.109	±.007	.110		.400	34206	10200
VHO-262	.088	.070	9000	.145	.013	.290		.226		.111		.110		.418	35068	10800
VHO-268	.090	.072	9000	.148	.013	.300		.230		.113		.110		.393	35931	11300
VHO-268	.090	.072	9000	.148	.013	.300		.230		.113		.110		.423	35931	11300
VHO-275	.092	.074	9000	.153	.014	.300		.234		.115		.110		.442	36642	11800
VHO-281	.088	.070	9000	.156	.014	.300		.230		.115		.110		.459	37504	12200
VHO-281	.088	.070	9000	.156	.014	.300		.230		.115		.110		.512	37504	12200
VHO-287	.092	.074	9000	.157	.014	.300		.240		.120		.110		.451	38367	12600
VHO-300	.092	.074	9000	.168	.015	.300		.250		.122		.110	+.015	.449	40093	14200
VHO-300	.092	.074	9000	.168	.015	.300		.250		.122		.110	-.002	.568	40093	14200
VHO-306	.097	.078	12000	.171	.015	.310		.254		.126		.125		.473	47807	14800
VHO-312	.099	.079	12000	.172	. 0155	.310		.259		.129		.125		.469	48822	15200
VHO-315	.100	.080	12000	.174	.0155	.310		.262		.129		.125		.462	49329	15500
VHO-315	.100	.080	12000	.174	.0155	.310		.262		.129		.125		.481	49329	15500
VHO-325	.104	.083	12000	.178	.016	.342		.269		.135		.125		.509	50750	16400
VHO-334SP1	.108	.086	12000	.183	.0165	.342		.276		.140		.125		.514	52374	17300
VHO-347	.108	.086	12000	.192	.017	.342	±.008	.286	±.008	.144	±.008	.125		.571	54201	18800
VHO-350	.110	.088	12000	.195	.017	.342		.289		.142		.125		.574	54709	19300
VHO-354SP1	.110	.088	12000	.198	.0175	.342		.292		.142		.125		.586	55419	19800
VHO-354SP1	.110	.088	12000	.201	.018	.342		.292		.142		.125		.643	55419	19800
VHO-362	.116	.093	12000	.205	.018	.342		.299		.150		.125		.639	56739	21100
VHO-375	.120	.096	12000	.217	.0195	.342		.309		.155		.125		.647	58566	23100
VHO-375	.120	.096	12000	.217	.0195	.342		.309		.155		.125		.674	58566	23100
VHO-387	.123	.098	12000	.222	.020	.370		.319		.160		.125		.680	60494	24300
VHO-393	.124	.099	12000	.223	.020	.370		.324		.161		.125		.687	61611	24900
VHO-400	.128	.102	12000	.226	.020	.370		.330		.166		.125		.694	62626	25600

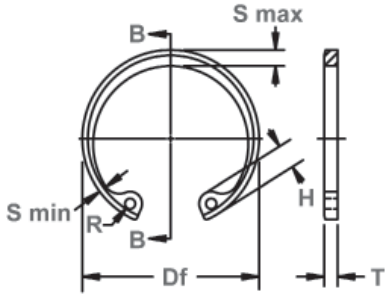
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.

Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

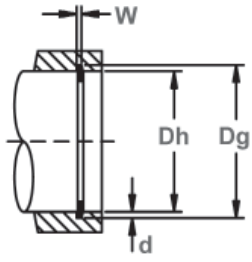
VHO Housing Rings

Axially Assembled, Internal Beveled

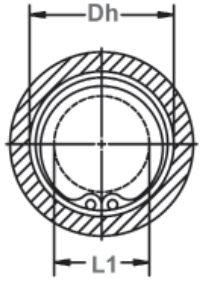
These rings look exactly like their HO counterpart, only they have a 15° angle on the outer edge. This combines with a complementary groove angle to eliminate endplay by wedging itself between the groove and the retained part.



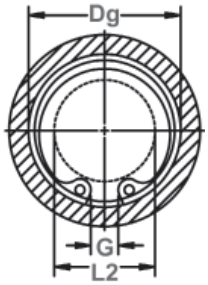
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



Clearance Diameter Compressed in Housing



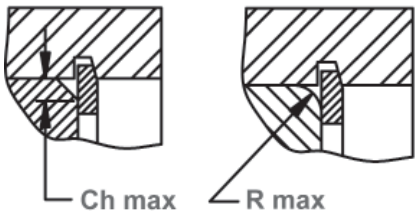
Clearance Diameter & Gap Width Released in Groove

RING NO.	HOUSING DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT							CLEARANCE	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		THICKNESS BEVELED END		Weight. Per 1000 Pcs.	Com-pressed in housing	Re-leased in groove
	Dh DEC	Dh FRACT	Dh mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	U	Tol.	lbs.	L1	L2
VHO-412	4.125	4-1/8	104.8	4.433		.089		.154	4.558		.109		.082		97.0	3.36	3.51
VHO-425	4.250	4-1/4	108.0	4.562		.089		.156	4.691		.109		.082		101.0	3.48	3.63
VHO-433	4.331	-	110.0	4.647	+.006	.089	+.008	.158	4.756		.109		.082		105.0	3.50	3.65
VHO-450	4.500	4-1/2	114.3	4.824	-.000	.089	-.000	.162	4.940		.109	±.003	.082	±.0025	111.00	3.66	3.81
VHO-462	4.625	4-5/8	117.5	4.955	.006*	.089		.165	5.076		.109		.082		117.00	3.79	3.95
VHO-475	4.724	-	120.0	5.060		.089		.168	5.213		.109		.082		124.0	3.88	4.04
VHO-475	4.750	4-3/4	120.6	5.086		.089		.168	5.213	±.065	.109		.082		124.0	3.90	4.06
VHO-500	5.000	5	127.0	5.346		.089		.173	5.485		.109		.082		136.0	4.08	4.25
VHO-525	5.250	5-1/4	133.3	5.612		.102		.181	5.770		.125		.095		174.0	4.35	4.52
VHO-537	5.375	5-3/8	136.5	5.739	+.007	.102		.182	5.910		.125		.095		179.0	4.45	4.62
VHO-550	5.500	5-1/2	139.7	5.864	-.000	.102		.182	6.066		.125	±.004	.095		183.0	4.57	4.74
VHO-575	5.750	5-3/4	146.0	6.120	.006*	.102		.185	6.336		.125		.095		192.0	4.82	5.00
VHO-600	6.000	6	152.4	6.374		.102		.187	6.620		.125		.095		201.0	5.07	5.25
VHO-625	6.250	6-1/4	158.7	6.642		.129		.196	6.895		.156		.121		266.0	5.24	5.43
VHO-650	6.500	6-1/2	165.1	6.908		.129		.204	7.170		.156		.121		281.0	5.49	5.68
VHO-662	6.625	6-5/8	168.3	7.042		.129		.208	7.308	±.080	.156		.121		305.0	5.60	5.80
VHO-675	6.750	6-3/4	171.4	7.174		.128	+.010	.212	7.445		.156		.120		325.0	5.68	5.88
VHO-700	7.000	7	177.8	7.441		.128	-.000	.220	7.720		.156		.120		344.0	5.91	6.12
VHO-725	7.250	7-1/4	184.1	7.708	+.008	.159		.229	7.995		.187		.150	±.003	428.0	6.11	6.33
VHO-750	7.500	7-1/2	190.5	7.974	-.000	.159		.237	8.270		.187		.150		485.0	6.36	6.59
VHO-775	7.750	7-3/4	196.8	8.240	.006	.159		.245	8.545		.187	±.005	.150		520.0	6.58	6.82
VHO-800	8.000	8	203.2	8.507		.155		.253	8.820		.187		.146		555.0	6.83	7.07
VHO-825	8.250	8-1/4	209.5	8.773		.155		.261	9.095		.187		.146		603.0	7.04	7.29
VHO-850	8.500	8-1/2	215.9	9.040		.151		.270	9.285	±.090	.187		.142		634.0	7.29	7.55
VHO-875	8.750	8-3/4	222.2	9.307		.151		.278	9.558		.187		.142		653.0	7.38	7.65
VHO-900	9.000	9	228.6	9.573		.151		.286	9.830		.187		.142		732.0	7.63	7.91
VHO-925	9.250	9-1/4	235.0	9.838		.151		.294	10.102		.187		.142		767.0	7.88	8.16
VHO-950	9.500	9-1/2	241.3	10.106		.147		.303	10.375		.187		.138		803.0	7.98	8.27
VHO-975	9.750	9-3/4	247.7	10.372		.147		.311	10.648		.187		.138		833.0	8.23	8.52
VHO-1000	10.000	10	254.0	10.639		.147		.319	10.920		.187		.138		863.0	8.48	8.78

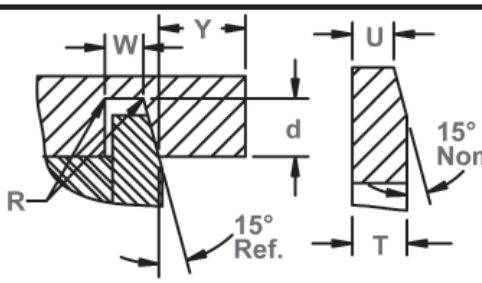
i BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL.
NOTE: CONTACT ROTOR CLIP FOR AVAILABILITY OF SIZES LISTED.
*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND HOUSING.**
*****FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS (T) AND BEVELED END THICKNESS (U) VALUES.**

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

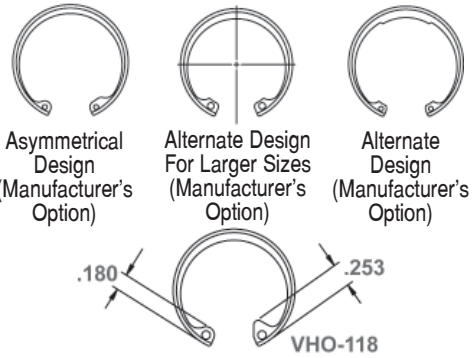
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
VHO	100&102	30N	63-69.5
	106+	C	44-51



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes
-100 thru -200; .010 for ring sizes -206 thru -1000



RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (in lbs.)	EDGE MAR-GIN	END-PLAY TAKE-UP	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in groove	ĩ THRUST LD. (lbs.) Sqr. corner abutment	
															Ring Safety factor of 4	Groove Safety factor of 2
	R max	Ch max	P'r	Y	In.	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G min	Pr	Pg
VHO-412	.130	.104	12000	.231	.021	.370		.330		.171		.125	+.015	.718	64554	26900
VHO-425	.138	.110	12000	.234	.021	.370		.335		.180		.125	-.002	.743	66483	28100
VHO-433	.142	.114	12000	.237	.021	.405		.343		.180		.156		.803	67599	29000
VHO-450	.146	.117	12000	.243	.022	.405	±.008	.351		.181		.156		.787	70340	30900
VHO-462	.151	.121	12000	.247	.022	.405		.405		.183		.156		.822	72370	32400
VHO-475	.154	.123	12000	.252	.023	.405		.370		.183		.156		.773	74298	33800
VHO-475	.154	.123	12000	.252	.023	.405		.370		.183		.156		.843	74298	33800
VHO-500	.158	.126	12000	.259	.023	.435		.435		.186		.156		.753	78155	38700
VHO-525	.168	.134	15000	.271	.024	.435		.435		.198		.156		.886	94091	40300
VHO-537	.168	.134	15000	.273	.024	.435		.435	±.009	.198	±.009	.156		.893	96324	41500
VHO-550	.168	.134	15000	.273	.024	.435		.435		.198		.156		.879	98658	42500
VHO-575	.168	.134	15000	.277	.025	.435		.435		.198		.156		.905	103124	45100
VHO-600	.168	.134	15000	.280	.025	.435		.435		.198		.156		.929	107489	47600
VHO-625	.177	.142	23000	.294	.026	.485		.485		.211		.187	+.020	.956	139766	52000
VHO-650	.181	.145	23000	.306	.027	.485		.485		.219		.187	-.005	1.040	145450	56200
VHO-662	.183	.146	23000	.312	.028	.485		.485		.221		.187		1.063	148190	58400
VHO-675	.188	.150	23000	.318	.028	.515		.515		.224		.187		.985	151032	60700
VHO-700	.196	.157	23000	.330	.029	.515	±.010	.515		.232		.187		1.037	156615	65300
VHO-725	.202	.162	34000	.343	.031	.545		.545		.238		.187		1.085	194373	70400
VHO-750	.208	.166	34000	.355	.032	.545		.545		.247		.187		1.138	201173	75400
VHO-775	.214	.171	34000	.367	.033	.560		.560		.255		.187		1.178	207872	80500
VHO-800	.220	.176	34000	.379	.034	.560		.560		.262		.187		1.238	214571	85800
VHO-825	.229	.183	34000	.391	.035	.580		.580	±.010	.270	±.010	.187		1.269	221270	91300
VHO-850	.235	.188	34000	.405	.036	.580		.580		.277		.187		1.444	227969	97300
VHO-875	.241	.193	34000	.417	.037	.660		.591		.286		.187		1.481	233856	103200
VHO-900	.249	.199	34000	.429	.038	.660		.609		.294		.187		1.539	241367	109200
VHO-925	.253	.202	34000	.441	.039	.660		.625		.299		.187		1.559	248066	115300
VHO-950	.258	.206	34000	.454	.041	.735		.642		.304		.187		1.596	254765	122100
VHO-975	.263	.210	34000	.466	.042	.735		.658		.309		.187		1.680	261464	128600
VHO-1000	.270	.216	34000	.478	.043	.735		.675		.315		.187		1.687	268163	135300

Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
VHO	100&102	30N	66-71
	106-347	C	47-52
	350-700	C	44-51
	725-1000	C	40-47

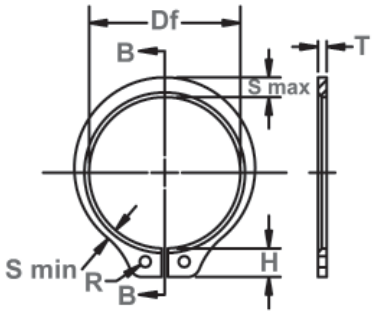
HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
VHO	100&102	30N	54-62
	106+	C	34-43

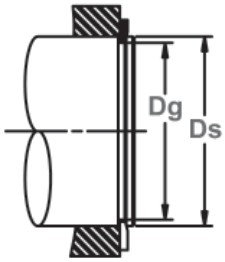
VSH Shaft Rings

Axially Assembled, External Beveled

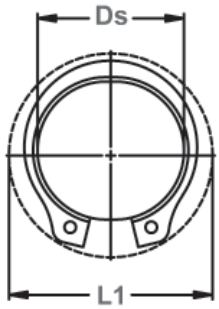
These rings look exactly like their SH counterpart, only they have a 15° angle on the inner edge. This combines with a complimentary groove angle to eliminate endplay by wedging itself between the groove and the retained part.



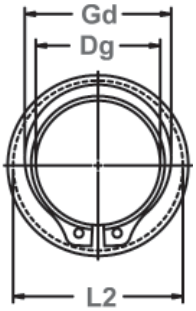
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



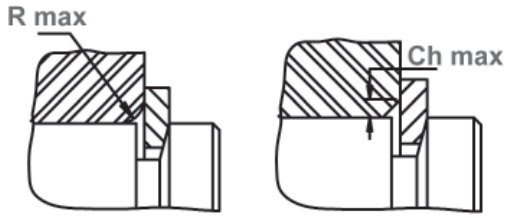
Clearance Diameter Expanded Over Shaft



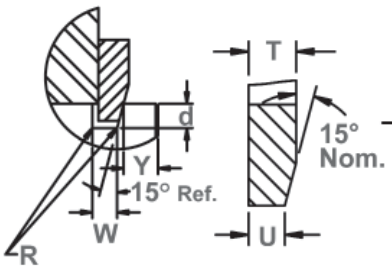
Clearance Diameter & Gaging Diameter Released in Groove

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT							CLEARANCE DIA.	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		THICKNESS BEVELED END		WEIGHT PER 1000 PCS.	EX-PANDED OVER SHAFT	RE-LEASED IN GROOVE
	Ds DEC	Ds FRACT	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	U	Tol.	lbs.	L1	L2
VSH-100	1.000	1	25.4	.930	+.000	.037		.035	.925	+.005	.042		.034		3.6	1.41	1.38
VSH-102	1.023	-	26.0	.951	-.003 .004*	.036		.036	.946	-.010	.042		.033		3.9	1.43	1.40
VSH-106	1.062	1-1/16	27.0	.992		.044		.035	.982		.050		.041		4.8	1.50	1.47
VSH-112	1.125	1-1/8	28.6	1.051		.044		.037	1.041		.050		.041		5.1	1.55	1.52
VSH-119	1.188	1-3/16	30.2	1.108	+.000	.044		.040	1.098	+.010	.050	±.002	.041		5.6	1.61	1.57
VSH-125	1.250	1-1/4	31.7	1.166	-.004	.043		.042	1.156	-.015	.050		.040		5.9	1.69	1.65
VSH-131	1.312	1-5/16	33.3	1.224	.005*	.042		.044	1.214		.050		.039		6.8	1.75	1.71
VSH-137	1.375	1 -3/8	34.9	1.282		.042		.046	1.272		.050		.039		7.2	1.80	1.76
VSH-143	1.438	1-7/16	36.5	1.343		.042	+.005	.047	1.333		.050		.039	±.001	8.1	1.87	1.83
VSH-150	1.500	1-1/2	38.1	1.397		.041	-.000	.051	1.387		.050		.038		9.0	1.99	1.95
VSH-157	1.562	1-9/16	39.7	1.459		.053		.051	1.446		.062		.049		12.4	2.10	2.05
VSH-162	1.625	1-5/8	41.3	1.516		.053		.054	1.503		.062		.049		13.2	2.17	2.13
VSH-168	1.688	1-11/16	42.9	1.573		.052		.057	1.560		.062		.048		14.8	2.24	2.20
VSH-175	1.750	1-3/4	44.4	1.631	+.000	.052		.059	1.618	+.013	.062		.048		15.3	2.31	2.26
VSH-177	1.772	-	45.0	1.650	-.005	.052		.061	1.637	-.020	.062		.048		15.4	2.33	2.28
VSH-181	1.812	1-13/16	46.0	1.688	.005*	.052		.062	1.675		.062		.048		16.2	2.38	2.33
VSH-187	1.875	1-7/8	47.6	1.748		.052		.063	1.735		.062		.048		17.3	2.44	2.39
VSH-196	1.969	1-31/32	50.0	1.832		.051		.068	1.819		.062		.047		18.0	3.09	2.54
VSH-200	2.000	2	50.8	1.863		.051		.068	1.850		.062		.047		19.0	3.10	2.57
VSH-206	2.062	2-1/16	52.4	1.921		.067		.070	1.906		.078		.062		25.0	3.22	2.68
VSH-212	2.125	2-1/8	54.0	1.979		.067		.073	1.964		.078		.062		26.1	3.29	2.78
VSH-215	2.156	2-5/32	54.8	2.008		.067		.074	1.993		.078	±.003	.062		26.3	3.40	2.81
VSH-225	2.250	2-1/4	57.1	2.096		.066		.077	2.081	+.015	.078		.061		27.7	3.51	2.90
VSH-231	2.312	2-5/16	58.7	2.154		.065		.079	2.139	-.025	.078		.060		28.0	3.58	2.97
VSH-237	2.375	2-3/8	60.3	2.212		.065		.081	2.197		.078		.060	±.0015	29.2	3.50	3.06
VSH-243	2.438	2-7/16	61.9	2.270	+.000	.065	+.007	.084	2.255		.078		.060		29.5	3.64	3.07
VSH-250	2.500	2-1/2	63.5	2.328	-.006	.064	-.000	.086	2.313		.078		.059		29.7	3.17	3.09
VSH-255	2.559	-	65.0	2.397	.006*	.064		.081	2.377		.078		.059		33.9	3.18	3.10
VSH-262	2.625	2-5/8	66.7	2.448		.064		.088	2.428		.078		.059		35.0	3.30	3.22
VSH-268	2.688	2-11/16	68.3	2.505		.064		.091	2.485		.078		.059		36.0	3.37	3.29
VSH-275	2.750	2-3/4	69.8	2.563		.079		.093	2.543	+.020	.093		.073		47.0	3.48	3.40
VSH-287	2.875	2-7/8	73.0	2.679		.078		.098	2.659	-.030	.093		.072		48.5	3.60	3.51
VSH-293	2.938	2-15/16	74.6	2.737		.078		.100	2.717		.093		.072	±.002	50.0	3.67	3.58
VSH-300	3.000	3	76.2	2.795		.077		.102	2.775		.093		.071		52.0	3.60	3.50
VSH-306	3.062	3-1/16	77.8	2.852		.077		.105	2.832		.093		.071		47.0	3.74	3.64

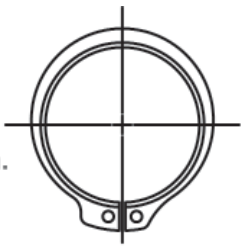
*** FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS (T) AND BEVELED END THICKNESS (U) VALUES.
* F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin
Maximum bottom radii (R), .005 for ring sizes -100 thru -200; .010 for ring sizes -206 thru -1000



Asymmetrical Design
Manufacturer's Option

Alternate Lug Design
Manufacturer's Option
For Larger Sizes

RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		MAX LOAD W/ R MAX OR CH MAX (IN LBS.)	EDGE MAR-GIN	END PLAY TAKE-UP	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAG-ING DIA.	î THRUST LOAD (lbs.) SQR. CORNER ABUTMENT	
															RING SAFETY FACTOR OF 4	GROOVE SAFETY FACTOR OF 2
	R max	Ch max	P'r	Y	In.	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	Gd Max	Pr	Pg
VSH-100	.057	.034	1340	.052	.005	.167		.116	±.005	.065	±.005	.078		1.144	5024	1200
VSH-102	.058	.035	1340	.054	.005	.168		.118		.066		.078		1.170	5126	1300
VSH-106	.060	.036	1950	.052	.005	.181		.122		.069		.078		1.217	6293	1300
VSH-112	.063	.038	1950	.055	.005	.182		.128		.071		.078		1.286	6699	1450
VSH-119	.064	.0385	1950	.060	.005	.198		.132		.072		.078		1.351	7105	1650
VSH-125	.068	.041	1950	.063	.0055	.183		.140		.076		.078		1.424	7460	1850
VSH-131	.068	.041	1950	.066	.006	.183		.146		.0765		.078		1.490	7866	2000
VSH-137	.072	.043	1950	.069	.006	.184		.152		.082		.078		1.562	8222	2250
VSH-143	.076	.045	1950	.070	.006	.184	±.004	.160	±.006	.086	±.006	.078		1.636	8628	2450
VSH-150	.079	.047	1950	.076	.007	.214		.168		.091		.120		1.706	8932	2700
VSH-157	.082	.049	3000	.076	.007	.255		.172		.093		.125		1.778	11571	2900
VSH-162	.087	.052	3000	.081	.0075	.235		.180		.097		.125		1.849	12028	3100
VSH-168	.090	.054	3000	.085	.0075	.235		.184		.099		.125		1.912	12535	3400
VSH-175	.091	.054	3000	.088	.008	.260	±.005	.188		.101		.125		1.981	12992	3650
VSH-177	.092	.055	3000	.090	.008	.237		.190		.102		.125		2.004	13144	3750
VSH-181	.092	.055	3000	.093	.008	.238		.192		.102		.125	+.015	2.047	13449	3950
VSH-187	.094	.056	3000	.094	.0085	.239		.196		.104		.125	-.002	2.114	13906	4200
VSH-196	.094	.056	3000	.102	.009	.245		.200		.106		.125		2.209	14565	4700
VSH-200	.096	.057	3000	.102	.009	.239		.204		.108		.125		2.246	14819	4800
VSH-206	.098	.059	5000	.105	.0095	.266		.208		.111		.125		2.315	19234	5100
VSH-212	.098	.059	5000	.109	.010	.280		.212		.113		.125		2.386	19793	5450
VSH-215	.097	.058	5000	.111	.010	.280		.212		.113		.125		2.410	20097	5600
VSH-225	.100	.060	5000	.115	.010	.280		.220		.116		.125		2.513	21011	6100
VSH-231	.100	.060	5000	.118	.0105	.280		.222		.118		.125		2.577	21518	6300
VSH-237	.100	.060	5000	.121	.011	.292		.224		.119		.125		2.640	22127	6800
VSH-243	.102	.061	5000	.126	.011	.268		.228		.120		.125		2.706	22736	7100
VSH-250	.104	.062	5000	.129	.0115	.292	±.005	.232	±.007	.122	±.007	.125		2.772	23345	7500
VSH-255	.108	.065	5000	.121	.011	.268		.238		.125		.125		2.845	23853	7300
VSH-262	.1095	.066	5000	.132	.0115	.292		.242		.127		.125		2.910	24462	8200
VSH-268	.1115	.067	5000	.136	.012	.292		.246		.129		.125		2.975	25071	8600
VSH-275	.112	.067	7350	.139	.012	.324		.248		.131		.125		3.041	30552	9000
VSH-287	.115	.069	7350	.147	.013	.324		.256		.133		.125		3.172	31973	9900
VSH-293	.116	.070	7350	.150	.0135	.324		.260		.136		.125		3.239	32683	10300
VSH-300	.117	.070	7350	.153	.0135	.264		.264		.138		.125		3.306	33394	10700
VSH-306	.107	.064	7350	.157	.014	.300		.300		.131		.125		3.347	34003	11200

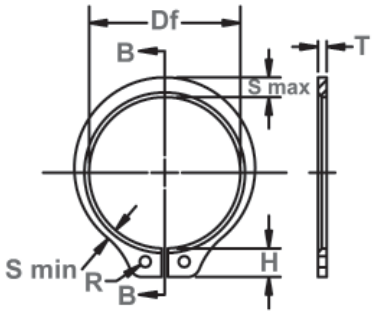
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT. FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.

Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

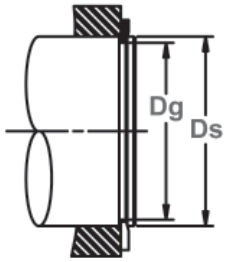
VSH Shaft Rings

Axially Assembled, External Beveled

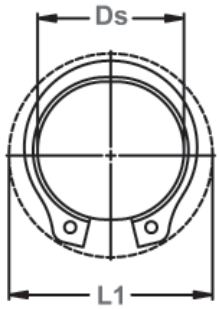
These rings look exactly like their SH counterpart, only they have a 15° angle on the inner edge. This combines with a complimentary groove angle to eliminate endplay by wedging itself between the groove and the retained part.



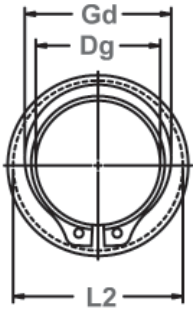
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



Clearance Diameter Expanded Over Shaft



Clearance Diameter & Gaging Diameter Released in Groove

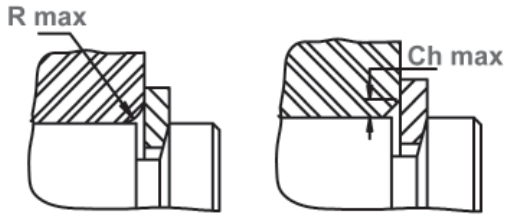
RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT							CLEARANCE DIA.	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		THICKNESS BEVELED END		WEIGHT PER 1000 PCS.	EX-PANDED OVER SHAFT	RE-LEASED IN GROOVE
	Ds DEC	Ds FRACT	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	U	Tol.	lbs.	L1	L2
VSH-312	3.125	3-1/8	79.4	2.912		.076		.106	2.892		.093		.070		58.0	3.85	3.76
VSH-315	3.156	3-5/32	80.2	2.940		.076	+.007	.108	2.920		.093		.070		59.0	3.88	3.78
VSH-325	3.250	3-1/4	82.5	3.026		.076	-.000	.112	3.006		.093		.070	±.002	62.0	3.93	3.83
VSH-334	3.346	3-11/32	85.0	3.112		.075		.117	3.092		.093		.069		64.0	4.02	3.92
VSH-343	3.438	3-7/16	87.3	3.199		.075		.119	3.179		.093		.069		66.0	4.12	4.01
VSH-350	3.500	3-1/2	88.9	3.257		.091		.121	3.237		.109		.084		72.0	4.16	4.05
VSH-354	3.543	-	90.0	3.297	+.000	.091		.123	3.277		.109		.084		73.0	4.25	4.14
VSH-362	3.625	3-5/8	92.1	3.372	-.006	.090		.126	3.352	+.020	.109		.083		76.0	4.33	4.21
VSH-368	3.688	3-11/16	93.7	3.430	.006*	.090		.129	3.410	-.030	.109	±.003	.083		80.0	4.39	4.27
VSH-375	3.750	3-3/4	95.2	3.488		.089		.131	3.468		.109		.082		83.0	4.52	4.40
VSH-387	3.875	3-7/8	98.4	3.604		.089		.135	3.584		.109		.082		88.0	4.62	4.49
VSH-393	3.938	3-15/16	100.0	3.662		.088		.138	3.642		.109		.081	±.0025	95.0	4.70	4.57
VSH-400	4.000	4	101.6	3.720		.088		.140	3.700		.109		.081		101.0	4.76	4.63
VSH-425	4.250	4-1/4	108.0	4.009		.094		.120	3.989		.109		.087		112.0	4.98	4.87
VSH-437	4.375	4-3/8	111.1	4.126		.094		.124	4.106		.109		.087		115.0	5.11	4.99
VSH-450	4.500	4-1/2	114.3	4.243		.094		.128	4.223		.109		.087		132.0	5.37	5.25
VSH-475	4.750	4-3/4	120.6	4.478		.092	+.008	.136	4.458		.109		.085		113.0	5.62	5.49
VSH-500	5.000	5	127.0	4.712		.091	-.000	.144	4.692		.109		.084		149.0	5.87	5.74
VSH-525	5.250	5-1/4	133.3	4.947	+.000	.105		.151	4.927		.125		.098		190.0	6.20	6.05
VSH-550	5.500	5-1/2	139.7	5.182	-.007	.104		.159	5.162	+.020	.125	±.004	.097		201.0	6.45	6.30
VSH-575	5.750	5-3/4	146.0	5.416	.006*	.103		.167	5.396	-.040	.125		.096		199.0	6.69	6.53
VSH-600	6.000	6	152.4	5.651		.102		.174	5.631		.125		.095		210.0	6.95	6.78
VSH-625	6.250	6-1/4	158.7	5.886		.132		.182	5.866		.156		.124		282.0	7.31	7.14
VSH-650	6.500	6-1/2	165.1	6.120		.131		.190	6.100	+.020	.156		.123		330.0	7.67	7.49
VSH-675	6.750	6-3/4	171.4	6.355		.130		.197	6.335	-.050	.156		.122	±.003	356.0	8.06	7.87
VSH-700	7.000	7	177.8	6.590	+.000	.129		.205	6.570		.156		.121		388.0	8.13	7.93
VSH-750	7.500	7-1/2	190.5	7.059	-.008	.158		.220	7.039		.187	±.005	.149		534.0	8.70	8.49
VSH-800	8.000	8	203.2	7.528	.006*	.157		.236	7.508		.187		.148		628.0	9.24	9.01
VSH-850	8.500	8-1/2	215.9	7.997		.154		.251	7.977	+.020	.187		.145		700.0	9.79	9.54
VSH-900	9.000	9	228.6	8.465		.153		.267	8.445	-.060	.187		.144		757.0	10.60	10.34
VSH-950	9.500	9-1/2	241.3	8.935		.150		.282	8.915		.187		.141		820.0	11.10	10.82
VSH-1000	10.000	10	254.0	9.405		.148		.297	9.385		.187		.139		964.0	11.61	11.32

*** F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
*****FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

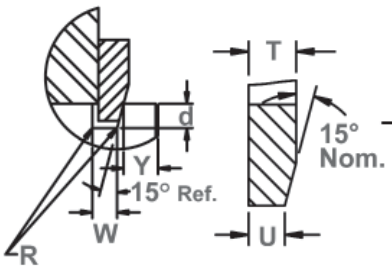
Note: Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements. (Tech@rotorclip.com or +1-732-469-7333.)

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

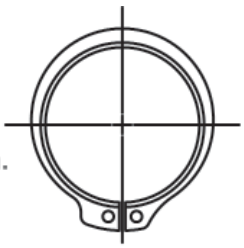
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
VSH	All	C	44-51



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin
Maximum bottom radii (R), .005 for ring sizes -100 thru -200; .010 for ring sizes -206 thru -1000



Asymmetrical Design
Manufacturer's Option

Alternate Lug Design
Manufacturer's Option
For Larger Sizes

RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD W/ R MAX OR CH MAX (IN LBS.)	EDGE MARGIN	END-PLAY TAKE-UP	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAGING DIA.	î THRUST LD. (LBS.) SQR. CORNER ABUTMENT	
															RING SAFETY FACTOR OF 4	GROOVE SAFETY FACTOR OF 2
	R max	Ch max	P'r	Y	In.	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	Gd Max	Pr	Pg
VSH-312	.120	.072	7350	.159	.014	.324		.272		.141		.125		3.439	34815	11700
VSH-315	.1205	.072	7350	.162	.0145	.324		.274		.143		.125		3.469	35119	11900
VSH-325	.123	.074	7350	.168	.015	.300		.300		.145		.125		3.571	36134	12700
VSH-334	.126	.076	7350	.175	.0155	.300		.300		.147		.125		3.669	37251	13600
VSH-343	.129	.077	7350	.178	.016	.300		.300		.148		.125		3.767	38266	14300
VSH-350	.122	.073	10500	.181	.016	.285		.285		.148		.125		3.821	45574	14800
VSH-354	.123	.074	10500	.184	.0165	.310	±.005	.310	±.008	.149	±.008	.125		3.866	46183	15200
VSH-362	.127	.076	10500	.189	.017	.310		.310		.153		.125	+.015	3.956	47299	16300
VSH-368	.1295	.078	10500	.193	.017	.310		.310		.156		.125	-.002	4.026	48010	16500
VSH-375	.133	.080	10500	.196	.0175	.342		.342		.160		.125		4.098	48822	17200
VSH-387	.137	.082	10500	.202	.018	.342		.342		.163		.125		4.229	50446	18300
VSH-393	.137	.082	10500	.207	.0185	.342		.342		.163		.125		4.290	51359	19000
VSH-400	.135	.081	10500	.210	.019	.342		.342		.163		.125		4.350	52171	19600
VSH-425	.146	.088	10500	.180	.016	.342		.342		.176		.125		4.620	55419	18000
VSH-437	.146	.088	10500	.186	.017	.342		.342		.181		.125		4.740	57043	19000
VSH-450	.102	.061	10500	.192	.017	.405		.405		.185		.125		4.920	58667	20200
VSH-475	.115	.069	10500	.204	.018	.405		.405		.136		.125		5.060	61915	22700
VSH-500	.165	.099	10500	.216	.019	.405	±.008	.405	±.010	.194	±.010	.156		5.410	65163	25400
VSH-525	.169	.101	13500	.226	.020	.435		.435		.211		.156		5.670	78460	28000
VSH-550	.175	.105	13500	.238	.021	.497		.390		.209		.156		5.940	82215	30800
VSH-575	.184	.110	13500	.250	.022	.518		.435		.220		.156		6.210	85971	33800
VSH-600	.143	.086	13500	.261	.023	.540		.435		.171		.156		6.380	89625	37000
VSH-625	.148	.089	21000	.273	.024	.561		.485		.176		.156		6.650	116522	40000
VSH-650	.191	.114	21000	.285	.025	.586		.485		.236		.156	+.020	6.980	121191	43500
VSH-675	.200	.120	21000	.295	.026	.608		.515		.246		.187	-.005	7.260	125860	47000
VSH-700	.208	.125	21000	.307	.027	.530		.515		.256		.187		7.520	130529	50500
VSH-750	.220	.132	30000	.330	.029	.676	±.012	.545	±.015	.277	±.015	.187		8.060	167678	58000
VSH-800	.235	.141	30000	.354	.032	.735		.560		.294		.187		8.590	178843	66500
VSH-850	.250	.150	30000	.376	.034	.735		.580		.314		.187		9.130	190008	75000
VSH-900	.267	.160	30000	.400	.036	.735		.609		.333		.187		9.670	201173	86000
VSH-950	.281	.168	30000	.423	.038	.735		.642		.350		.187		10.200	212338	94500
VSH-1000	.294	.176	30000	.445	.040	.735		.675		.367		.187		10.730	223503	105000

î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
VSH	100-102	C	47-53
	106-343	C	47-52
	350-700	C	44-51
	725-1000	C	40-47

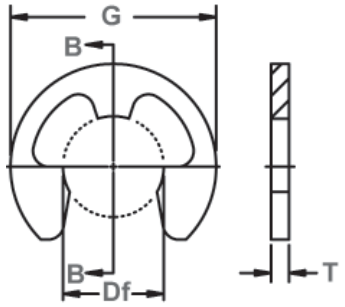
HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
VSH	100-102	30N	56.5-62
	106+	C	37-43

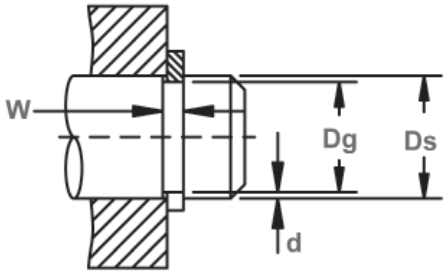
E Shaft Rings

Radially Assembled, External 'E'

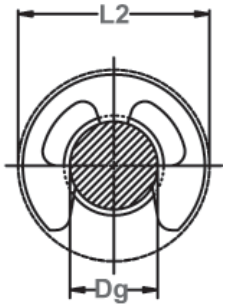
Perhaps the most popular and widely used radial retaining ring is the "E" (so named because it is shaped like the letter "E".) Three prongs make contact with the bottom of the groove and provide a shoulder for effective retention of assemblies.



Free Diameter & Ring Measurements With Section B-B



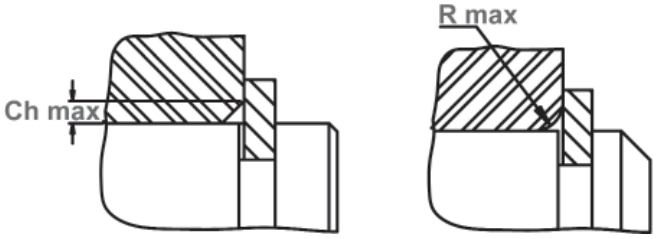
Shaft Diameter & Groove Dimensions



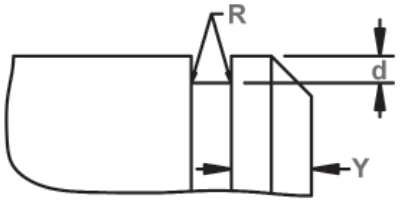
Clearance Diameter Installed In Groove

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD. (lbs.) Sqr. corner abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight. Per 1000 pcs.	Free out-side dia. REF.	Installed in groove	Ring Safety factor of 3	Groove Safety factor of 2
	Ds DEC	Ds FRAC	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	G	L2	Pr	Pg
**E-4	.040	-	1.0	.026		.012		.007	.025		.010		.009	.079	.090	13	6
E-6	.062	1/16	1.6	.052		.012		.005	.051	+.001 -.003	.010	±.001	.030	.156	.165	20	7
SE-6	.062	1/16	1.6	.052		.012		.005	.051		.010		.028	.140	.150	20	7
YE-6	.062	1/16	1.6	.052	+.002 -.000 *.0015	.023		.005	.051		.020		.094	.187	.200	41	7
SE-9	.094	3/32	2.4	.074		.020	+.002 -.000	.010	.069	+.002-.003	.015		.10	.230	.245	46	20
E-9	.094	3/32	2.4	.074		.020		.010	.073		.015		.058	.187	.200	46	20
SE-11	.110	7/64	2.8	.079		.020		.015	.076		.015		.31	.375	.390	61	40
SE-12	.125	1/8	3.2	.095		.029		.015	.094		.025		.12	.214	.225	110	45
E-12	.125	1/8	3.2	.095		.020		.015	.094		.015		.087	.230	.240	66	45
SE-14	.140	9/64	3.6	.102		.020		.019	.100		.015		.060	.203	.215	76	60
YE-14	.140	9/64	3.6	.110		.020		.015	.108		.015		.10	.250	.265	76	45
E-14	.140	9/64	3.6	.105		.029		.017	.102	+.001 -.003	.025		.21	.270	.285	173	60
SE-15	.156	5/32	4.0	.118		.046		.019	.116		.042		.76	.375	.390	300	70
E-15	.156	5/32	4.0	.116	+.002 -.000 *.002	.029		.020	.114		.025		.21	.282	.295	178	75
SE-17	.172	11/64	4.4	.127		.029		.022	.125		.025		.24	.312	.325	183	90
SE-18	.188	3/16	4.8	.125		.029		.031	.122		.025		.45	.375	.39	203	135
YE-18	.188	3/16	4.8	.147		.029		.020	.145		.025	±.002	.70	.470	.485	193	90
ZE-18	.188	3/16	4.8	.125		.029		.031	.122		.025		1.05	.550	.565	203	135
E-18	.188	3/16	4.8	.147		.029		.020	.145		.025		.29	.335	.35	193	90
SE-21	.219	7/32	5.6	.188		.029		.015	.185		.025		.47	.437	.45	228	75
E-25	.250	1/4	6.3	.210		.029		.020	.207		.025		.76	.527	.54	259	115
SE-31	.312	5/16	7.9	.250		.029	+.003 -.000	.031	.243		.025		.57	.500	.52	330	225
YE-31	.312	5/16	7.9	.250		.029		.031	.243		.025		1.220	.670	.685	325	220
SE-37	.375	3/8	9.5	.306		.039		.034	.303	+.002 -.004	.035		1.050	.567	.587	680	300
E-37	.375	3/8	9.5	.303	+.003 -.000 *.004	.039		.036	.300		.035		1.5	.660	.68	700	315
E-43	.438	7/16	11.1	.343		.039		.047	.337		.035		1.5	.687	.71	842	480
SE-43	.438	7/16	11.1	.380		.039		.029	.375		.035		1.0	.600	.62	812	280
E-50	.500	1/2	12.7	.396		.046		.052	.392		.042		2.5	.800	.82	1127	600
E-62	.625	5/8	15.9	.485		.046		.070	.480		.042		3.2	.940	.96	1441	1050
SE-74	.750	3/4	19.0	.625		.056		.062	.616	+.003 -.005	.050		4.3	1.000	1.02	1979	1100
E-75	.750	3/4	19.0	.580		.056		.085	.574		.050		5.8	1.120	1.14	2030	1500
E-87	.875	7/8	22.2	.675		.056		.100	.668		.050		7.6	1.300	1.32	2385	2050
SE-98	.984	63/64	25.0	.835		.056		.074	.822		.050		9.2	1.500	1.53	2639	1750
SE-98	1.000	1	25.4	.835		.056		.082	.822		.050		9.2	1.500	1.53	2690	1900
SE-118	1.188	1-3/16	30.2	1.079	+.005 -.000 *.005	.068	+.004 -.000	.054	1.066	+.006 -.010	.062	±.003	11.3	1.626	1.67	3501	1500
SE-137	1.375	1-3/8	34.9	1.230		.068		.072	1.213		.062		15.4	1.875	1.92	4162	2350

LISTED GROOVE WIDTH (W) MINIMUM.
*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
**** AVAILABLE IN BERYLLIUM COPPER ONLY.**
î BASED ON GROOVES MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND 0THER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
***** FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), Sharp corners
for rings 4 thru 6; .005 For sizes SE9 thru 25; .010
For sizes SE-31 thru SE-43; .015 For sizes 50 thru SE-137

RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		MAX LOAD w/ R max or Ch max (in lbs.)	EDGE MAR-GIN	R.P.M. LIMITS Stan-dard material
	R max	Ch max	P'r	Y	
**E-4	.015	.010	13	.014	40000
E-6	.030	.020	20	.010	40000
SE-6	.030	.020	20	.010	40000
YE-6	.035	.025	40	.010	40000
SE-9	.053	.040	45	.020	36000
E-9	.040	.030	45	.020	36000
SE-11	.080	.060	60	.030	35000
SE-12	.040	.030	108	.030	35000
E-12	.040	.030	65	.030	35000
SE-14	.029	.022	75	.038	32000
YE-14	.040	.030	75	.030	32000
E-14	.060	.045	170	.034	32000
SE-15	.080	.060	250	.038	31000
E-15	.060	.045	175	.040	31000
SE-17	.060	.045	180	.044	30000
SE-18	.060	.045	200	.062	30000
YE-18	.060	.045	190	.040	25000
ZE-18	.060	.045	200	.062	18000
E-18	.060	.045	190	.040	30000
SE-21	.060	.045	225	.030	26000
E-25	.060	.045	255	.040	25000
SE-31	.060	.045	325	.062	22000
YE-31	.060	.045	320	.062	15000
SE-37	.060	.045	680	.068	20000
E-37	.065	.050	690	.072	20000
E-43	.065	.050	830	.094	16500
SE-43	.050	.035	800	.058	16500
E-50	.080	.060	1110	.104	14000
E-62	.080	.060	1420	.140	12000
SE-74	.057	.042	1900	.124	11000
E-75	.085	.065	2000	.170	10500
E-87	.085	.065	2350	.200	9000
SE-98	.085	.065	2700	.148	6500
SE-98	.077	.057	2700	.164	6500
SE-118	.090	.070	3450	.108	5500
SE-137	.090	.070	4100	.144	4000

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
E	E6-SE6	15N	82.5-86*
All	YE6-YE14	15N	82.5-86
	E14-SE31	30N	63-69.5
	E37+	C	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
E	E4-SE6	15N	79-82*
All	YE6-YE14	15N	79-82
	E14-SE31	30N	56.5-62
	E37+	C	37-43

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

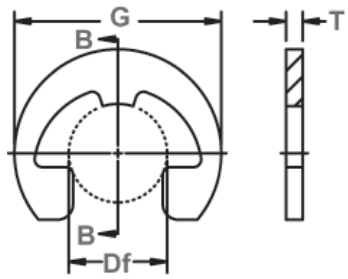
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
E	E6 -SE6	15N	84.5-87*
All	YE6-YE14	15N	84.5-87
	E14-SE31	30N	66.5-71
	E37+	C	47-52

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

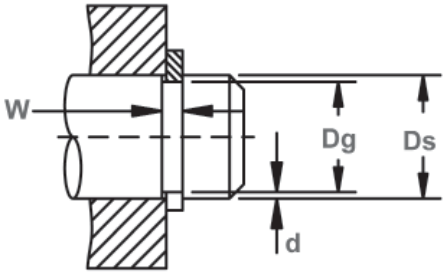
RE Shaft Rings

Radially Assembled, External Reinforced 'E'

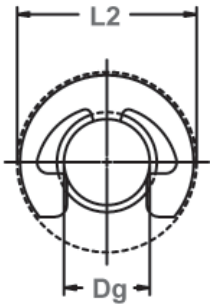
The RE retaining ring is a reinforced version of the E ring, which will accommodate higher thrust loadings and RPM. RE rings function in the same groove as regular E rings, so that you can change from one to the other without re-engineering the application.



Free Diameter & Ring Measurements with Section B-B



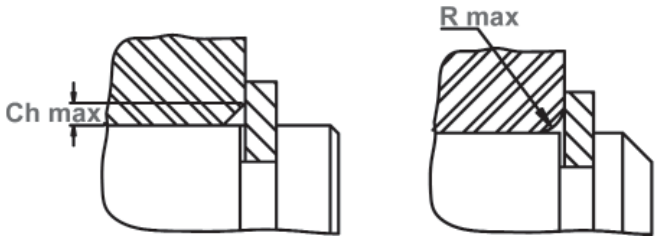
Shaft Diameter & Groove Dimensions



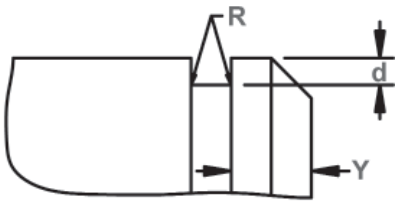
Clearance Diameter Installed In Groove

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD. (lbs.) Sqr. Corner Abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight. Per 1000 Pcs.	Free Out-Side Dia.	Installed In Groove	Ring Safety factor of 3	Groove Safety factor of 2
	Ds DEC	Ds FRACT	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	Ref. G	L2	Pr	Pg
RE-9	.094	3/32	2.4	.074	+.002	.020	+.002	.010	.072	+.001	.015		.07	.206	.219	51	13
RE-12	.125	1/8	3.2	.095	-.000	.020	-.000	.015	.093	-.003	.015		.13	.270	.283	76	25
RE-15	.156	5/32	4.0	.116	.0015*	.029		.020	.113	+.002-.003	.025		.31	.335	.35	152	40
RE-18	.188	3/16	4.8	.147		.029		.020	.143		.025		.39	.375	.39	183	50
RE-21	.219	7/32	5.6	.188	±.002	.029		.015	.182	±.003	.025	±.002	.54	.446	.46	223	50
RE-25	.250	1/4	6.3	.210	.002*	.029		.020	.204		.025		.71	.516	.53	254	75
RE-31	.312	5/16	7.9	.250	±.003	.029	+.003	.031	.242		.025		.85	.588	.61	305	135
RE-37	.375	3/8	9.5	.303	.003*	.039	-.000	.036	.292		.035		1.5	.660	.68	528	190
RE-43	.438	7/16	11.1	.343		.039		.047	.332		.035		1.9	.746	.77	609	285
RE-50	.500	1/2	12.7	.396	±.003	.046		.052	.385	±.004	.042		3.2	.810	.83	832	360
RE-56	.562	9/16	14.3	.437	.004*	.046		.062	.430		.042		3.5	.870	.89	944	480

***F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
***** FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -9 thru -25; .010 for ring sizes -31 thru -43; .015 for ring sizes -50 thru -56

RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD W/ R MAX or Ch max (in lbs.)	EDGE MARGIN	R.P.M. LIMITS Standard Material
	R max	Ch max	P'r	Y	
RE-9	.045	.033	50	.020	90000
RE-12	.045	.033	75	.030	70000
RE-15	.065	.050	150	.040	60000
RE-18	.065	.050	180	.040	50000
RE-21	.065	.050	220	.031	43000
RE-25	.065	.050	250	.040	38000
RE-31	.070	.055	300	.062	32000
RE-37	.070	.055	520	.072	28000
RE-43	.070	.055	600	.094	24000
RE-50	.080	.060	820	.104	20000
RE-56	.080	.060	930	.124	17000

NOTE: CONTACT ROTOR CLIP FOR AVAILABILITY OF SIZES LISTED. LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
RE	9&12	15N	82.5-86
	15-31	30N	63-69.5
	37+	C	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
RE	9&12	15N	77-82
	15-31	30N	54-62
	37+	C	34-43

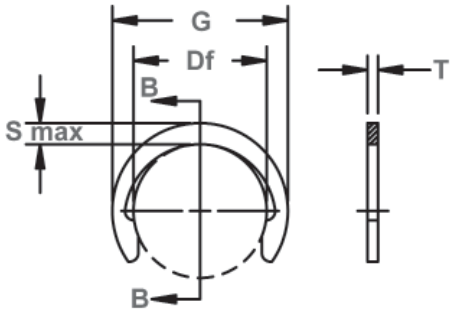
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
RE	9&12	15N	84.5-87
	15-31	30N	66.5-71
	37 +	C	47-52

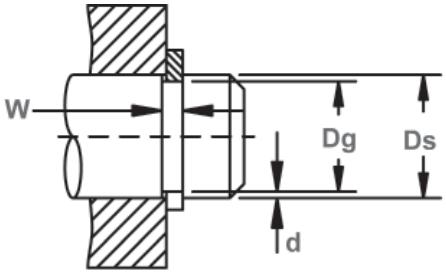
C Shaft Rings

Radially Assembled, External Crescent

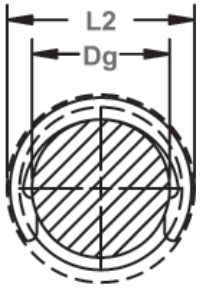
Ideal for low clearance applications where radial installation is preferred.



Free Diameter & Ring Measurements with Section B-B



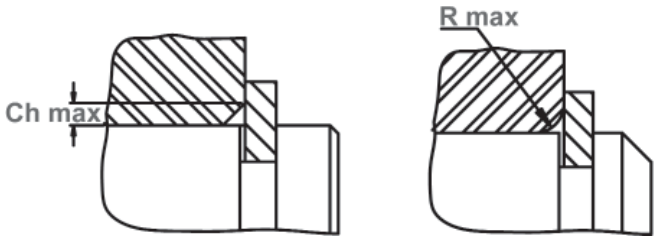
Shaft Diameter & Groove Dimensions



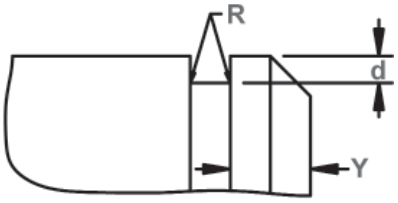
Clearance Diameter Installed In Groove

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD. (lbs.) Sqr. Corner Abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS**		Wght. Per 1000 Pcs.	Free out-side dia. REF.	Re-leased in groove	Ring Safety factor of 4	Groove Safety factor of 2
	Ds DEC	Ds FRACT	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	G	L2	Pr	Pg
C-12	.125	1/8	3.2	.106	±.0015	.020	+.002	.0095	.102	+.002	.015		.030	.165	.18	86	45
C-15	.156	5/32	4.0	.135	*.0015	.020	-.000	.0105	.131	-.004	.015		.052	.205	.22	102	55
C-18	.188	3/16	4.8	.165		.020		.011	.161		.015		.062	.244	.25	132	70
C-21	.219	7/32	5.6	.193	±.002*.0015	.029		.013	.187		.025		.120	.275	.29	264	100
C-23	.236	15/64	6.0	.208	±.002*.002	.029		.014	.203		.025		.15	.295	.31	284	115
C-25	.250	1/4	6.4	.220		.029		.015	.211	±.003	.025		.157	.311	.33	294	130
C-28	.281	9/32	7.1	.247		.029		.017	.242	-.005	.025		.19	.346	.36	335	165
C-31	.312	5/16	7.9	.276	±.002	.029		.018	.270		.025		.226	.376	.39	376	200
C-37	.375	3/8	9.5	.335	*.002	.029		.020	.328		.025		.300	.448	.47	447	270
C-40	.406	13/32	10.3	.364		.029		.021	.359		.025		.352	.486	.50	487	300
C-43	.438	7/16	11.1	.393		.029		.022	.386		.025		.359	.517	.53	528	350
C-50	.500	1/2	12.7	.450		.039	+.003	.025	.441	±.006	.035	±.002	.671	.581	.60	842	450
C-56	.562	9/16	14.3	.507		.039	-.000	.028	.497		.035		.710	.653	.67	944	550
C-62	.625	5/8	15.9	.563		.039		.031	.553		.035		.937	.715	.74	1045	700
C-68	.688	11/16	17.5	.619	±.003	.046		.034	.608		.042		1.3	.784	.80	1726	800
C-75	.750	3/4	19.0	.676	*.004	.046		.037	.665		.042		1.5	.845	.87	1878	1000
C-81	.812	13/16	20.6	.732		.046		.040	.721	±.007	.042		1.7	.915	.94	2040	1150
C-87	.875	7/8	22.2	.789		.046		.043	.777		.042		2.0	.991	1.01	2202	1300
C-93	.938	15/16	23.8	.843		.046		.047	.830		.042		2.3	1.058	1.08	2355	1550
C-100	1.000	1	25.4	.900		.046		.050	.887		.042		2.7	1.130	1.15	2517	1800
C-112	1.125	1-1/8	28.6	1.013		.056		.056	.997		.050		4.0	1.267	1.30	3370	2200
C-125	1.250	1-1/4	31.7	1.126	±.004	.056		.062	1.110	±.008	.050		5.1	1.415	1.44	3735	2700
C-137	1.375	1-3/8	34.9	1.237	*.005	.056	+.004	.069	1.220		.050		6.1	1.555	1.58	4111	3350
C-150	1.500	1-1/2	38.1	1.350		.056	-.000	.075	1.331		.050		7.6	1.691	1.72	4486	4000
C-162	1.625	1-5/8	41.3	1.483	±.005	.068		.071	1.463		.062		11.0	1.853	1.88	5506	4650
C-175	1.750	1-3/4	44.4	1.576	*.005	.068		.087	1.555	±.010	.062	±.003	12.9	1.975	2.01	6526	5300
C-200	2.000	2	50.8	1.800		.068		.100	1.777		.062		16.2	2.257	2.30	7410	7000

***F.I.M.(FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
**** FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**



Maximum Corner Radius & Chamfer



Enlarged Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 For rings sizes -12 thru -43; .010 For ring sizes -46 thru -100; .015 For sizes -112 thru -200

RING NO.	MAXIMUM SECTION		ALLOWABLE CORNER RADII & CHAMFERS		MAX LOAD w/ R max or Ch max (in lbs.)	EDGE MARGIN	R.P.M. LIMITS Standard material
	S max	Tol.	R max	Ch max	P'r	Y	
C-12	.031		.014	.011	85	.020	80000
C-15	.037	±.003	.018	.014	100	.020	75000
C-18	.042		.021	.016	110	.022	73000
C-21	.044		.021	.016	260	.026	71000
C-23	.046		.022	.017	275	.028	62000
C-25	.050		.023	.018	290	.030	60000
C-28	.051		.021	.016	310	.034	56000
C-31	.053	±.004	.024	.018	310	.036	52000
C-37	.060		.026	.020	310	.040	43000
C-40	.063		.027	.021	310	.042	40000
C-43	.065		.029	.022	310	.044	31000
C-50	.070		.030	.023	610	.050	25000
C-56	.078		.033	.025	610	.056	22000
C-62	.081		.033	.025	610	.062	20000
C-68	.086	±.005	.034	.026	880	.068	18500
C-75	.090		.036	.027	880	.074	17500
C-81	.097		.038	.029	880	.080	16000
C-87	.105		.040	.031	880	.086	15000
C-93	.112		.043	.033	880	.094	14000
C-100	.120		.046	.035	880	.100	12500
C-112	.135		.052	.040	1250	.112	11500
C-125	.150		.057	.044	1250	.124	10500
C-137	.165	±.007	.062	.048	1250	.138	9500
C-150	.180		.069	.053	1250	.150	8500
C-162	.195		.075	.058	1920	.162	8000
C-175	.210		.081	.062	1920	.174	7500
C-200	.240		.091	.070	1920	.200	6000

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
C	12-18	15N	82.5-86*
	21-81	30N	63-69.5
	87+	C	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
C	12-62	15N	77-82*
	68-81	30N	54-62
	87+	C	34-43

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

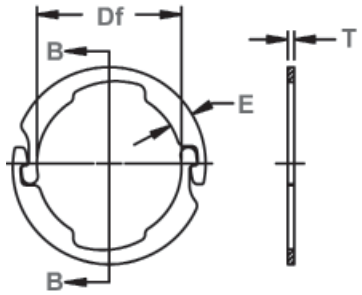
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
C	12-18	15N	86-88.5*
	21-43	30N	67.5-72
	50-81	30N	66-71
	87+	C	47-52

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

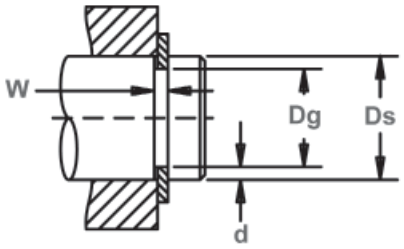
LC Shaft Rings

Radially Assembled, External Interlocking

The LC ring is produced in two identical halves. The ends interlock into a groove on a shaft and, once assembled, are dynamically balanced. As a result, they are particularly effective at retaining assemblies with extremely high rotational speeds.

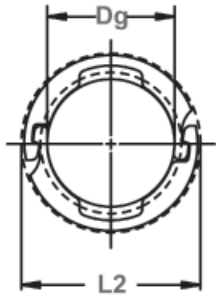


Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions

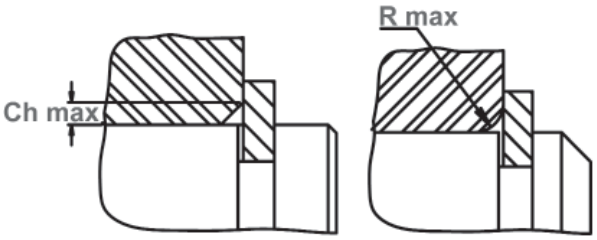

Plier Notch Design (Call for additional information)



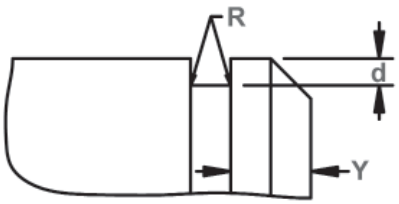
Clearance Diameter Installed in Groove

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE	î Thrust ld. (lbs.) Sq. Corner Abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight Per 1000 Rings (2 Halves)	In-stalled in groove	Ring Safety factor of 3	Groove Safety factor of 2
	Ds DEC	Ds FRACT	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L2	Pr	Pg
LC-46	.469	15/32	11.9	.419	±.0015	.039		.025	.414		.035		1.36	.640	2030	620
LC-50	.500	1/2	12.7	.464	.004*	.039		.018	.459		.035		1.50	.680	2132	480
LC-59	.594	19/32	15.1	.544		.039	+.003	.025	.538	±.002	.035		1.74	.766	2538	790
LC-62	.625	5/8	15.9	.575		.039	-.000	.025	.569		.035		1.82	.797	2690	830
LC-66	.669	-	17.0	.599		.046		.035	.593		.042		3.1	.886	3400	1250
LC-75	.750	3/4	19.0	.680	±.002	.046		.035	.673	±.003	.042	±.002	3.5	.967	3806	1400
LC-78	.781	25/32	19.8	.711	*.004	.046		.035	.703		.042		3.6	.998	4009	1450
LC-87	.875	7/8	22.2	.805		.046		.035	.796		.042		3.8	1.092	4466	1600
LC-98	.984	63/64	25.0	.872	±.003	.056		.056	.863		.050		7.3	1.273	5938	2900
LC-98	1.000	1	25.4	.872	*.004	.056		.064	.863		.050		7.3	1.273	5938	3400
LC-112	1.125	1-1/8	28.6	1.013		.056		.056	1.002		.050		7.9	1.42	6801	3350
LC-118	1.188	1-3/16	30.2	1.075	±.003	.056	+.004	.056	1.064	±.004	.050		8.5	1.48	7207	3500
LC-125	1.250	1-1/4	31.7	1.138	*.005	.056	-.000	.056	1.126		.050		8.9	1.54	7562	3700
LC-137	1.375	1-3/8	34.9	1.263		.056		.056	1.250		.050		9.6	1.67	8323	4100
LC-150	1.500	1-1/2	38.1	1.388		.056		.056	1.374		.050		10.6	1.79	9084	4450
LC-156	1.562	1-9/16	39.7	1.427		.068		.068	1.412		.062		16.4	1.91	11926	5650
LC-162	1.625	1-5/8	41.3	1.489		.068		.068	1.474		.062		17.5	1.97	12434	5850
LC-175	1.750	1 -3/4	44.4	1.614	±.005	.068		.068	1.597	±.005	.062		18.4	2.10	13398	6300
LC-175	1.772	-	45.0	1.614	*.005	.068		.078	1.597		.062		18.4	2.10	13398	7350
LC-187	1.875	1-7/8	47.6	1.739		.068		.068	1.721		.062		20.8	2.22	14312	6800
LC-196	1.969	1-31/32	50.0	1.797		.086		.086	1.779		.078		31.0	2.37	18524	9000
LC-200	2.000	2	50.8	1.828		.086		.086	1.809		.078		31.6	2.40	18778	9150
LC-212	2.125	2-1/8	54.0	1.953	±.005	.086	+.005	.086	1.933	±.006	.078	±.003	34.2	2.52	19996	9700
LC-212	2.156	2-5/32	54.8	1.953	*.006	.086	-.000	.101	1.933		.078		34.2	2.52	19996	11500
LC-225	2.250	2-1/4	57.1	2.078		.086		.086	2.057		.078		37.3	2.65	21112	10300
LC-237	2.375	2-3/8	60.3	2.203		.086		.086	2.180		.078		38.9	2.77	22330	10800
LC-250	2.500	2-1/2	63.5	2.328		.086		.086	2.304		.078		39.7	2.90	23548	11400
LC-262	2.625	2-5/8	66.7	2.453		.086		.086	2.428		.078		43.9	3.02	24665	12000
LC-275	2.750	2-3/4	69.8	2.544		.103		.103	2.518		.093		63.2	3.25	30653	15000
LC-287	2.875	2-7/8	73.0	2.669	±.006	.103		.103	2.642	±.008	.093		68.4	3.37	32074	15700
LC-300	3.000	3	76.2	2.794	*.006	.103		.103	2.754		.093		70.4	3.50	33495	16400
LC-325	3.250	3-1/4	82.5	3.044		.103		.103	3.013		.093		77.6	3.75	36286	17800
LC-337	3.375	3-3/8	85.7	3.145		.120		.115	3.114		.109		94.0	3.99	44153	20600

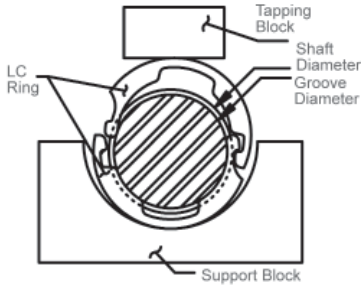
*F.I.M. (FULL INDICATOR MOVEMENT) -MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
***FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -46 thru -98; .010 for ring sizes -112 thru -200; .015 for ring sizes -212 thru -337.



V-Block Assembly

RING NO.	MAXIMUM SECTION		ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD W/R max or Ch max (lbs)	EDGE MARGIN	R.P.M. LIMITS Standard Material
	E	Tol.	R max	Ch max	P'r	Y	
LC-46	.105		.052	.040	610	.075	50000
LC-50	.105		.052	.040	610	.054	50000
LC-59	.105	±.005	.052	.040	610	.075	46000
LC-62	.105		.052	.040	610	.075	45000
LC-66	.135		.065	.050	880	.105	43000
LC-75	.135		.065	.050	880	.105	40000
LC-78	.135		.065	.050	880	.105	39000
LC-87	.135		.065	.050	880	.105	35000
LC-98	.188		.086	.066	1250	.168	31000
LC-98	.188	±.006	.081	.062	1250	.192	30000
LC-112	.188		.086	.066	1250	.168	28000
LC-118	.188		.086	.066	1250	.168	27000
LC-125	.188		.086	.066	1250	.168	26000
LC-137	.188		.086	.066	1250	.168	24000
LC-150	.188		.086	.066	1250	.168	22000
LC-156	.222		.100	.077	1900	.204	21000
LC-162	.222		.100	.077	1900	.204	20500
LC-175	.222		.100	.077	1900	.204	19000
LC-175	.222		.094	.072	1900	.234	19000
LC-187	.222		.100	.077	1900	.204	17000
LC-196	.262		.114	.088	3050	.258	15500
LC-200	.262		.114	.088	3050	.258	15000
LC-212	.262	±.007	.114	.088	3050	.258	14300
LC-212	.262		.104	.080	3050	.303	14300
LC-225	.262		.114	.088	3050	.258	13500
LC-237	.262		.114	.088	3050	.258	12800
LC-250	.262		.114	.088	3050	.258	12000
LC-262	.262		.114	.088	3050	.258	11300
LC-275	.323		.143	.110	4300	.309	10500
LC-287	.323		.143	.110	4300	.309	9800
LC-300	.329	±.008	.143	.110	4300	.309	9000
LC-325	.325		.144	.111	4300	.309	7500
LC-337	.395		.182	.140	5950	.345	6800

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
LC	All	C	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
LC	46-62	30N	56.5-62
	66 & over	C	37-43

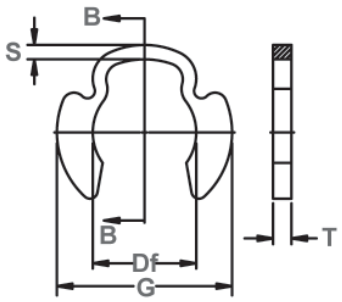
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
LC	46-62	30N	65.5-70.5
	66 & over	C	47-52

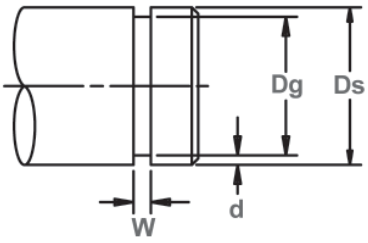
PO/POL Shaft Rings

Radially Assembled, External Poodle

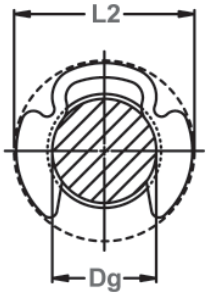
The PO ring features wide "ears" (resembling those of a poodle dog, thus the name) which offer extra retention surface against the retained part. PO rings also come in thinner sizes as a standard series of rings known as POL.



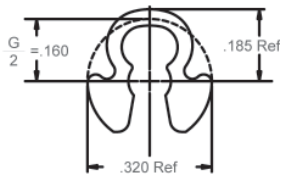
Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions



Clearance Diameter Installed In Groove

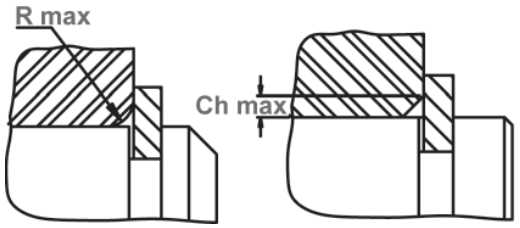


PO-15 & POL-15 Only**

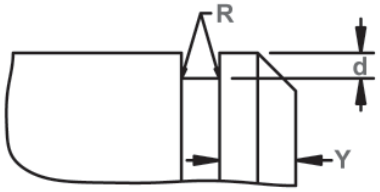
RING NO.	SHAFT DIAMETER			GROOVE SIZE						RING SIZE & WEIGHT					CLR. DIA.	î THRUST LD. (lbs.) Sqr. Corner Abutment	
				DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight Per 1000 Pcs.	In-stalled in groove	Ring Safety factor of 2 1/2	Groove Safety factor of 2
	Ds DEC	Ds FRACT	Ds mm	Dg	Tol.	F.I.M*	W	Tol.	d ref.	Df	Tol.	T	Tol.	lbs.	L2	Pr	Pg
PO-15	.156	5/32	4.0	.120	±.004	.002	.039		.018	.110		.035		.42	.39	457	110
PO-18	.188	3/16	4.8	.148	±.005	.002	.039		.020	.140	±.003	.035		.63	.42	609	130
PO-25	.250	1/4	6.4	.210		.003	.039		.020	.188		.035		.84	.52	914	200
PO-31	.312	5/16	7.9	.272	±.006	.003	.046	+.006	.020	.250		.042	±.002	1.46	.63	1320	250
PO-37	.375	3/8	9.5	.331		.003	.046		.022	.312		.042		1.92	.72	1573	300
PO-43	.438	7/16	11.1	.390		.003	.056		.024	.375	±.004	.050		2.66	.79	2233	400
PO-50	.500	1/2	12.7	.440	±.008	.004	.056		.030	.406		.050		3.30	.89	2538	600
PO-62	.625	5/8	15.9	.531		.004	.056		.047	.500	±.005	.050		4.65	1.03	3045	1100
PO-75	.750	3/4	19.0	.632		.004	.068		.059	.594		.062		6.35	1.17	4669	1600
PO-100	1.000	1	25.4	.860	±.010	.004	.086	+.008	.070	.812	±.006	.078	±.003	12.65	1.51	7613	2600
PO-125	1.250	1 -1/4	31.8	1.090		.006	.103		.080	1.032		.093		25.20	1.90	11165	3500
PO-150	1.500	1 -1/2	38.1	1.317		.008	.120		.091	1.250	±.008	.109		36.3	2.18	15530	4800
PO-175	1.750	1-3/4	44.4	1.480	±.015	.010	.139	+.010	.135	1.406	±.010	.125	±.004	53.0	2.45	20808	8200
PO-200	2.000	2	50.8	1.730		.012	.139		.135	1.625	±.015	.125		69.2	2.83	23853	9450
POL-15	.156	5/32	4.0	.120	±.004	.002	.029		.018	.110		.025		.30	.39	325	110
POL-18	.188	3/16	4.8	.148	±.005	.002	.029		.020	.140		.025		.45	.42	436	130
POL-25	.250	1/4	6.4	.210		.003	.029		.020	.188		.025		.60	.52	650	200
POL-31	.312	5/16	7.9	.272	±.006	.003	.029	+.006	.020	.250	±.003	.025	±.002	.87	.63	792	250
POL-37	.375	3/8	9.5	.331		.003	.039		.022	.312		.035		1.60	.72	1320	300
POL-43	.438	7/16	11.1	.390		.003	.039		.024	.375	±.004	.035		1.86	.79	1878	400
POL-50	.500	1/2	12.7	.440	±.008	.004	.046		.030	.406		.042		2.77	.89	2132	600
POL-62	.625	5/8	15.9	.531		.004	.046		.047	.500	±.005	.042		3.65	1.03	2538	1100
POL-75	.750	3/4	19.0	.632	±.010	.004	.056	+.008	.059	.594		.050		5.35	1.17	3756	1600
POL-100	1.000	1	25.4	.860		.004	.056		.070	.812	±.006	.050		8.60	1.51	4872	2600

*F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
***FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.

NOTE: THIS GROUP CONTAINS ALTERNATE THICKNESS VALUES (COLUMN "T"). OTHER PARAMETERS SUCH AS WIDTH OF GROOVE ("W") AND THRUST LOAD "Pr" ALSO DIFFER FROM STANDARD VERSIONS. PLEASE TAKE THIS INTO CONSIDERATION WHEN SELECTING A PO RING FOR YOUR DESIGN.



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)Maximum bottom radii (R), .005 For ring sizes 15 thru 50; .010 For ring sizes 62 thru 100 .015 For ring sizes 125 thru 150; .020 For ring sizes 175 thru 200

Optional Center Prong Design

Optional Center Prong Design PO-125 thru 200

RING NO.	OUTSIDE DIA.	LARGE SECT.	ALLOWABLE CORNER RADII & CHAMFERS		MAX LOAD W/ R max or Ch max in (lbs.)	EDGE MARGIN	R.P.M. LIMITS Steel Rings
	G ref.	S	R max	Ch max	P'r (lbs.)	y min	
PO-15	**	.042	.050	.040	250	.036	80000
PO-18	.400	.048	.050	.040	270	.040	80000
PO-25	.482	.058	.050	.040	310	.040	65000
PO-31	.588	.074	.065	.050	400	.040	65000
PO-37	.680	.081	.065	.050	430	.044	65000
PO-43	.752	.081	.080	.060	600	.048	60000
PO-50	.826	.097	.080	.060	630	.060	50000
PO-62	.966	.086	.080	.060	720	.094	45000
PO-75	1.095	.095	.085	.065	1000	.118	38000
PO-100	1.415	.113	.090	.065	1800	.140	25000
PO-125	1.800	.180	.090	.065	2750	.160	11000
PO-150	2.050	.208	.10	.07	3800	.182	9000
PO-175	2.300	.235	.12	.09	5100	.270	7000
PO-200	2.650	.250	.13	.10	5100	.270	5000
POL-15	**	.042	.050	.040	130	.036	80000
POL-18	.400	.048	.050	.040	140	.040	80000
POL-25	.482	.058	.050	.040	150	.040	65000
POL-31	.588	.074	.050	.040	150	.040	65000
POL-37	.680	.081	.065	.050	200	.044	65000
POL-43	.752	.081	.065	.050	300	.048	60000
POL-50	.826	.097	.080	.060	450	.060	50000
POL-62	.966	.086	.080	.060	500	.094	45000
POL-75	1.095	.095	.090	.070	650	.118	38000
POL-100	1.415	.113	.090	.070	740	.140	25000

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

SEE NOTE ON PREVIOUS PAGE.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
PO	All	C	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
PO	15-25	30N	54-62
	31+	C	34-43

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
PO	All	C	47-53

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
POL	15-31	30N	63-69.5
	37+	C	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
POL	15-43	30N	54-62
	50+	C	34-43

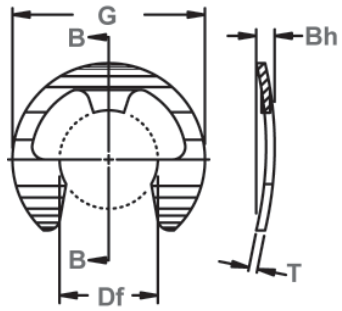
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
POL	15-31	30N	65.5-71
	37+	C	47-53

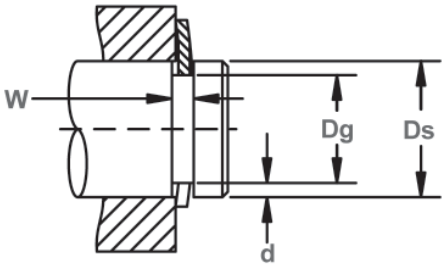
BE Shaft Rings

Radially Assembled, External Bowed 'E'

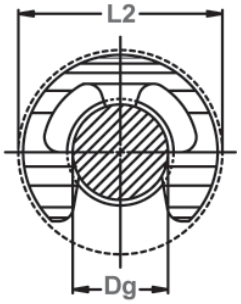
Compensating for accumulated tolerances is what a BE "Bowed" retaining ring is designed to do on a shaft. Once snapped into the groove, bowed rings exert a force or a "preload" on the retained parts for the range specified.



Free Diameter & Ring Measurements With Section B-B



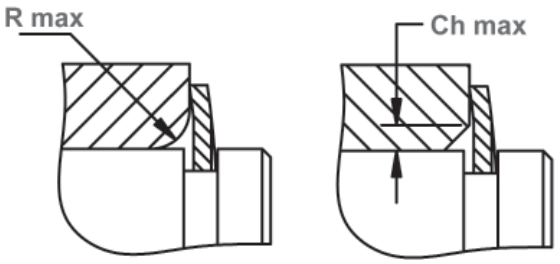
Shaft Diameter & Groove Dimensions



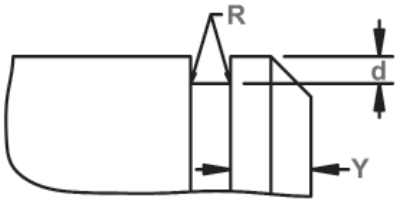
Clearance Diameter Installed In Groove

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE AND WEIGHT						CLEARANCE DIAMETER		
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		BOW HEIGHT		Weight Per 1000 Pcs.	Out-side dia. REF.	Installed in groove
	Ds DEC	Ds FRACT	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	Bh min.	Bh max	lbs.	G	L2
BSE-11	.110	7/64	2.8	.079	+.002	.022		.015	.076		.010		.025	.035	.20	.375	.390
BE-12	.125	1/8	3.2	.095	-.000	.022		.015	.094		.010	±.001	.025	.035	.06	.230	.240
BSE-14	.140	9/64	3.6	.102	.0015*	.019		.019	.100		.010		.022	.032	.040	.203	.215
BE-14	.140	9/64	3.6	.105		.025		.017	.102		.015		.028	.038	.13	.270	.285
BE-15	.156	5/32	4.0	.116		.027		.020	.114	+.001	.015		.030	.040	.13	.282	.295
BSE-17	.172	11/64	4.4	.127	+.002	.029		.022	.125	-.003	.015		.032	.042	.16	.312	.325
BE-18	.188	3/16	4.8	.147	-.000	.030		.020	.145		.015		.033	.043	.17	.335	.35
BSE-18	.188	3/16	4.8	.125	.002*	.035	+.003	.031	.122		.015		.038	.048	.27	.375	.39
BSE-21	.219	7/32	5.6	.188		.040	-.000	.015	.185		.015		.043	.058	.28	.437	.45
BE-25	.250	1/4	6.3	.210		.047		.020	.207		.025		.050	.065	.76	.527	.54
BSE-31	.312	5/16	7.9	.250		.047		.031	.243	+.002	.025	±.002	.050	.065	.57	.500	.52
BE-37	.375	3/8	9.5	.303		.060		.036	.300	-.004	.035		.060	.076	1.5	.660	.68
BE-43	.438	7/16	11.1	.343		.060		.047	.337		.035		.060	.076	1.5	.687	.71
BSE-43	.438	7/16	11.1	.380	+.003	.057		.029	.375		.035		.060	.076	1.0	.600	.62
BE-50	.500	1/2	12.7	.396	-.000	.073		.052	.392		.042		.075	.093	2.5	.800	.82
BE-62	.625	5/8	15.9	.485	.004*	.077		.070	.480		.042		.080	.098	3.2	.940	.96
BSE-74	.744	-	18.9	.625		.085		.060	.616		.050		.090	.110	4.3	1.000	1.02
BSE-74	.750	3/4	19.0	.625		.085		.062	.616		.050		.090	.110	4.3	1.000	1.02
BE-75	.750	3/4	19.0	.580		.085		.085	.574	+.003	.050		.090	.110	5.8	1.120	1.14
BE-87	.875	7/8	22.2	.675		.085		.100	.668	-.005	.050		.090	.110	7.6	1.300	1.32
BSE-98	.984	63/64	25	.835		.085		.074	.822		.050		.088	.112	9.38	1.500	1.530

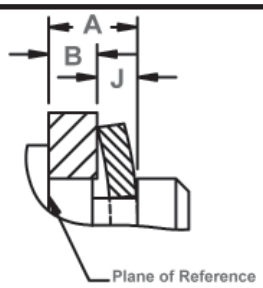
***F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
*****FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS.**



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 For ring sizes BSE-11 Thru -25; 010 For ring sizes BSE-31 Thru BSE-43; .015 For ring sizes 50 and over.



Outer Groove Wall Location
A max=B min + J max
A min=B max + J min

RING NO.	DISTANCE Outer groove wall to face of retained part		TAKE-UP Resil-ient take-up of tolerances a & b	FORCE Needed to flatten rings	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (in lbs.)	EDGE MARGIN	R.P.M LIMITS Stan-dard materials	ì THRUST LD. (lbs.) Sqr. corner abutment	
										Ring Safety factor of 3	Groove Safety factor of 2
	J min	J max	J max-J min	lbs.	R max	Ch max	(lbs.)	Y		Pr	Pg
BSE-11	.017	.022	.005	19	.080	.060	60	.030	35000	61	40
BE-12	.017	.022	.005	8	.040	.030	43	.030	35000	44	45
BSE-14	.014	.018	.004	6	.029	.022	50	.038	32000	51	60
BE-14	.020	.023	.003	16	.060	.045	75	.034	32000	76	60
BE-15	.022	.027	.005	15	.060	.045	80	.040	31000	81	75
BSE-17	.023	.029	.006	14	.060	.045	90	.044	30000	91	90
BE-18	.023	.030	.007	12	.060	.045	95	.040	30000	96	90
BSE-18	.026	.034	.008	16	.060	.045	100	.062	30000	102	135
BSE-21	.029	.039	.010	12	.060	.045	115	.030	26000	117	75
BE-25	.036	.046	.010	35	.060	.045	255	.040	25000	259	115
BSE-31	.036	.046	.010	30	.060	.045	325	.062	22000	330	225
BE-37	.045	.055	.010	55	.065	.050	690	.072	20000	700	315
BE-43	.045	.055	.010	50	.065	.050	830	.094	16500	842	480
BSE-43	.045	.055	.010	65	.050	.035	800	.058	16500	812	280
BE-50	.056	.070	.014	90	.080	.060	1110	.104	14000	1127	600
BE-62	.061	.075	.014	85	.080	.060	1420	.140	12000	1441	1050
BSE-74	.069	.085	.016	110	.057	.062	1900	.118	11000	1940	1050
BSE-74	.069	.085	.016	110	.042	.062	1900	.124	11000	1979	1100
BE-75	.069	.085	.016	110	.085	.065	2000	.170	10500	2030	1500
BE-87	.069	.085	.016	120	.085	.065	2350	.200	9000	2385	2050
BSE-98	.067	.083	.016	110	.085	.065	2700	.148	6500	2600	1750

ì BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA PLEASE CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT. LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
BE	BE12-BSE14	15N	82.5-86*
	BSE11,BE14-BSE21	15N	82.5-86
	BE25-BSE31	30N	63-69.5
	BE37+	C	44-51

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
BE All	BSE12-BSE14	15N	84.5-87*
	BSE11,BE14-BSE21	15N	84.5-87
	BE25-BSE31	30N	66.5-71
	BE37+	C	47-52

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

HARDNESS RANGES: BERYLLIUM COPPER RINGS

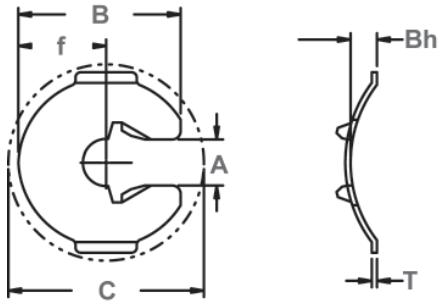
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
BE	BE12-BSE14	15N	77-82*
	BSE11,BE14-BSE21	15N	77-82
	BE25&BSE31	30N	54-62
	BE37+	C	34-43

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

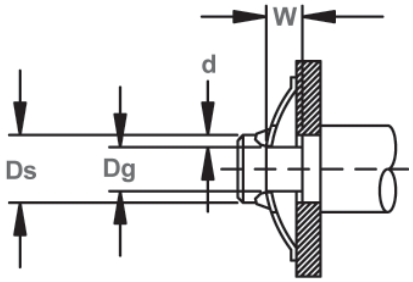
EL Shaft Rings

Radially Assembled, External Bowed Locking

Another variation of a bowed E ring is the EL. In addition to the bowed design for eliminating "play" in an assembly, it also features two prongs, which extend from the inner circumference to the open end locking the ring firmly into place.



Ring Measurements

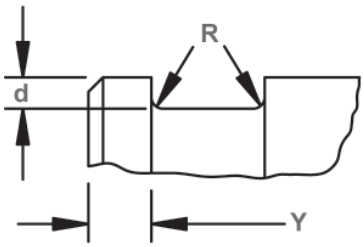


Shaft Diameter & Groove Dimensions

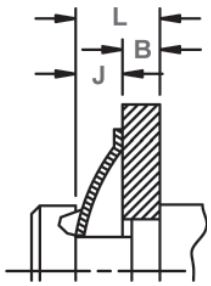
RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT									CLR. DIA.	îTHRUST LOAD (lbs.sq. corner abutment)	
				DIAMETER		WIDTH		DEPTH	LENGTH		THICKNESS***		BOW HEIGHT		GAP		WGHT. PER 1000 Pcs.	Released In Groove	Ring Safety Factor Of 3	Groove Safety Factor Of 3
	DEC	Tol.	FRACT	Dg	Tol.	W	TOL.	d	B	Tol.	T	Tol.	Bh	Tol.	A	Tol.	LBS.	C	Pr	Pg
EL-9	.092		3/32	.061	±.001	.035		.016	.307		.010		.050		.063		.23	.370	80	35
EL-12	.125	±.002	1/8	.082	±.0015	.035		.021	.307		.010	±.001	.050		.086	±.004	.19	.370	102	60
EL-18	.188		3/16	.124	±.002	.045	+.005	.032	.390	±.010	.015		.060	±.010	.130		.47	.480	203	140
EL-25	.250	±.003	1/4	.165		.055	-.000	.042	.500		.015	±.002	.070		.172	±.005	.77	.620	305	250
EL-31	.312		5/16	.228	±.003	.080		.042	.620		.015		.095		.234		1.3	.790	355	300
EL-37	.375		3/8	.270		.095		.052	.740		.020		.130		.280		2.2	.940	555	450

î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT. LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

*****For plated rings, add .002" to the listed maximum thickness.**



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R) .005 for ring sizes
-9 thru -25; .010 for ring sizes -31 thru -37



Outer Grove Wall Location
Lmax=Bmin + Jmax
Lmin=Bmax + Jmin

RING NO.	DISTANCE OUTER GROOVE WALL TO FACE OF RETAINED PART		RESILIENT TAKE-UP OF TOLERANCES OF A&B	FORCE NEEDED TO FLATTEN RINGS	APPROX. AV RESILIENT RES. (lbs) WITHIN J MAX. & J MIN		f	EDGE MARGIN
	J MIN.	J MAX.	J MAX. - J MIN.	LBS.	IN-STALLED	FLAT-TENED	REF.	Y
EL-9	.030	.038	.008	30	9	3.5	.166	.031
EL-12	.030	.040	.010	30	8	3.0	.166	.043
EL-18	.039	.049	.010	60	20	5.5	.213	.064
EL-25	.045	.060	.015	60	15	7.0	.280	.085
EL-31	.070	.085	.015	60	6	4.0	.360	.084
EL-37	.080	.105	.025	80	19	7.0	.427	.105

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
EL	9&12	15N	82.5-86*
	18-31	15N	82.5-86
	37	30N	63-69.5

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
EL	9&12	15N	77-82*
	18-37	15N	77-82

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

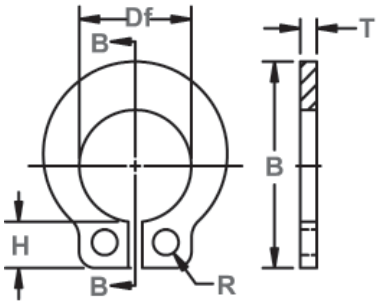
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
EL	9&12	15N	83.5-86*
	18&25	15N	83.5-86
	31&37	30N	65-69.5

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

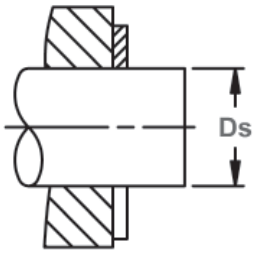
SHF Shaft Rings

External, Self-Locking Friction

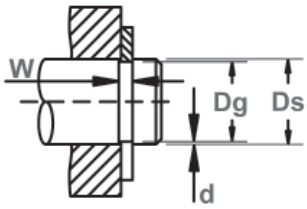
The SHF ring resembles a regular SH ring except that it its designed to function on a shaft without a groove. The design of the ring causes it to exert significant gripping power uniformly on the shaft (except where the gap occurs.)



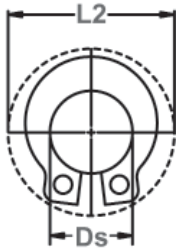
Free Diameter & Ring Measurements With Section B-B



Without Groove



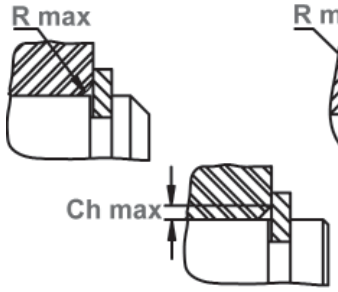
Optional Use in Groove (Larger Sizes)



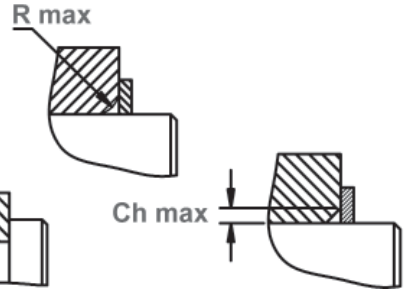
Clearance Diameter Expanded Over Shaft

RING NO.	SHAFT DIAMETER				GROOVE SIZE DIAMETER		GROOVE SIZE WIDTH		GROOVE SIZE DEPTH	RING SIZE & WEIGHT FREE DIAMETER		RING SIZE & WEIGHT THICKNESS***		Weight Per 1000 Pcs.	CLEAR. Released over shaft	î THRUST LD.(lbs.) Sqr. corner abutment Allowable load (lbs.)	Groove Safety factor of 2
	Ds DEC FROM	Ds DEC TO	Ds FRACT	Ds mm	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	lbs.	L2	Pr	Pg
SHF-6	.058	.060	-	1.5	NOT RECOMMENDED FOR USE WITH GROOVES					.055	+.002 -.003	.015	±.002	.030	.21	5	NOT RECOMMENDED FOR USE WITH GROOVES
SHF-7	.078	.080	5/64	2.0						.074		.025		.08	.24	8	
SHF-9	.092	.096	3/32	2.4						.089		.025		.10	.26	8	
SHF-12	.123	.127	1/8	3.2						.120		.025		.24	.33	10	
SHF-15	.154	.158	5/32	4.0						.150	+.002 -.004	.025		.30	.36	12	
SHF-18	.185	.189	3/16	4.8						.181		.035		.55	.44	20	
SHF-19	.195	.199	-	5.0						.187	±.003	.032		.45	.43	30	
SHF-23	.234	.238	15/64	6.0	.228	+.0005 -.0015	.041	+.003 -.000	.004	.224	+.002-.004	.035	±.003	.76	.48	22	70
SHF-25	.248	.252	1/4	6.3	.240		.041		.005	.238		.035		.74	.49	23	90
SHF-31	.310	.316	5/16	7.9	.303		.048		.005	.298	+.003 -.005	.042		1.39	.68	25	110
SHF-37	.373	.379	3/8	9.5	.361		.048		.007	.354		.042		1.72	.74	31	180
SHF-43	.434	.440	7/16	11.0	.419	+.001 -.002	.056	+.004 -.000	.009	.412		.050		2.61	.81	41	290
SHF-50	.497	.503	1/2	12.7	.478		.056		.011	.470	+.004 -.006	.050		2.91	.90	46	390
SHF-62	.622	.628	5/8	15.9	.599		.069		.013	.593		.062	±.004	5.70	1.06	61	570
SHF-75	.745	.755	3/4	19.0	.718	+.002-.003	.069		.016	.706		.062		6.88	1.32	66	850

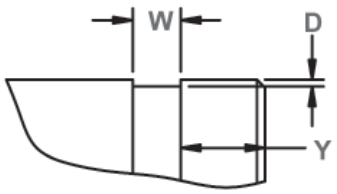
î VALUES SHOWN APPLY TO RINGS INSTALLED ON A SHAFT MADE OF LOW CARBON STEEL.
FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR PLATED RINGS, ADD.002" TO THE LISTED MAXIMUM THICKNESS.**
MAXIMUM RING THICKNESS (WHEN USED IN GROOVE) WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.



Maximum Corner Radius & Chamfer (With Grooves)



Maximum Corner Radius & Chamfer (Without Grooves)



Exploded Groove Profile & Edge Margin (Y)

Optional Lug Design

RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		EDGE MARGIN	LUG		HOLE		RING HEIGHT	R.P.M. LIMITS Standard material
	R max	Ch max	Y	H	Tol.	R	Tol.	B	
SHF-6	.025	.015		.066	±.005	.035		.145	
SHF-7	.036	.022		.071		.034	±.004	.184	
SHF-9	.042	.025	NOT RECOMMENDED	.074		.034		.207	
SHF-12	.054	.032	FOR USE WITH GROOVES	.078	±.003	.042	+.010	.268	OVER
SHF-15	.059	.035		.078		.042	-.002	.307	80000
SHF-18	.063	.038		.097		.051		.364	
SHF-19	.064	.039		.104	±.008	.051	±.004	.375	
SHF-23	.070	.042	.030	.098	±.003	.051	+.010	.422	
SHF-25	.072	.043	.030	.097		.051	-.002	.437	77000
SHF-31	.080	.048	.030	.141		.078		.553	58000
SHF-37	.086	.051	.030	.141		.078		.620	51000
SHF-43	.093	.056	.030	.151	±.004	.078	+.015	.701	44000
SHF-50	.100	.060	.040	.158		.078	-.002	.768	40000
SHF-62	.120	.072	.045	.180		.078		.948	32000
SHF-75	.125	.075	.050	.233		.120		1.115	25000

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHF	9	15N	82.5-86
	12-23	30N	63-69.5
	25+	C	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHF	9	15N	77-82
	12-23	30N	54-62
	25+	C	34-43

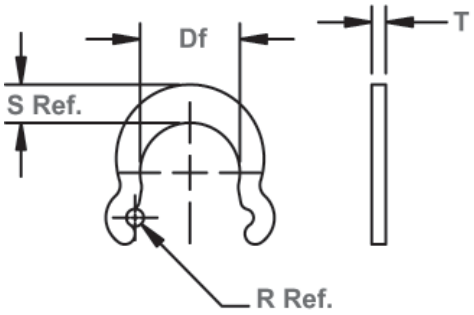
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHF	6-9	15N	83.5-86
	12-23	30N	65-69.5
	25+	C	46-51

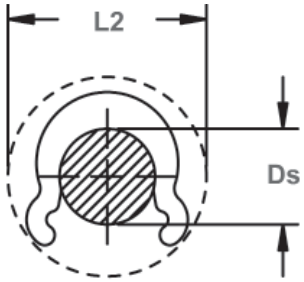
RG Shaft Rings

External, Self-Locking Radial Grip

The RG makes indentations on either side of the groove once installed which significantly increases its holding power. It can also be installed directly against the face of the retained part, virtually eliminating end play. (Note: this product works only on "soft" shafts.)



Free Diameter & Ring Measurements



Clearance Diameter
Installed On Shaft

RING NO.	SHAFT DIAMETER				RING SIZE & WEIGHT							CLEARANCE	î THRUST LOAD Allow-able load (lbs.)	RPM LIMITS Standard Material
					FREE DIAMETER		THICKNESS***		NOTCH DIA.	MAXIMUM SECTION	Weight Per 1000 Pcs.	Installed on shaft		
	Ds DEC		Ds FRACT	Ds mm										
	FROM	TO			Df	Tol.	T	TOL.	R Ref.	S Ref.	lbs.	L2	P'r	
RG-9	.092	.096	3/32	2.4	.089	+.002	.025		.040	.045	.14	.30	8	
RG-12	.123	.127	1/8	3.2	.119	-.003	.025		.040	.054	.19	.34	10	OVER 80,000
RG-15	.154	.158	5/32	4.0	.149	+.002	.025		.040	.078	.27	.38	13	
RG-18	.185	.189	3/16	4.8	.179	-.004	.035	±.002	.048	.085	.45	.44	18	
RG-25	.248	.252	1/4	6.3	.238		.035		.048	.100	.74	.54	22	
RG-31	.310	.316	5/16	7.9	.298	+.003	.042		.052	.114	1.1	.66	32	
RG-37	.373	.379	3/8	9.5	.356	-.005	.042		.052	.130	1.5	.76	42	

î VALUES SHOWN APPLY TO RINGS INSTALLED ON A SHAFT MADE OF LOW CARBON STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.

*****FOR PLATED RINGS, ADD.002" TO THE LISTED MAXIMUM THICKNESS.**

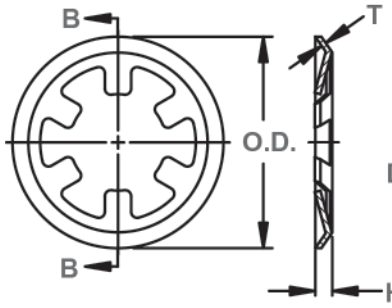
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
RG	9-15	30N	65.8-70.2
	18-37	C	47-52

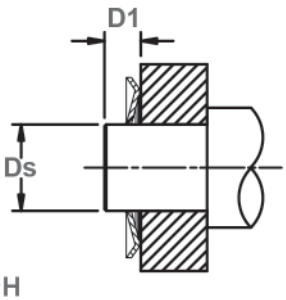
External, Self-Locking Push-On (Curved Rim)

This ring features an outer rim with a series of prongs protruding into the center. The ends create interference with the shaft when the ring is installed and a load introduced to the other side. The outer rim of the TX is curved which affords greater thrust load capacity and is easier to orient for assembly than the TY ring (next page.)

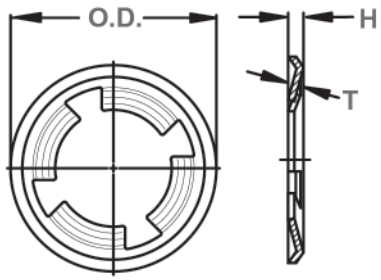
TX Shaft Rings



Outside Diameter With Section B-B



Installation View



RTX Prong Configuration

RING NO.	SHAFT DIAMETER				OUTSIDE DIAMETER		No. of prongs	*** RING HEIGHT		* THICKNESS **Standard		i Thrust Ld. @ Std. T	Wght. Per 1000 Pcs. @ Std. T	* Thick-ness Optional	i Thrust Ld. @ Opt. T	WEIGHT Per 1000 Pcs. @ Opt. T	Min. Distance Face of part to end of shaft
	Ds DEC FROM	Ds DEC TO	Ds FRACT	Ds mm	O.D.	Tol.		H	Tol.	T	Tol.	lbs.	lbs.	T Tol.	lbs.	lbs.	D1
TX-9	.091	.097	3/32	2.39	.326	±.005	3	.029	±.005	.010	±.001	27	.16	.015	45	.25	.058
TX-12	.121	.129	1/8	3.17	.366		4	.029		.010		39	.19	±.002	57	.30	.058
RTX-12	.121	.129	1/8	3.17	.366		2	.029		.010		100	.30	-	-	-	.058
TX-15	.152	.160	5/32	3.96	.397		4	.029		.010		46	.22	.015	70	.35	.058
TX-18	.184	.192	3/16	4.77	.444		6	.031	±.007	.010	±.001	56	.27	±.002	85	.42	.062
TX-25	.246	.254	1/4	6.35	.522		6	.042		.015		112	.55	.010	58	.39	.074
TX-31	.308	.316	5/16	7.92	.584		8	.042	±.008	.015		112	.64	±.001	60	.44	.074
TX-37	.371	.379	3/8	9.53	.645		8	.042		.015		122	.74		65	.48	.074
RTX-37	.371	.379	3/8	9.53	.645		4	.047	±.010	.020		250	1.14	-	-	-	.074
TX-43	.432	.442	7/16	11.1	.737		10	.045	±.009	.015		122	.96	-	-	-	.090
TX-50	.495	.505	1/2	12.7	.828	±.010	10	.054		.015	±.002	122	1.27	-	-	-	.108
TX-56	.557	.567	9/16	14.27	.889		12	.054		.015		127	1.38	-	-	-	.108
TX-62	.620	.630	5/8	15.88	.951		12	.054	±.010	.015		137	1.47	-	-	-	.108
TX-75	.745	.755	3/4	19.05	1.076		14	.054		.015		142	1.65	-	-	-	.108
TX-87	.870	.880	7/8	22.23	1.203		16	.054		.015		142	1.96	-	-	-	.108
TX-100	.995	1.005	1	25.4	1.327		18	.054		.015		142	2.29	-	-	-	.108
RTX-100	.995	1.005	1	25.4	1.327		6	.059		.020		600	3.30	-	-	-	.108

***FOR PLATED RINGS ADD .002" TO MAXIMUM THICKNESS AND HEIGHT.**
**** STANDARD THICKNESS FOR STAINLESS STEEL IS AS FOLLOWS:TX-9 - TX-37, .010"; TX-43 - TX-100, .015".**
***** FOR TX-9 - TX-18 OPTIONAL THICKNESS (.015"), ADD .005" TO RING HEIGHT VALUES (H) SHOWN.**
FOR TX-25 - TX-37 OPTIONAL THICKNESS (.010), DEDUCT.005" FROM RING HEIGHT VALUES (H) SHOWN.
THRUST LOAD CAPACITY IF APPLICABLE TO PARTS MADE FROM CARBON SPRING STEEL AND STAINLESS STEEL MATERIALS ONLY INSTALLED ON LOW CARBON STEEL SHAFTS WITHIN THE LISTED DIA. RANGE.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TX	All .010 Thick Rings	15N	82.5-86*
	All .015 Thick Rings	15N	82.5-86

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TX	All .010 Thick Rings	15N	77-82*
	All .015 Thick Rings	15N	77-82

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

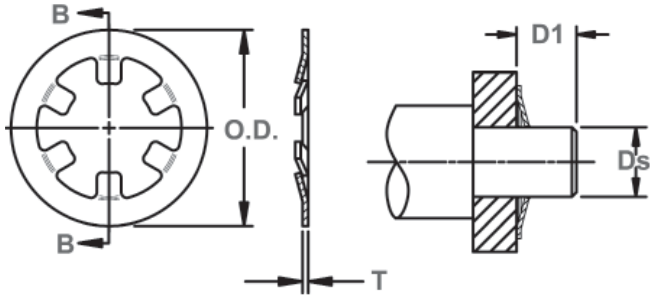
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TX	All .010 Thick Rings	15N	84-86*
	All .015 Thick Rings	15N	84-86

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

TY Shaft Rings

External, Self-Locking Push-On (Flat Rim)

This ring features an outer rim with a series of prongs protruding into the center. The ends create interference with the shaft when the ring is installed and a load introduced to the other side. The outer rim of the TY is flat.



Outside Diameter With Section B-B

Installation View

RING NO.	SHAFT DIAMETER				OUTSIDE DIAMETER		No. Of Prongs	THICKNESS*		î Thrust Load	WEIGHT Per 1000 Pcs.	Min. Distance Face of part to end of shaft
	Ds DEC-DEZ		Ds FRACT	Ds mm								
	FROM	TO			O.D.	Tol.		T	Tol.	lbs.	lbs.	D1
TY-9	.093	.095	3/32	2.39	.250	±.005	3	.010	±.001	13	.09	.040
TY-12	.124	.126	1/8	3.17	.325		4			20	.14	.040
TY-15	.155	.157	5/32	3.96	.356		4			25	.17	.040
TY-18	.187	.189	3/16	4.77	.387		6			35	.20	.040
TY-21	.218	.220	7/32	5.56	.418		6			35	.21	.040
TY-24	.239	.241	-	6.10	.460		6	.015	±.002	40	.35	.060
TY-25	.249	.251	1/4	6.35	.460		6			40	.23	.040
TY-31	.311	.313	5/16	7.92	.512		6	.010	±.001	45	.26	.040
TY-37	.374	.376	3/8	9.53	.575		6			45	.27	.040
TY-43	.437	.439	7/16	11.1	.638		6	.015	±.002	50	.47	.060
TY-50	.498	.502	1/2	12.7	.750		6			50	.72	.060
TY-56	.560	.564	9/16	14.27	.812	±.010	6			50	.75	.060
TY-62	.623	.627	5/8	15.88	.875		7			50	.82	.060
TY-75	.748	.752	3/4	19.05	1.000		8			55	.97	.060
TY-87	.873	.877	7/8	22.23	1.125		10			60	1.1	.060
TY-100	.998	1.002	1	25.4	1.250		10			65	1.2	.060

*** FOR PLATED RINGS ADD .002" TO MAXIMUM THICKNESS.**
LARGER SIZES MAY BE AVAILABLE UPON REQUEST.
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
THRUST LOAD CAPACITY IF APPLICABLE TO PARTS MADE FROM CARBON SPRING STEEL AND STAINLESS STEEL MATERIALS ONLY INSTALLED ON LOW CARBON STEEL SHAFTS WITHIN THE LISTED DIA. RANGE.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TY	9-21,25-37	15N	82.5-86*
	24,43+	15N	82.5-86

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TY	9-21,25-37	15N	77-82*
	24,43+	15N	77-82

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

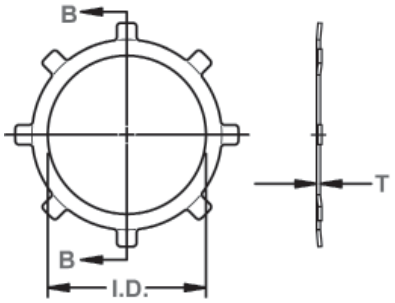
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TY	9-21,25-37	15N	84-86*
	24,43+	15N	84-86

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

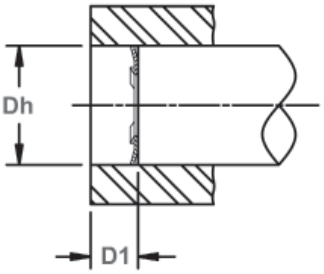
Internal, Self-Locking Push-On

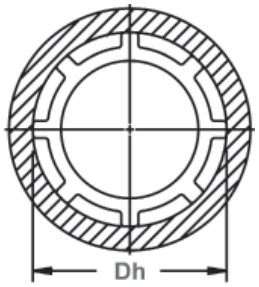
The internal version of the TY featuring a series of prongs protruding outward. The ends create interference with the housing when the ring is installed and a load introduced to the other side.

TI Housing Rings



Inside Diameter With Section B-B





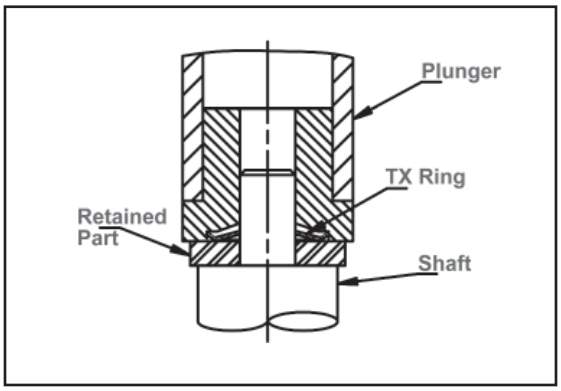
Housing Diameter

RING NO.	HOUSING DIAMETER				RING SIZE & WEIGHT							Min. Distance Face of part to end of housing
					INSIDE DIAMETER		THICKNESS***		No. of Prongs	Thrust Load	Weight Per 1000 Pcs.	
	Dh DEC FROM	Dh DEC TO	Dh FRACT	Dh mm	I.D.	Tol.	T	Tol.		lbs.	lbs.	D1
TI-31	.311	.313	5/16	7.92	.136				6	81	.11	.040
TI-37	.374	.376	3/8	9.53	.175				6	76	.16	.040
TI-43	.437	.439	7/16	11.13	.237	±.005	.010	±.001	6	71	.20	.040
TI-44	.440	.442	-	11.20	.258				6	41	.18	.040
TI-50	.498	.502	1/2	12.7	.258				6	61	.24	.040
TI-56	.560	.564	9/16	14.27	.312				6	51	.29	.040
TI-62	.623	.627	5/8	15.85	.390				6	46	.30	.040
TI-63	.638	.640	-	16.23	.390				6	43	.32	.040
TI-75	.748	.752	3/4	19.05	.500				8	76	.62	.060
TI-87	.873	.877	7/8	22.23	.625				8	71	.75	.060
TI-93	.936	.940	15/16	23.83	.687				10	71	.85	.060
TI-100	.998	1.002	1	25.4	.750				10	75	.91	.060
TI-112	1.123	1.127	1 1/8	28.58	.813	±.010	.015	±.002	10	60	1.30	.060
TI-125	1.248	1.252	1 1/4	31.75	.938				10	60	1.50	.060
TI-143	1.436	1.44	1 7/16	36.51	1.117				12	60	1.73	.060
TI-150	1.498	1.502	1 1/2	38.10	1.188				12	60	1.80	.060
TI-175	1.748	1.752	1 3/4	44.45	1.438				12	55	2.10	.060
TI-200	1.998	2.002	2	50.80	1.600				14	55	3.00	.060

*** FOR PLATED RINGS ADD .002" TO MAXIMUM THICKNESS.
LARGER SIZES MAY BE AVAILABLE UPON REQUEST.
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
THRUST LOAD CAPACITY IF APPLICABLE TO PARTS MADE FROM CARBON SPRING STEEL AND STAINLESS STEEL MATERIALS ONLY INSTALLED ON LOW CARBON STEEL SHAFTS WITHIN THE LISTED DIA. RANGE.

PLUNGER

For Fast, Easy Installation Of Rotor Clip TX, TY Rings.



A cylindrical plunger can be easily made to install TX, TY rings. The ring is positioned at the opening of the plunger and then pushed or tapped onto the shaft, as illustrated.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TI	31-62	15N	82.5-86*
	75+	15N	82.5-86

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TI	31-62	15N	77-82*
	75+	15N	77-82

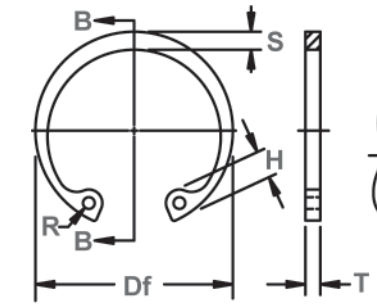
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TI	31-62	15N	84-86*
	75+	15N	84-86

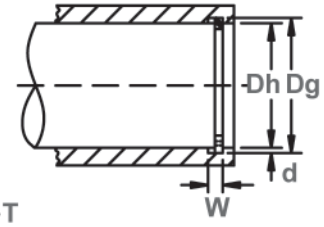
*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

DHO Housing Rings
(DIN 472)

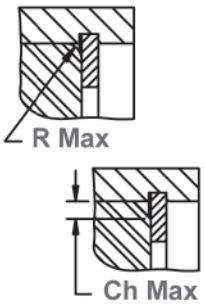
Axially Assembled, Internal, Metric
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



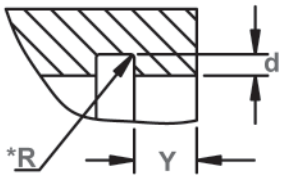
Free Diameter & Ring Measurements With Section B-B



Groove Dimensions



Allowable Corner Radius & Chamfer



Groove Details

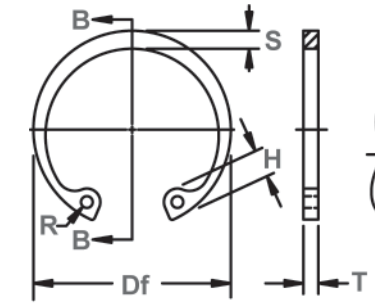

Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)

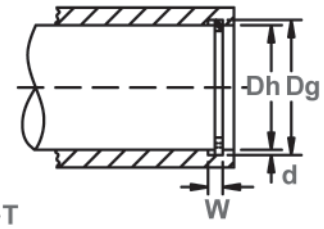

Alternate Design (Manufacturer's Option)

RING NO.	HOUSING Dia. (mm)	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R /Ch Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHO-8	8	8,4	+0,09	0,90	0,20	0,80	-0,05	8,7		2,4	1,1	1,0	0,10	0,6	2,0	0,86	0,5	1,5
DHO-9	9	9,4		0,90	0,20	0,80		9,8		2,5	1,3	1,0	0,13	0,6	2,0	0,96	0,5	1,5
DHO-10	10	10,4		1,10	0,20	1,00		10,8		3,2	1,4	1,2	0,26	0,6	4,0	1,08	0,5	2,2
DHO-11	11	11,4		1,10	0,20	1,00		11,8	+0,36	3,3	1,5	1,2	0,31	0,6	4,0	1,17	0,5	2,3
DHO-12	12	12,5		1,10	0,25	1,00		13,0	-0,10	3,4	1,7	1,5	0,37	0,8	4,0	1,60	0,5	2,3
DHO-13	13	13,6	+0,11	1,10	0,30	1,00		14,1		3,6	1,8	1,5	0,42	0,9	4,2	2,10	0,5	2,3
DHO-14	14	14,6		1,10	0,30	1,00		15,1		3,7	1,8	1,7	0,52	0,9	4,5	2,25	0,5	2,3
DHO-15	15	15,7		1,10	0,35	1,00		16,2		3,7	2,0	1,7	0,56	1,1	5,0	2,80	0,5	2,3
DHO-16	16	16,8		1,10	0,40	1,00		17,3		3,8	2,0	1,7	0,60	1,2	5,5	3,40	1,0	2,6
DHO-17	17	17,8		1,10	0,40	1,00		18,3		3,9	2,1	1,7	0,65	1,2	6,0	3,60	1,0	2,5
DHO-18	18	19,0		1,10	0,50	1,00		19,5		4,1	2,2	2,0	0,74	1,5	6,5	4,80	1,0	2,6
DHO-19	19	20,0		1,10	0,50	1,00		20,5		4,1	2,2	2,0	0,83	1,5	6,8	5 ,10	1,0	2,6
DHO-20	20	21,0	+0,13	1,10	0,50	1,00		21,5	+0,42	4,2	2,3	2,0	0,90	1,5	7,2	5,40	1,0	2,6
DHO-21	21	22,0		1,10	0,50	1,00		22,5	-0,13	4,2	2,4	2,0	1,00	1,5	7,6	5,70	1,0	2,6
DHO-22	22	23,0		1,10	0,50	1,00		23,5		4,2	2,5	2,0	1,10	1,5	8,0	5,90	1,0	2,7
DHO-23	23	24,1		1,30	0,55	1,20		24,6		4,2	2,5	2,0	1,34	1,7	8,0	6,80	1,0	4,6
DHO-24	24	25,2		1,30	0,60	1,20	-0,06	25,9		4,4	2,6	2,0	1,42	1,8	13,9	7,70	1,0	4,6
DHO-25	25	26,2		1,30	0,60	1,20		26,9	+0,42	4,5	2,7	2,0	1,50	1,8	14,6	8,00	1,0	4,7
DHO-26	26	27,2	+0,21	1,30	0,60	1,20		27,9	-0,21	4,7	2,8	2,0	1,60	1,8	13,8	8,40	1,0	4,6
DHO-27	27	28,4		1,30	0,70	1,20		29,1		4,7	2,9	2,0	1,75	2,1	13,3	10,10	1,0	4,5
DHO-28	28	29,4		1,30	0,70	1,20		30,1		4,8	2,9	2,0	1,80	2,1	13,3	10,50	1,0	4,5
DHO-29	29	30,4		1,30	0,70	1,20		31,1		4,8	3,0	2,0	1,88	2,1	13,6	10,90	1,0	4,6
DHO-30	30	31,4		1,30	0,70	1,20		32,1		4,8	3,0	2,0	2,06	2,1	13,7	11,30	1,0	4,6
DHO-31	31	32,7		1,30	0,85	1,20		33,4		5,2	3,1	2,5	2,10	2,6	13,8	14,10	1,0	4,7
DHO-32	32	33,7		1,30	0,85	1,20		34,4	+0,50	5,4	3,2	2,5	2,21	2,6	13,8	14,60	1,0	4,7
DHO-33	33	34,7	+0,25	1,30	0,85	1,20		35,5	-0,25	5,4	3,3	2,5	2,40	2,6	14,3	15,00	1,0	4,9
DHO-34	34	35,7		1,60	0,85	1,50		36,5		5,4	3,3	2,5	3,20	2,6	26,2	15,40	1,5	6,3
DHO-35	35	37,0		1,60	1,00	1,50		37,8		5,4	3,4	2,5	3,54	3,0	26,9	18,80	1,5	6,4
DHO-36	36	38,0		1,60	1,00	1,50		38,8		5,4	3,5	2,5	3,70	3,0	26,4	19,40	1,5	6,4
DHO-37	37	39,0		1,60	1,00	1,50		39,8		5,5	3,6	2,5	3,74	3,0	27,1	19,80	1,5	6,5
DHO-38	38	40,0		1,60	1,00	1,50		40,8		5,5	3,7	2,5	3,90	3,0	28,2	22,50	1,5	6,7

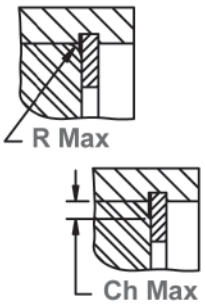
ALL DIMENSIONS IN MILLIMETERS.
*The radius "R" on the load side must not exceed 0.1 T.
*** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.



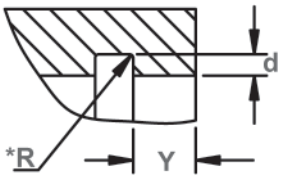
Free Diameter & Ring Measurements With Section B-B



Groove Dimensions



Allowable Corner Radius & Chamfer



Groove Details


Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)

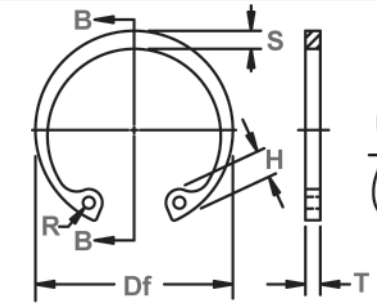
RING NO.	HOUSING Dia. (mm)	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R /Ch Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHO-39	39	41,0		1,60	1,00	1,50		42,0		5,6	3,8	2,5	4,00	3,0	28,8	26,00	1,5	6,9
DHO-40	40	42,5		1,85	1,25	1,75		43,5		5,8	3,9	2,5	4,70	3,8	44,6	27,00	2,0	8,3
DHO-41	41	43,5		1,85	1,25	1,75		44,5		5,9	4,0	2,5	5,10	3,8	45,0	27,60	2,0	8,3
DHO-42	42	44,5		1,85	1,25	1,75		45,5	+0,90	5,9	4,1	2,5	5,40	3,8	44,7	28,40	2,0	8,4
DHO-43	43	45,5	+0,25	1,85	1,25	1,75	-0,06	46,5	-0,39	5,9	4,2	2,5	5,60	3,8	44,5	28,80	2,0	8,4
DHO-44	44	46,5		1,85	1,25	1,75		47,5		6,0	4,2	2,5	5,80	3,8	43,3	29,50	2,0	8,3
DHO-45	45	47,5		1,85	1,25	1,75		48,5		6,2	4,3	2,5	6,00	3,8	43,1	30,20	2,0	8,2
DHO-46	46	48,5		1,85	1,25	1,75		49,5		6,3	4,4	2,5	6,05	3,8	42,9	30,80	2,0	8,2
DHO-47	47	49,5		1,85	1,25	1,75		50,5		6,4	4,4	2,5	6,10	3,8	43,5	31,40	2,0	8,3
DHO-48	48	50,5		1,85	1,25	1,75		51,5	+1,10	6,4	4,5	2,5	6,70	3,8	43,2	32,00	2,0	8,4
DHO-50	50	53,0	+0,30	2,15	1,50	2,00		54,2	-0,46	6,5	4,6	2,5	7,30	4,5	60,8	40,50	2,0	12,1
DHO-51	51	54,0		2,15	1,50	2,00		55,2		6,5	4,7	2,5	7,75	4,5	60,2	41,20	2,0	12,0
DHO-52	52	55,0		2,15	1,50	2,00		56,2		6,7	4,7	2,5	8,20	4,5	60,2	42,00	2,0	12,0
DHO-53	53	56,0		2,15	1,50	2,00		57,2		6,7	4,9	2,5	8,22	4,5	60,7	42,90	2,0	12,1
DHO-54	54	57,0		2,15	1,50	2,00		58,2		6,7	5,0	2,5	8,25	4,5	60,4	43,60	2,0	12,3
DHO-55	55	58,0		2,15	1,50	2,00		59,2		6,8	5,0	2,5	8,30	4,5	60,3	44,40	2,0	12,5
DHO-56	56	59,0		2,15	1,50	2,00		60,2		6,8	5,1	2,5	8,80	4,5	60,3	45,20	2,0	12,6
DHO-57	57	60,0		2,15	1,50	2,00		61,2		6,8	5,1	2,5	9,40	4,5	60,8	46,00	2,0	12,7
DHO-58	58	61,0		2,15	1,50	2,00		62,2		6,9	5,2	2,5	10,50	4,5	60,8	46,70	2,0	12,7
DHO-60	60	63,0	+0,30	2,15	1,50	2,00	-0,07	64,2	+1,10	7,3	5,4	2,5	11,10	4,5	61,0	48,30	2,0	13,0
DHO-62	62	65,0		2,15	1,50	2,00		66,2	-0,46	7,3	5,5	2,5	11,20	4,5	60,9	49,80	2,0	13,0
DHO-63	63	66,0		2,15	1,50	2,00		67,2		7,3	5,6	2,5	12,40	4,5	60,8	50,60	2,0	13,0
DHO-64	64	67,0		2,15	1,50	2,00		68,2		7,4	5,7	2,5	12,45	4,5	60,6	51,40	2,0	13,0
DHO-65	65	68,0		2,65	1,50	2,50		69,2		7,6	5,8	3,0	14,30	4,5	121	51,80	2,5	20,8
DHO-67	67	70,0		2,65	1,50	2,50		71,5		7,7	6,0	3,0	15,30	4,5	121	53,80	2,5	21,1
DHO-68	68	71,0		2,65	1,50	2,50		72,5		7,8	6,1	3,0	16,00	4,5	119	56,20	2,5	21,0
DHO-70	70	73,0		2,65	1,50	2,50		74,5		7,8	6,2	3,0	16,50	4,5	119	56,20	2,5	21,0
DHO-72	72	75,0		2,65	1,50	2,50		76,5		7,8	6,4	3,0	18,10	4,5	119	58,00	2,5	21,0
DHO-75	75	78,0		2,65	1,50	2,50		79,5		7,8	6,6	3,0	18,80	4,5	118	60,00	2,5	21,0
DHO-76	76	79,0		2,65	1,50	2,50		80,5		7,8	6,6	3,0	19,00	4,5	119	61,00	2,5	21,0
DHO-78	77	80,0		2,65	1,50	2,50		82,5	+1,30	8,5	6,8	3,0	20,40	4,5	121	61,60	2,5	21,5
DHO-78	78	81,0	+0,35	2,65	1,50	2,50		82,5	-0,54	8,5	6,8	3,0	20,40	4,5	122	62,30	2,5	21,8
DHO-80	80	83,5		2,65	1,75	2,50		85,5		8,5	7,0	3,0	22,00	5,3	120	74,60	2,5	21,8

ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1 T.**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.

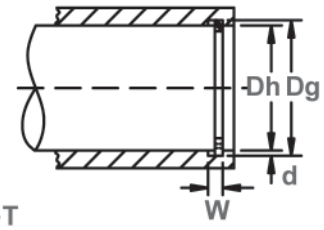
DHO Housing Rings
(DIN 472)

Axially Assembled, Internal, Metric

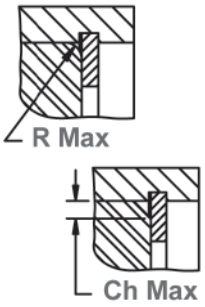
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



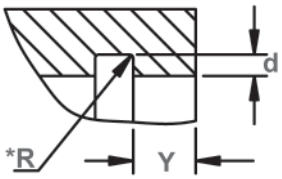
Free Diameter & Ring Measurements With Section B-B



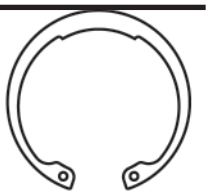
Groove Dimensions



Allowable Corner Radius & Chamfer



Groove Details

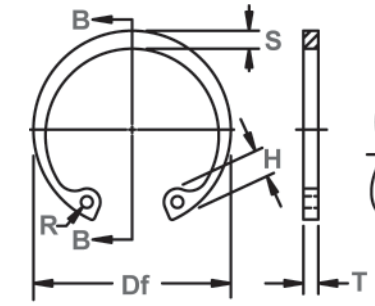

Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)

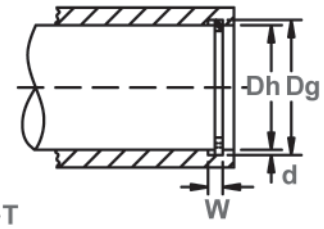

Alternate Design (Manufacturer's Option)

RING NO.	HOUSING Dia. (mm)	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R /Ch Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHO-81	81	84,5		2,65	1,75	2,50		86,5		8,5	7,0	3,0	23,00	5,3	119	75,80	2,5	21,6
DHO-82	82	85,5		2,65	1,75	2,50	-0,07	87,5		8,5	7,0	3,0	24,00	5,3	119	76,6	2,5	21,4
DHO-83	83	86,5		2,65	1,75	2,50		88,5		8,5	7,0	3,0	25,00	5,3	118	77,5	2,5	21,2
DHO-85	85	88,5		3,15	1,75	3,00		90,5		8,6	7,2	3,5	25,30	5,3	201	79,5	3,0	31,2
DHO-88	87	90,5	+0,35	3,15	1,75	3,00		93,5		8,6	7,4	3,5	31,00	5,3	204	81,3	3,0	31,8
DHO-88	88	91,5		3,15	1,75	3,00		93,5	+1,30	8,6	7,4	3,5	31,00	5,3	209	82,0	3,0	32,7
DHO-90	90	93,5		3,15	1,75	3,00	-0,08	95,5	-0,54	8,6	7,6	3,5	33,00	5,3	199	84,0	3,0	31,4
DHO-92	92	95,5		3,15	1,75	3,00		97,5		8,7	7,8	3,5	35,00	5,3	201	85,0	3,0	32,0
DHO-95	95	98,5		3,15	1,75	3,00		100,5		8,8	8,1	3,5	37,00	5,3	195	88,0	3,0	31,4
DHO-98	97	100,5		3,15	1,75	3,00		103,5		9,0	8,3	3,5	41,00	5,3	193	90,0	3,0	31,2
DHO-98	98	101,5		3,15	1,75	3,00		103,5		9,0	8,3	3,5	41,00	5,3	191	91,0	3,0	31,0
DHO-100	100	103,5		3,15	1,75	3,00		105,5		9,2	8,4	3,5	42,00	5,3	188	93,0	3,0	30,8
DHO-102	102	106,0		4,15	2,00	4,00		108,0		9,5	8,5	3,5	55,00	6,0	439	108,0	3,0	72,6
DHO-105	105	109,0		4,15	2,00	4,00		112,0		9,5	8,7	3,5	56,00	6,0	436	112,0	3,0	73,0
DHO-108	107	111,0		4,15	2,00	4,00		115,0		9,5	8,9	3,5	60,00	6,0	425	114,0	3,0	71,6
DHO-108	108	112,0	+0,54	4,15	2,00	4,00		115,0		9,5	8,9	3,5	60,00	6,0	419	115,0	3,0	71,0
DHO-110	110	114,0		4,15	2,00	4,00		117,0		10,4	9,0	3,5	64,50	6,0	415	117,0	3,0	71,0
DHO-112	112	116,0		4,15	2,00	4,00		119,0		10,5	9,1	3,5	72,00	6,0	418	119,0	3,0	72,0
DHO-115	115	119,0		4,15	2,00	4,00		122,0		10,5	9,3	3,5	74,50	6,0	409	122,0	3,0	71,2
DHO-118	117	121,0		4,15	2,00	4,00		125,0		10,7	9,6	3,5	75,50	6,0	399	124,0	3,0	70,0
DHO-118	118	122,0		4,15	2,00	4,00		125,0		10,7	9,6	3,5	75,50	6,0	394	125,0	3,0	69,3
DHO-120	120	124,0		4,15	2,00	4,00	-0,10	127,0		11,0	9,7	3,5	77,00	6,0	396	127,0	3,0	70,0
DHO-122	122	126,0		4,15	2,00	4,00		129,0		11,0	9,8	4,0	78,00	6,0	399	129,0	3,0	71,0
DHO-125	125	129,0		4,15	2,00	4,00		132,0		11,0	10,0	4,0	79,00	6,0	385	132,0	3,0	70,0
DHO-128	127	131,0	+0,63	4,15	2,00	4,00		135,0	+1,50	11,0	10,0	4,0	81,00	6,0	383	135,0	3,0	70,0
DHO-128	128	132,0		4,15	2,00	4,00		135,0	-0,63	11,0	10,2	4,0	81,00	6,0	378	136,0	3,0	69,0
DHO-130	130	134,0		4,15	2,00	4,00		137,0		11,0	10,2	4,0	82,00	6,0	374	138,0	3,0	69,0
DHO-132	132	136,0		4,15	2,00	4,00		139,0		11,0	10,3	4,0	83,00	6,0	366	140,0	3,0	68,0
DHO-135	135	139,0		4,15	2,00	4,00		142,0		11,2	10,5	4,0	84,00	6,0	358	143,0	3,0	67,0
DHO-138	137	141,0		4,15	2,00	4,00		145,0		11,2	10,6	4,0	86,00	6,0	356	145,0	3,0	67,0
DHO-138	138	142,0		4,15	2,00	4,00		145,0		11,2	10,6	4,0	86,00	6,0	352	146,0	3,0	66,5
DHO-140	140	144,0		4,15	2,00	4,00		147,0		11,2	10,7	4,0	87,50	6,0	350	148,0	3,0	66,5

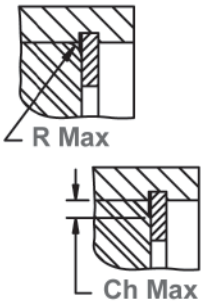
ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1 T.**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.



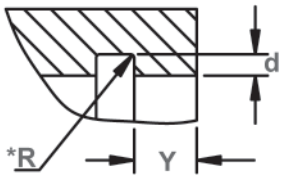
Free Diameter & Ring Measurements With Section B-B



Groove Dimensions

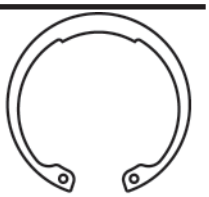


Allowable Corner Radius & Chamfer



Groove Details


Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)

RING NO.	HOUSING Dia. (mm)	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R /Ch Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHO-142	142	146,0		4,15	2,00	4,00		149,0		11,3	10,8	4,0	89,00	6,0	342	150,0	3,0	65,5
DHO-145	145	149,0		4,15	2,00	4,00		152,0		11,4	10,9	4,0	93,00	6,0	336	153,0	3,0	65,0
DHO-148	147	151,0		4,15	2,00	4,00		155,0		11,8	11,1	4,0	100,0	6,0	336	156,0	3,0	65,0
DHO-148	148	152,0		4,15	2,00	4,00		155,0		11,8	11,1	4,0	100,0	6,0	331	157,0	3,0	64,5
DHO-150	150	155,0		4,15	2,50	4,00		158,0		12,0	11,2	4,0	105,0	7,5	326	191,0	3,0	64,0
DHO-152	152	157,0		4,15	2,50	4,00		161,0	+1,50	12,0	11,3	4,0	106,0	7,5	326	202,0	3,5	55,0
DHO-155	155	160,0		4,15	2,50	4,00		164,0	-0,63	12,0	11,4	4,0	107,0	7,5	324	206,0	3,5	55,0
DHO-158	157	162,0	+0,63	4,15	2,50	4,00		167,0		12,3	11,5	4,0	109,0	7,5	328	208,0	3,5	55,5
DHO-158	158	163,0		4,15	2,50	4,00		167,0		12,3	11,5	4,0	109,0	7,5	326	210,0	3,5	55,0
DHO-160	160	165,0		4,15	2,50	4,00		169,0		13,0	11,6	4,0	110,0	7,5	321	212,0	3,5	54,5
DHO-162	162	167,0		4,15	2,50	4,00		171,5		13,0	11,7	4,0	118,0	7,5	321	215,0	3,5	54,5
DHO-165	165	170,0		4,15	2,50	4,00		174,5		13,0	11,8	4,0	125,0	7,5	319	219,0	3,5	54,0
DHO-168	167	172,0		4,15	2,50	4,00		177,5		13,5	12,1	4,0	135,0	7,5	355	221,0	3,5	60,0
DHO-168	168	173,0		4,15	2,50	4,00	-0,10	177,5		13,5	12,1	4,0	135,0	7,5	353	223,0	3,5	60,0
DHO-170	170	175,0		4,15	2,50	4,00		179,5		13,5	12,2	4,0	140,0	7,5	349	225,0	3,5	59,0
DHO-172	172	177,0		4,15	2,50	4,00		181,5		13,5	12,5	4,0	145,0	7,5	357	228,0	3,5	60,0
DHO-175	175	180,0		4,15	2,50	4,00		184,5		13,5	12,7	4,0	150,0	7,5	351	232,0	3,5	59,0
DHO-178	177	182,0		4,15	2,50	4,00		187,5		14,2	12,9	4,0	162,0	7,5	346	235,0	3,5	58,5
DHO-178	178	183,0		4,15	2,50	4,00		187,5		14,2	12,9	4,0	162,0	7,5	344	236,0	3,5	58,0
DHO-180	180	185,0		4,15	2,50	4,00		189,5		14,2	13,2	4,0	165,0	7,5	347	238,0	3,5	58,5
DHO-182	182	187,0		4,15	2,50	4,00		191,5		14,2	13,5	4,0	168,0	7,5	355	241,0	3,5	60,0
DHO-185	185	190,0		4,15	2,50	4,00		194,5		14,2	13,7	4,0	170,0	7,5	349	245,0	3,5	59,0
DHO-188	187	192,0		4,15	2,50	4,00		197,5	+1,70	14,2	13,8	4,0	174,0	7,5	345	248,0	3,5	58,5
DHO-188	188	193,0		4,15	2,50	4,00		197,5	-0,72	14,2	13,8	4,0	174,0	7,5	343	249,0	3,5	58,0
DHO-190	190	195,0	+0,72	4,15	2,50	4,00		199,5		14,2	13,8	4,0	175,0	7,5	340	251,0	3,5	57,5
DHO-192	192	197,0		4,15	2,50	4,00		201,5		14,2	13,8	4,0	178,0	7,5	336	254,0	3,5	57,0
DHO-195	195	200,0		4,15	2,50	4,00		204,5		14,2	13,8	4,0	183,0	7,5	330	258,0	3,5	55,5
DHO-198	197	202,0		4,15	2,50	4,00		207,5		14,2	14,0	4,0	190,0	7,5	330	260,0	3,5	55,5
DHO-198	198	203,0		4,15	2,50	4,00		207,5		14,2	14,0	4,0	190,0	7,5	329	262,0	3,5	55,5
DHO-200	200	205,0		4,15	2,50	4,00		209,5		14,2	14,0	4,0	195,0	7,5	325	265,0	3,5	55,0
DHO-202	202	208,0		5,15	3,00	5,00		214,0		14,2	14,0	4,0	210,0	9,0	625	321,0	4,0	92,5
DHO-205	205	211,0		5,15	3,00	5,00	-0,12	217,0		14,2	14,0	4,0	225,0	9,0	616	326,0	4,0	91,5
DHO-205	207	213,0		5,15	3,00	5,00		217,0		14,2	14,0	4,0	225,0	9,0	610	329,0	4,0	90,0

ALL DIMENSIONS IN MILLIMETERS.
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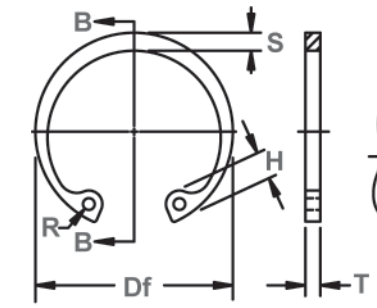
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.

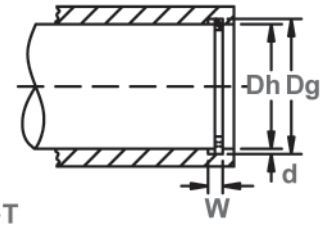
DHO Housing Rings
(DIN 472)

Axially Assembled, Internal, Metric

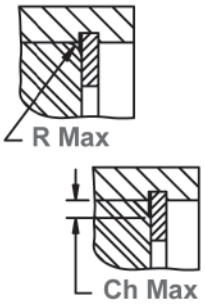
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



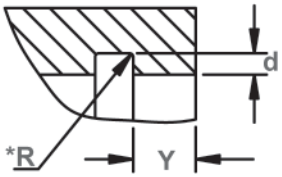
Free Diameter & Ring Measurements With Section B-B



Groove Dimensions



Allowable Corner Radius & Chamfer



Groove Details

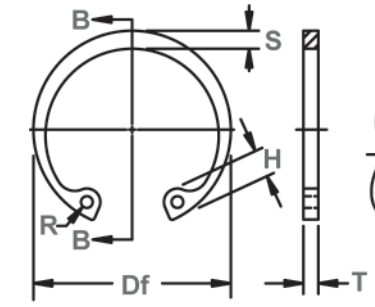

Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)

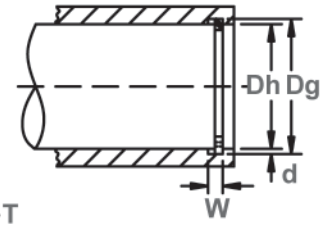

Alternate Design (Manufacturer's Option)

RING NO.	HOUSING Dia. (mm)	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R /Ch Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHO-210	208	214,0		5,15	3,00	5,00		222,0		14,2	14,0	4,0	270,0	9,0	607	331,0	4,0	90,0
DHO-210	210	216,0		5,15	3,00	5,00		222,0		14,2	14,0	4,0	270,0	9,0	601	333,0	4,0	89,5
DHO-210	212	218,0		5,15	3,00	5,00		222,0		14,2	14,0	4,0	270,0	9,0	596	337,0	4,0	88,5
DHO-215	215	221,0		5,15	3,00	5,00		227,0		14,2	14,0	4,0	300,0	9,0	586	341,0	4,0	87,0
DHO-215	217	223,0		5,15	3,00	5,00		227,0		14,2	14,0	4,0	300,0	9,0	581	345,0	4,0	86,0
DHO-220	218	224,0		5,15	3,00	5,00		232,0	+1,70	14,2	14,0	4,0	315,0	9,0	580	346,0	4,0	86,0
DHO-220	220	226,0		5,15	3,00	5,00		232,0	-0,72	14,2	14,0	4,0	315,0	9,0	574	349,0	4,0	85,0
DHO-220	222	228,0		5,15	3,00	5,00		232,0		14,2	14,0	4,0	315,0	9,0	568	353,0	4,0	84,0
DHO-225	225	231,0	+0,72	5,15	3,00	5,00		237,0		14,2	14,0	4,0	323,0	9,0	560	357,0	4,0	83,0
DHO-225	227	233,0		5,15	3,00	5,00		237,0		14,2	14,0	4,0	323,0	9,0	555	361,0	4,0	82,0
DHO-230	228	234,0		5,15	3,00	5,00		242,0		14,2	14,0	4,0	330,0	9,0	554	362,0	4,0	82,0
DHO-230	230	236,0		5,15	3,00	5,00		242,0		14,2	14,0	4,0	330,0	9,0	549	365,0	4,0	81,0
DHO-230	232	238,0		5,15	3,00	5,00	-0,12	242,0		14,2	14,0	4,0	330,0	9,0	544	369,0	4,0	80,50
DHO-235	235	241,0		5,15	3,00	5,00		247,0		14,2	14,0	4,0	338,0	9,0	536	373,0	4,0	79,50
DHO-235	237	243,0		5,15	3,00	5,00		247,0		14,2	14,0	4,0	338,0	9,0	531	376,0	4,0	79,00
DHO-240	238	244,0		5,15	3,00	5,00		252,0		14,2	14,0	4,0	345,0	9,0	530	378,0	4,0	79,00
DHO-240	240	246,0		5,15	3,00	5,00		252,0		14,2	14,0	4,0	345,0	9,0	525	380,0	4,0	77,50
DHO-240	242	248,0		5,15	3,00	5,00		252,0	+2,00	14,2	14,0	4,0	345,0	9,0	521	385,0	4,0	77,00
DHO-245	245	251,0		5,15	3,00	5,00		257,0	-0,81	14,2	14,0	4,0	353,0	9,0	514	389,0	4,0	76,50
DHO-245	247	253,0		5,15	3,00	5,00		257,0		14,2	14,0	4,0	353,0	9,0	509	392,0	4,0	76,00
DHO-250	248	254,0	+0,81	5,15	3,00	5,00		262,0		14,2	14,0	4,0	360,0	9,0	507	394,0	4,0	75,50
DHO-250	250	256,0		5,15	3,00	5,00		262,0		14,2	14,0	4,0	360,0	9,0	504	396,0	4,0	75,00
DHO-252	252	260,0		5,15	4,00	5,00		262,0		14,2	16,0	5,0	360,0	12,0	557	535,0	4,0	83,00
DHO-255	255	263,0		5,15	4,00	5,00		270,0		16,2	16,0	5,0	368,0	12,0	549	541,0	4,0	81,50
DHO-255	257	265,0		5,15	4,00	5,00		270,0		16,2	16,0	5,0	368,0	12,0	545	546,0	4,0	81,00

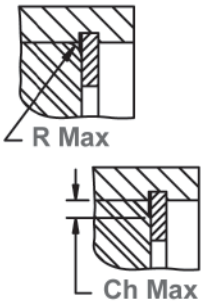
ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1 T.**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.



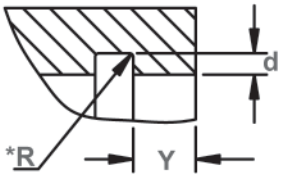
Free Diameter & Ring Measurements With Section B-B



Groove Dimensions



Allowable Corner Radius & Chamfer



Groove Details


Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)

RING NO.	HOUSING Dia. (mm)	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R /Ch Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHO-260	258	266,0		5,15	4,00	5,00		275,0		16,2	16,0	5,0	375,0	12,0	543	548,0	4,0	80,50
DHO-260	260	268,0		5,15	4,00	5,00		275,0		16,2	16,0	5,0	375,0	12,0	538	553,0	4,0	80,00
DHO-260	262	270,0		5,15	4,00	5,00		275,0		16,2	16,0	5,0	375,0	12,0	535	556,0	4,0	79,00
DHO-265	265	273,0		5,15	4,00	5,00		280,0		16,2	16,0	5,0	383,0	12,0	528	563,0	4,0	78,50
DHO-265	267	275,0		5,15	4,00	5,00		280,0		16,2	16,0	5,0	383,0	12,0	524	566,0	4,0	78,00
DHO-270	268	276,0		5,15	4,00	5,00		285,0		16,2	16,0	5,0	388,0	12,0	522	570,0	4,0	77,50
DHO-270	270	278,0		5,15	4,00	5,00		285,0		16,2	16,0	5,0	388,0	12,0	518	573,0	4,0	77,00
DHO-270	272	280,0		5,15	4,00	5,00		285,0		16,2	16,0	5,0	388,0	12,0	515	577,0	4,0	76,50
DHO-275	275	283,0		5,15	4,00	5,00		290,0	+2,00	16,2	16,0	5,0	393,0	12,0	509	585,0	4,0	75,50
DHO-275	277	285,0	+0,81	5,15	4,00	5,00	-0,12	290,0	-0,81	16,2	16,0	5,0	393,0	12,0	505	587,0	4,0	75,00
DHO-280	278	286,0		5,15	4,00	5,00		295,0		16,2	16,0	5,0	400,0	12,0	504	590,0	4,0	75,00
DHO-280	280	288,0		5,15	4,00	5,00		295,0		16,2	16,0	5,0	400,0	12,0	499	593,0	4,0	74,00
DHO-280	282	290,0		5,15	4,00	5,00		295,0		16,2	16,0	5,0	400,0	12,0	497	599,0	4,0	74,00
DHO-285	285	293,0		5,15	4,00	5,00		300,0		16,2	16,0	5,0	408,0	12,0	491	605,0	4,0	73,00
DHO-285	287	295,0		5,15	4,00	5,00		300,0		16,2	16,0	5,0	408,0	12,0	487	610,0	4,0	72,00
DHO-290	288	296,0		5,15	4,00	5,00		305,0		16,2	16,0	5,0	415,0	12,0	485	611,0	4,0	72,00
DHO-290	290	298,0		5,15	4,00	5,00		305,0		16,2	16,0	5,0	415,0	12,0	482	615,0	4,0	71,50
DHO-290	292	300,0		5,15	4,00	5,00		305,0		16,2	16,0	5,0	415,0	12,0	479	620,0	4,0	71,00
DHO-295	295	303,0		5,15	4,00	5,00		310,0		16,2	16,0	5,0	426,0	12,0	474	625,0	4,0	70,50
DHO-295	297	305,0		5,15	4,00	5,00		310,0		16,2	16,0	5,0	426,0	12,0	471	630,0	4,0	70,50
DHO-300	298	306,0		5,15	4,00	5,00		315,0		16,2	16,0	5,0	435,0	12,0	469	631,0	4,0	69,50
DHO-300	300	308,0		5,15	4,00	5,00		315,0		16,2	16,0	5,0	435,0	12,0	466	636,0	4,0	69,00
DHO-305	305	315,0		6,20	5,00	6,00	-0,15	322,0	+2,00	16,2	20,0	6,0	755,0	15,0	961	810,0	5,0	114,00
DHO-310	310	320,0	+0,89	6,20	5,00	6,00		327,0	-0,90	20,2	20,0	6,0	770,0	15,0	947	823,0	5,0	113,00

ALL DIMENSIONS IN MILLIMETERS.
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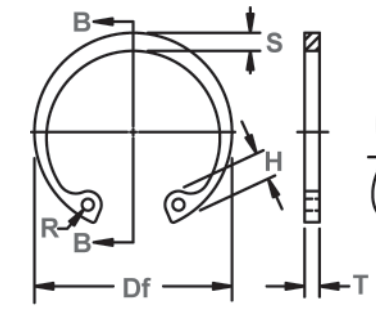
MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.

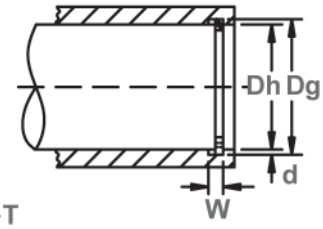
DHO Housing Rings
(DIN 472)

Axially Assembled, Internal, Metric

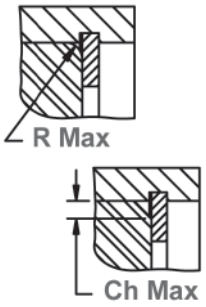
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



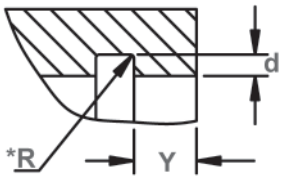
Free Diameter & Ring Measurements With Section B-B



Groove Dimensions



Allowable Corner Radius & Chamfer



Groove Details


Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)

RING NO.	HOUSING Dia. (mm)	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R /Ch Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHO-315	315	325,0		6,20	5,00	6,00		332,0		20,2	20,0	6,0	785,0	15,0	934	837,0	5,0	111,00
DHO-320	320	330,0		6,20	5,00	6,00		337,0		20,2	20,0	6,0	800,0	15,0	919	850,0	5,0	109,00
DHO-325	325	335,0		6,20	5,00	6,00		342,0		20,2	20,0	6,0	810,0	15,0	906	864,0	5,0	108,00
DHO-330	330	340,0		6,20	5,00	6,00		347,0		20,2	20,0	6,0	820,0	15,0	894	876,0	5,0	106,00
DHO-335	335	345,0		6,20	5,00	6,00		352,0		20,2	20,0	6,0	830,0	15,0	880	890,0	5,0	105,00
DHO-340	340	350,0		6,20	5,00	6,00		357,0	+2,00	20,2	20,0	6,0	840,0	15,0	869	903,0	5,0	104,00
DHO-345	345	355,0		6,20	5,00	6,00		362,0	-0,90	20,2	20,0	6,0	855,0	15,0	857	916,0	5,0	102,00
DHO-350	350	360,0	+0,89	6,20	5,00	6,00		367,0		20,2	20,0	6,0	870,0	15,0	846	929,0	5,0	101,00
DHO-355	355	365,0		6,20	5,00	6,00		372,0		20,2	20,0	6,0	880,0	15,0	834	942,0	5,0	99,00
DHO-360	360	370,0		6,20	5,00	6,00		377,0		20,2	20,0	6,0	890,0	15,0	823	955,0	5,0	98,00
DHO-365	365	375,0		6,20	5,00	6,00	-0,15	382,0		20,2	20,0	6,0	906,0	15,0	813	968,0	5,0	97,00
DHO-370	370	380,0		6,20	5,00	6,00		387,0		20,2	20,0	6,0	920,0	15,0	803	981,0	5,0	95,00
DHO-375	375	385,0		6,20	5,00	6,00		392,0		20,2	20,0	6,0	932,0	15,0	793	994,0	5,0	94,00
DHO-380	380	390,0		6,20	5,00	6,00		397,0		20,2	20,0	6,0	940,0	15,0	784	1008,0	5,0	93,00
DHO-385	385	395,0		6,20	5,00	6,00		402,0		20,2	20,0	6,0	950,0	15,0	774	1021,0	5,0	92,00
DHO-390	390	400,0		6,20	5,00	6,00		407,0		20,2	20,0	6,0	960,0	15,0	764	1033,0	5,0	91,00
DHO-395	395	405,0		6,20	5,00	6,00		412,0		20,2	20,0	6,0	972,0	15,0	756	1047,0	5,0	90,00
DHO-400	400	410,0		6,20	5,00	6,00		417,0	+2,00	20,2	20,0	6,0	980,0	15,0	746	1060,0	5,0	89,00
DHO-410	410	422,0		7,20	6,00	7,00		430,0	-1,00	26,2	26,0	6,0	1380,0	18,0	1512	1307,0	6,0	150,00
DHO-420	420	432,0	+1,00	7,20	6,00	7,00		440,0		26,2	26,0	6,0	1410,0	18,0	1480	1338,0	6,0	147,00
DHO-430	430	442,0		7,20	6,00	7,00		450,0		26,2	26,0	6,0	1440,0	18,0	1446	1369,0	6,0	144,00
DHO-440	440	452,0		7,20	6,00	7,00		460,0		26,2	26,0	6,0	1470,0	18,0	1418	1401,0	6,0	141,00
DHO-450	450	462,0		7,20	6,00	7,00		470,0		26,2	26,0	6,0	1510,0	18,0	1388	1431,0	6,0	138,00
DHO-460	460	472,0		7,20	6,00	7,00		480,0		26,2	26,0	6,0	1550,0	18,0	1360	1464,0	6,0	135,00

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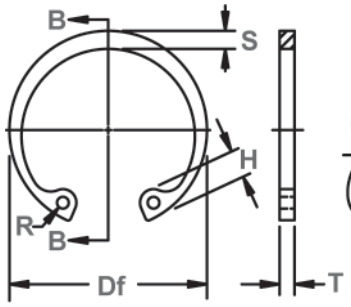
MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.

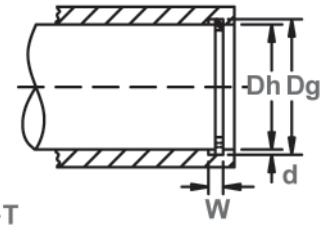
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DHO	8-22	470-580	47-54	66-72 HR30N
	23-48	470-580	47-54	-
	50-200	435-530	44-51	-
	202-300	390-470	40-47	-
	305-1000	370-415	38-43	-

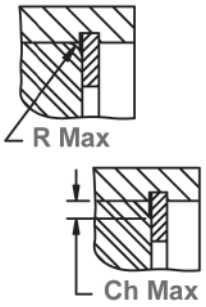
*WHERE APPLICABLE



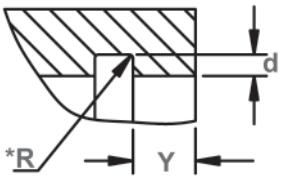
Free Diameter & Ring Measurements With Section B-B



Groove Dimensions

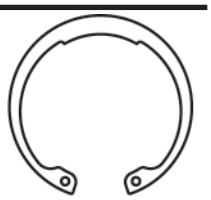


Allowable Corner Radius & Chamfer



Groove Details


Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)


Alternate Design (Manufacturer's Option)

RING NO.	HOUSING Dia. (mm)	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R /Ch Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHO-470	470	482,0		7,20	6,00	7,00		490,0	+2,00	26,2	26,0	6,0	1595,0	18,0	1330	1495	6,0	132,0
DHO-480	480	492,0		7,20	6,00	7,00		500,0	-1,00	26,2	26,0	6,0	1640,0	18,0	1306	1526	6,0	130,0
DHO-490	490	502,0		7,20	6,00	7,00		510,0		26,2	26,0	6,0	1685,0	18,0	1280	1558	6,0	127,0
DHO-500	500	512,0		7,20	6,00	7,00		520,0		26,2	26,0	6,0	1730,0	18,0	1256	1588	6,0	125,0
DHO-510	510	524,0		8,20	7,00	8,00		535,0		26,2	26,0	6,0	2250,0	21,0	1834	1894	7,0	156,0
DHO-520	520	534,0		8,20	7,00	8,00		545,0		26,2	26,0	6,0	2290,0	21,0	1802	1931	7,0	153,0
DHO-530	530	544,0		8,20	7,00	8,00	-0,15	555,0		26,2	26,0	6,0	2335,0	21,0	1768	1968	7,0	150,0
DHO-540	540	554,0		8,20	7,00	8,00		565,0	+3,00	26,2	26,0	6,0	2380,0	21,0	1738	2004	7,0	148,0
DHO-550	550	564,0		8,20	7,00	8,00		575,0	-1,50	26,2	26,0	6,0	2430,0	21,0	1711	2041	7,0	145,0
DHO-560	560	574,0	+1,00	8,20	7,00	8,00		585,0		26,2	26,0	6,0	2495,0	21,0	1682	2078	7,0	143,0
DHO-570	570	584,0		8,20	7,00	8,00		595,0		26,2	26,0	6,0	2560,0	21,0	1650	2114	7,0	141,0
DHO-580	580	594,0		8,20	7,00	8,00		605,0		26,2	26,0	6,0	2625,0	21,0	1627	2151	7,0	138,0
DHO-590	590	604,0		8,20	7,00	8,00		615,0		26,2	26,0	6,0	2700,0	21,0	1601	2188	7,0	136,0
DHO-600	600	614,0		8,20	7,00	8,00		625,0		26,2	26,0	6,0	2770,0	21,0	1571	2221	7,0	134,0
DHO-650	650	666,0		9,30	8,00	9,00		680,0		34,0	34,0	6,0	3600,0	24,0	2654	2753	7,0	226,0
DHO-700**	700	716,0		9,30	8,00	9,00		730,0		34,0	34,0	6,0	4120,0	24,0	2471	2966	7,0	210,0
DHO-750**	750	768,0		9,30	9,00	9,00		785,0		34,0	34,0	9,0	4540,0	27,0	2310	3566	7,0	196,0
DHO-800**	800	818,0		9,30	9,00	9,00	-0,20	835,0	+4,00	34,0	34,0	9,0	5450,0	27,0	2176	3800	7,0	184,0
DHO-850**	850	870,0		9,30	10,00	9,00		890,0	-2,00	34,0	34,0	9,0	5990,0	30,0	2045	4500	7,0	173,0
DHO-900**	900	920,0		9,30	10,00	9,00		940,0		34,0	34,0	9,0	6740,0	30,0	1938	4766	7,0	164,0
DHO-950**	950	972,0		9,30	11,00	9,00		1000,0		34,0	34,0	9,0	7930,0	33,0	1840	5608	7,0	156,0
DHO-1000**	1000	1022,0		9,30	11,00	9,00		1050,0		34,0	34,0	9,0	8880,0	33,0	1752	5825	7,0	148,0

ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1 T.**
**** THESE PARTS ARE MADE WITH A CONSTANT SECTION WIDTH (NO TAPER)**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DHO	ALL	470-580	47-54	84-87.5	66-72

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

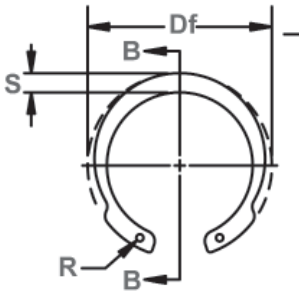
RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DHO	8-22	435-530	44-51	63-69.5 HR30N
	23-1000	435-530	44-51	-

*WHERE APPLICABLE

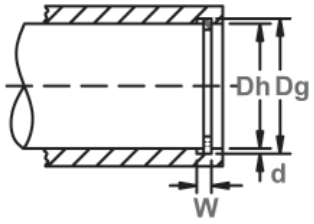
DHI Housing Rings

Axially Assembled, Internal Inverted, Metric

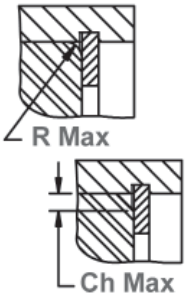
Functions like an DHO ring in a housing/bore, only the lugs are "reversed." This version reduces the distance the lugs of the standard DHO extend into the inner circumference of the housing/bore and allows for another assembly to pass through unimpeded.



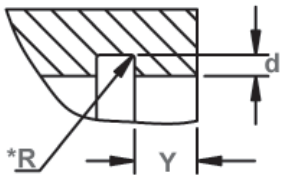
Free Diameter & Ring Measurements With Section B-B



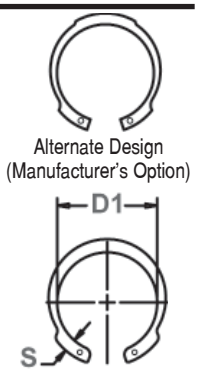
Housing Diameter & Groove Dimensions



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y) *The radius "R" on the load side must not exceed 0.1T.

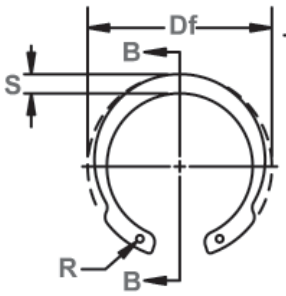


Measuring Free Diameter (Df)
DHI Series Df = D1 + 2S

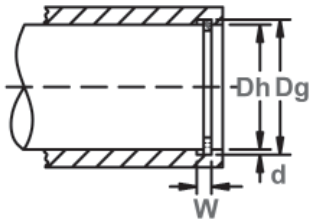
RING NO.	HOUSING DIAMETER	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		MAX. SEC.		HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R/Ch. Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	S	Tol.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch. Max.	P'r kN
DHI-12	12	12,6		0,70	0,30	0,60	-0,05	13,1		1,8		1,0	0,25	0,9	1,8	0,75	0,8	1,0
DHI-15	15	15,7	+0,11	0,90	0,35	0,80		16,1		2,0		1,0	0,41	1,0	3,3	1,33	1,0	1,9
DHI-16	16	16,8		1,10	0,40	1,00		17,3		2,1		1,3	0,53	1,2	5,2	1,67	1,0	3,1
DHI-17	17	17,8		1,10	0,40	1,00		18,3	+0,42	2,1		1,3	0,58	1,2	5,8	1,70	1,0	3,0
DHI-18	18	19,0		1,10	0,50	1,00		19,5	-0,13	2,2		1,3	0,62	1,5	6,3	1,78	1,0	3,0
DHI-19	19	20,0		1,10	0,50	1,00		20,5		2,2		1,3	0,66	1,5	6,6	2,50	1,0	2,8
DHI-20	20	21,0	+0,15	1,10	0,50	1,00		21,5		2,3		1,3	0,80	1,5	7,0	2,66	1,0	2,9
DHI-21	21	22,0		1,10	0,50	1,00		22,5		2,4		1,3	0,81	1,5	7,4	2,73	1,0	2,8
DHI-22	22	23,0		1,10	0,50	1,00		23,5		2,4		1,3	0,83	1,5	7,5	2,80	1,0	2,8
DHI-24	24	25,2		1,30	0,60	1,20		25,9		2,8	±0,1	1,5	1,30	1,8	14,5	3,68	1,0	4,8
DHI-25	25	26,2		1,30	0,60	1,20		26,9	+0,42	2,8		1,5	1,40	1,8	14,8	4,00	1,0	5,0
DHI-26	26	27,2	+0,21	1,30	0,60	1,20	-0,06	27,9	-0,21	3,0		1,5	1,50	1,8	15,3	4,17	1,0	5,2
DHI-27	27	28,4		1,30	0,70	1,20		29,1		3,0		1,5	1,53	2,1	15,0	5,00	1,0	5,1
DHI-28	28	29,4		1,30	0,70	1,20		30,1		3,1		1,5	1,80	2,1	15,3	5,10	1,0	5,2
DHI-30	30	31,4		1,30	0,70	1,20		32,1		3,2		1,5	2,03	2,1	14,9	5,50	1,0	5,1
DHI-32	32	33,7		1,30	0,85	1,20		34,4	+0,50	3,3		1,5	2,05	2,5	14,1	7,00	1,0	4,9
DHI-33	33	34,7		1,30	0,85	1,20		35,5	-0,25	3,3		1,5	2,35	2,5	13,8	7,30	1,0	4,8
DHI-34	34	35,7	+0,25	1,60	0,85	1,50		36,5		3,4		1,5	2,95	2,5	24,0	7,50	1,5	6,0
DHI-35	35	37,0		1,60	1,00	1,50		37,8		3,4		1,7	3,20	3,0	26,4	9,20	1,5	6,3
DHI-36	36	38,0		1,60	1,00	1,50		38,8		3,6		1,7	3,23	3,0	27,5	9,70	1,5	6,6
DHI-38	38	40,0		1,60	1,00	1,50		40,8		3,8		1,7	3,68	3,0	28,0	10,20	1,5	6,7

***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

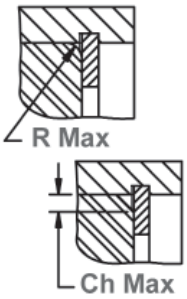
ALL DIMENSIONS IN MILLIMETERS.



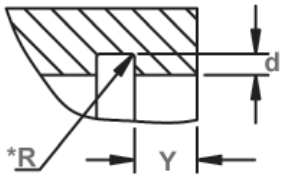
Free Diameter & Ring Measurements With Section B-B



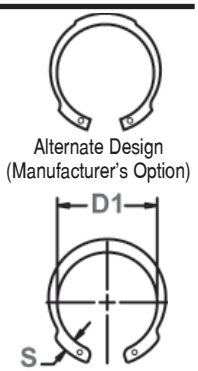
Housing Diameter & Groove Dimensions



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y) *The radius "R" on the load side must not exceed 0.1T.



Measuring Free Diameter (Df)
DHI Series Df = D1 + 2S

RING NO.	HOUSING DIAMETER	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		MAX. SEC.		HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R/Ch. Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	S	Tol.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch. Max.	P'r kN
DHI-40	40	42,5		1,85	1,25	1,75		43,5	+0,90	4,2		2,0	4,75	3,8	45,5	13,50	2,0	8,4
DHI-42	42	44,5	+0,25	1,85	1,25	1,75		45,5	-0,39	4,2		2,0	5,20	3,8	45,5	14,10	2,0	8,5
DHI-45	45	47,5		1,85	1,25	1,75	-0,06	48,5		4,2		2,0	6,00	3,8	44,0	15,00	2,0	8,4
DHI-47	47	49,5		1,85	1,25	1,75		50,5		4,7		2,0	6,50	3,8	45,0	15,80	2,0	8,7
DHI-48	48	50,5		1,85	1,25	1,75		51,5		4,7		2,0	7,00	3,8	48,0	16,00	2,0	9,1
DHI-50	50	53,0		2,15	1,50	2,00		54,2		5,2		2,5	8,50	4,5	69,0	20,00	2,0	13,4
DHI-52	52	55,0		2,15	1,50	2,00		56,2		5,2	±0,2	2,5	9,00	4,5	66,5	20,80	2,0	13,3
DHI-55	55	58,0		2,15	1,50	2,00		59,2		5,2		2,5	10,00	4,5	66,0	22,20	2,0	13,3
DHI-57	57	60,0		2,15	1,50	2,00		61,2	+1,10	5,2		2,5	10,25	4,5	65,0	23,00	2,0	13,1
DHI-58	58	61,0	+0,30	2,15	1,50	2,00		62,2	-0,46	5,2		2,5	10,50	4,5	64,0	23,30	2,0	12,9
DHI-60	60	63,0		2,15	1,50	2,00	-0,07	64,2		5,2		2,5	11,25	4,5	62,0	24,20	2,0	12,7
DHI-62	62	65,0		2,15	1,50	2,00		66,2		5,2		2,5	11,75	4,5	60,0	25,00	2,0	12,3
DHI-65	65	68,0		2,65	1,50	2,50		69,2		5,7		2,5	16,25	4,5	122,0	25,80	2,5	20,6
DHI-67	67	70,0		2,65	1,50	2,50		71,5		5,7		2,5	17,30	4,5	122,0	26,80	2,5	20,8
DHI-68	68	71,0		2,65	1,50	2,50		72,5		5,7		2,5	17,75	4,5	123,0	27,20	2,5	21,0
DHI-72	72	75,0		2,65	1,50	2,50		76,5		6,0		2,5	19,60	4,5	119,0	28,80	2,5	20,8
DHI-80	80	83,5		2,65	1,75	2,50		85,5		6,0	±0,3	2,5	22,90	5,3	110,0	37,40	2,5	19,6
DHI-85	85	88,5		3,15	1,75	3,00		90,5	+1,30	6,6		3,0	30,00	5,3	176,0	39,70	3,0	27,2
DHI-90	90	93,5	+0,35	3,15	1,75	3,00	-0,08	95,5	-0,54	6,6		3,0	33,00	5,3	169,0	42,00	3,0	26,6
DHI-95	95	98,5		3,15	1,75	3,00		100,5		7,4		3,0	37,50	5,3	168,0	43,50	3,0	27,0
DHI-100	100	103,5		3,15	1,75	3,00		105,5		7,4		3,0	41,90	5,3	165,0	46,70	3,0	26,8

***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

ALL DIMENSIONS IN MILLIMETERS.

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DHI	ALL	470-580	47-54	84-87.5	66-72

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

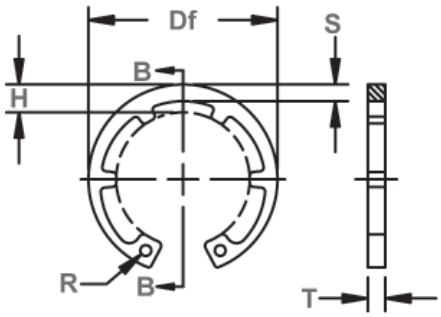
RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DHI	12-22	470-580	47-54	66-72 HR30N
	23-48	470-580	47-54	-
	50-100	435-530	44-51	-

*WHERE APPLICABLE

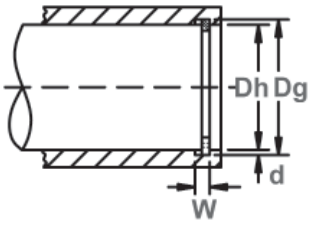
DHT Housing Rings
(DIN 984)

Axially Assembled, Internal Teeth, Metric

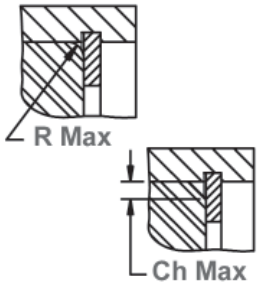
Similar in design to the DHO internal ring, this features several "teeth" equally distributed along the circumference of the ring. The increased shoulder offered by the teeth is particularly effective in retaining applications with large radii or chamfers.



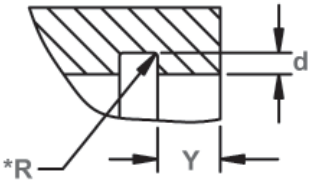
Free Diameter and Ring Measurements With Section B-B



Housing Diameter & Groove Dimensions



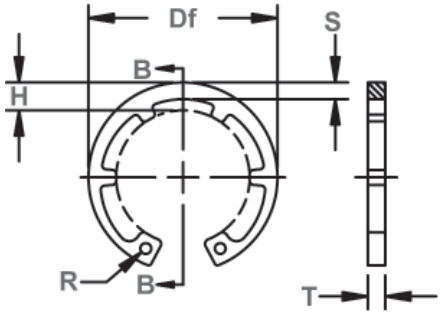
Allowable Corner Radius & Chamfer



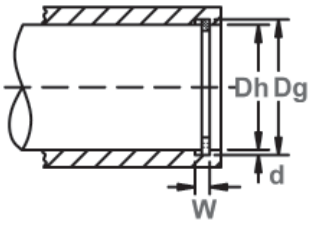
Exploded Groove Profile & Edge Margin (Y)
*The radius "R" on the load side must not exceed 0.1T.

RING NO.	HOUSING DIA.	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. load w/ R/Ch. Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHT-16	16	16,8	+0,11	1,10	0,40	1,00		17,3		3,4	2,1	1,7	0,72	1,2	5,5	3,4	1,0	2,5
DHT-17	17	17,8		1,10	0,40	1,00		18,3		3,7	2,2	1,7	0,80	1,2	6,0	3,6	1,0	2,5
DHT-18	18	19,0		1,10	0,50	1,00		19,5		3,8	2,2	1,7	0,90	1,5	6,5	4,8	1,0	2,6
DHT-19	19	20,0		1,10	0,50	1,00		20,5	+0,42	3,8	2,3	2,0	0,99	1,5	6,8	5,1	1,0	2,6
DHT-20	20	21,0	+0,15	1,10	0,50	1,00		21,5	-0,13	3,9	2,4	2,0	1,06	1,5	7,2	5,4	1,0	2,6
DHT-21	21	22,0		1,10	0,50	1,00		22,5		4,0	2,4	2,0	1,17	1,5	7,6	5,7	1,0	2,6
DHT-22	22	23,0		1,10	0,50	1,00		23,5		4,0	2,6	2,0	1,28	1,5	8,0	5,9	1,0	2,7
DHT-23	23	24,1		1,30	0,55	1,20		24,6		4,1	2,6	2,0	1,48	1,6	13,8	6,8	1,0	4,5
DHT-24	24	25,2		1,30	0,60	1,20		25,9		4,2	2,6	2,0	1,60	1,8	13,9	7,7	1,0	4,6
DHT-25	25	26,2		1,30	0,60	1,20		26,9	+0,42	4,4	2,8	2,0	1,72	1,8	14,6	8,0	1,0	4,7
DHT-26	26	27,2	+0,21	1,30	0,60	1,20		28,5	-0,21	4,4	2,8	2,0	2,00	1,8	13,8	8,4	1,0	4,6
DHT-27	27	28,4		1,30	0,70	1,20		29,1		4,5	2,9	2,0	2,00	2,1	13,3	10,1	1,0	4,5
DHT-28	28	29,4		1,30	0,70	1,20	-0,06	30,1		4,9	3,0	2,0	2,10	2,1	13,3	10,5	1,0	4,5
DHT-30	30	31,4		1,30	0,70	1,20		32,1		4,9	3,2	2,0	2,35	2,1	13,7	11,3	1,0	4,6
DHT-31	31	32,7		1,30	0,85	1,20		33,4		5,0	3,2	2,5	2,42	2,5	13,8	14,1	1,0	4,7
DHT-32	32	33,7		1,30	0,85	1,20		34,4	+0,50	5,1	3,3	2,5	2,50	2,5	13,8	14,6	1,0	4,7
DHT-33	33	34,7		1,30	0,85	1,20		35,5	-0,25	5,1	3,3	2,5	2,65	2,5	14,3	15,0	1,5	4,9
DHT-34	34	35,7		1,60	0,85	1,50		36,5		5,3	3,4	2,5	3,80	2,5	26,2	15,4	1,5	6,3
DHT-35	35	37,0		1,60	1,00	1,50		37,8		5,5	3,6	2,5	4,00	3,0	26,9	18,8	1,5	6,4
DHT-36	36	38,0	+0,25	1,60	1,00	1,50		38,8		5,6	3,6	2,5	4,15	3,0	26,4	19,4	1,5	6,4
DHT-38	38	40,0		1,60	1,00	1,50		40,8		6,1	3,8	2,5	4,40	3,0	28,2	22,5	1,5	6,7
DHT-40	40	42,5		1,85	1,25	1,75		43,5		7,2	4,0	2,5	5,30	3,8	44,6	27,0	2,0	8,3
DHT-42	42	44,5		1,85	1,25	1,75		45,5	+0,90	7,2	4,1	2,5	6,00	3,8	44,7	28,4	2,0	8,4
DHT-44	44	46,5		1,85	1,25	1,75		47,5	-0,39	7,2	4,2	2,5	6,45	3,8	43,3	29,5	2,0	8,3
DHT-45	45	47,5		1,85	1,25	1,75		48,5		7,2	4,3	2,5	6,60	3,8	43,1	30,2	2,0	8,2
DHT-47	47	49,5		1,85	1,25	1,75		50,5	+1,10	7,2	4,5	2,5	6,90	3,8	43,5	31,4	2,0	8,3
DHT-48	48	50,5	+0,30	1,85	1,25	1,75		51,5	-0,46	7,2	4,5	2,5	7,50	3,8	43,2	32,0	2,0	8,4

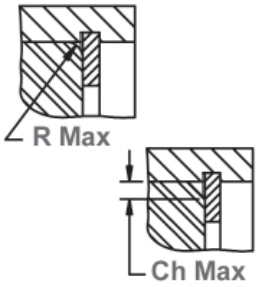
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**
ALL DIMENSIONS IN MILLIMETERS.



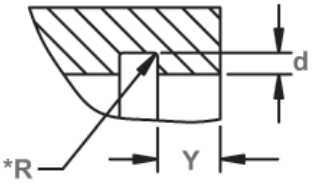
Free Diameter and Ring Measurements With Section B-B



Housing Diameter & Groove Dimensions



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
*The radius "R" on the load side must not exceed 0.1T.

RING NO.	HOUSING DIA.	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. load w/ R/Ch. Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHT-50	50	53,0		2,15	1,50	2,00		54,2		8,2	4,7	2,5	8,50	4,5	60,8	40,5	2,0	12,1
DHT-52	52	55,0		2,15	1,50	2,00		56,2		8,2	4,7	2,5	9,40	4,5	60,2	42,0	2,0	12,0
DHT-55	55	58,0		2,15	1,50	2,00		59,2		8,2	5,1	2,5	9,75	4,5	60,3	44,4	2,0	12,5
DHT-57	57	60,0		2,15	1,50	2,00		61,2		8,2	5,2	2,5	11,65	4,5	60,8	46,0	2,0	12,7
DHT-58	58	61,0		2,15	1,50	2,00		62,2	+1,10	8,2	5,3	2,5	12,00	4,5	60,8	46,7	2,0	12,7
DHT-60	60	63,0	+0,30	2,15	1,50	2,00	-0,07	64,2	-0,46	8,2	5,5	2,5	12,70	4,5	61,0	48,3	2,0	13,0
DHT-62	62	65,0		2,15	1,50	2,00		66,2		8,2	5,6	2,5	12,75	4,5	60,9	49,8	2,0	13,0
DHT-65	65	68,0		2,65	1,50	2,50		69,2		10,2	5,8	3,0	16,70	4,5	121,0	51,8	2,5	20,8
DHT-67	67	70,0		2,65	1,50	2,50		71,5		10,2	6,0	3,0	18,60	4,5	121,0	53,8	2,5	21,1
DHT-68	68	71,0		2,65	1,50	2,50		72,5		10,2	6,1	3,0	19,30	4,5	121,0	54,5	2,5	21,2
DHT-70	70	73,0		2,65	1,50	2,50		74,5		10,2	6,2	3,0	20,20	4,5	119,0	56,2	2,5	21,0
DHT-72	72	75,0		2,65	1,50	2,50		76,5		10,2	6,4	3,0	21,20	4,5	119,0	58,0	2,5	21,0
DHT-75	75	78,0		2,65	1,50	2,50		79,5		10,2	6,6	3,0	22,60	4,5	118,0	60,0	2,5	21,0
DHT-80	80	83,5		2,65	1,75	2,50		85,5		10,2	7,0	3,0	25,00	5,3	120,0	74,6	2,5	21,8
DHT-85	85	88,5		3,15	1,75	3,00		90,5		12,2	7,4	3,5	30,10	5,3	201,0	79,5	3,0	31,2
DHT-90	90	93,5	+0,35	3,15	1,75	3,00	-0,08	95,5	+1,30	12,2	7,7	3,5	35,50	5,3	199,0	84,0	3,0	31,4
DHT-95	95	98,5		3,15	1,75	3,00		100,5	-0,54	12,2	8,1	3,5	40,00	5,3	195,0	88,6	3,0	31,4
DHT-100	100	103,5		3,15	1,75	3,00		105,5		12,2	8,5	3,5	43,50	5,3	188,0	93,1	3,0	30,8
DHT-110	110	114,0	+0,54	4,15	2,00	4,00		117,0		12,2	9,0	3,5	73,00	6,0	415,0	117,0	3,0	71,0
DHT-115	115	119,0		4,15	2,00	4,00		122,0		12,2	9,3	3,5	82,00	6,0	409,0	122,0	3,0	71,2
DHT-120	120	124,0		4,15	2,00	4,00		127,0		12,2	9,6	3,5	87,00	6,0	396,0	127,0	3,0	70,0
DHT-125	125	129,0		4,15	2,00	4,00		132,0		12,2	9,9	4,0	92,00	6,0	385,0	132,0	3,0	70,0
DHT-130	130	134,0		4,15	2,00	4,00	-0,10	137,0	+1,50	12,2	10,2	4,0	102,00	6,0	374,0	138,0	3,0	69,0
DHT-140	140	144,0	+0,63	4,15	2,00	4,00		148,0	-0,63	14,2	10,7	4,0	112,00	6,0	350,0	148,0	3,0	66,5
DHT-150	150	155,0		4,15	2,50	4,00		158,0		14,2	11,1	4,0	123,00	7,5	326,0	191,0	3,0	64,0
DHT-160	160	165,0		4,15	2,50	4,00		169,0		14,2	11,8	4,5	133,00	7,5	321,0	212,0	3,5	54,5
DHT-170	170	175,0		4,15	2,50	4,00		179,0		14,2	12,3	4,5	145,00	7,5	349,0	225,0	3,5	59,0

***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**
ALL DIMENSIONS IN MILLIMETERS.

NUMBER OF TEETH (INCLUDING LUGS)

RING TYPE	SIZE RANGE	#TEETH
DHT	16-58	6
	60-170	8

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DHT	16-22	470-580	47-54	66-72 HR30N
	23-48	470-580	47-54	-
	50-170	435-530	44-51	-

*WHERE APPLICABLE

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

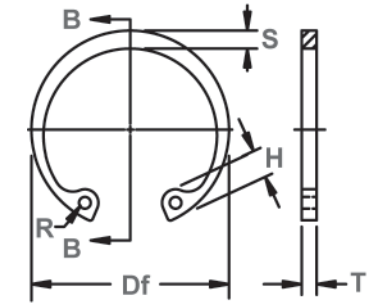
RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DHT	ALL	470-580	47-54	84-87.5	66-72

DHR Housing Rings

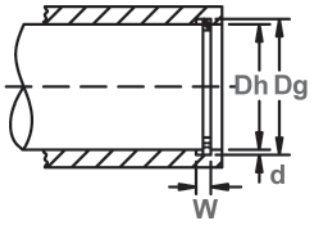
DIN 472 - Heavy Type

Axially Assembled, Internal Reinforced, Metric

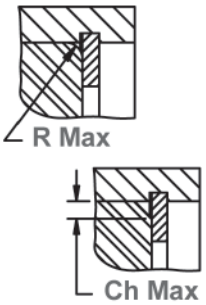
A thicker version of the DHO featuring a larger radial width than this ring. Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



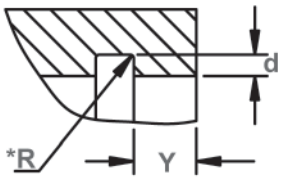
Free Diameter & Ring Measurements With Section B-B



Allowable Diameter & Groove Dimensions



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
*The radius "R" on the load side must not exceed 0.1T.


Alternate Design (Manufacturer's Option)

RING NO.	HOUSING DIA.	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA				
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. load w/ R/Ch. Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHR-20	20	21,0	+0,15	1,60	0,50	1,50		21,5		4,5	2,4	2,0	1,4	1,5	16,2	5,4	1,0	5,8
DHR-22	22	23,0		1,60	0,50	1,50		23,5	+0,42	4,7	2,8	2,0	1,9	1,5	18,0	5,9	1,0	6,1
DHR-24	24	25,2		1,60	0,60	1,50		25,9	-0,21	4,9	3,0	2,0	2,0	1,8	21,7	7,7	1,0	7,2
DHR-25	25	26,2		1,60	0,60	1,50		26,9		5,0	3,1	2,0	2,1	1,8	22,8	8,0	1,0	7,3
DHR-26	26	27,2	+0,21	1,60	0,60	1,50		27,9		5,1	3,1	2,0	2,3	1,8	21,6	8,4	1,0	7,2
DHR-27	27	28,4		1,60	0,70	1,50		29,1		5,1	3,2	2,0	2,4	2,1	20,8	10,1	1,0	7,0
DHR-28	28	29,4		1,60	0,70	1,50	-0,06	30,1		5,3	3,2	2,0	2,5	2,1	20,8	10,5	1,0	7,0
DHR-30	30	31,4		1,60	0,70	1,50		32,1		5,5	3,3	2,0	2,7	2,1	21,4	11,3	1,0	7,2
DHR-32	32	33,7		1,60	0,85	1,50		34,4	+0,50	5,7	3,4	2,0	2,9	2,6	21,4	14,6	1,0	7,3
DHR-34	34	35,7		1,85	0,85	1,75		36,5	-0,25	5,9	3,7	2,5	4,1	2,6	35,6	15,4	1,5	8,6
DHR-35	35	37,0		1,85	1,00	1,75		37,8		6,0	3,8	2,5	4,5	3,0	36,6	18,8	1,5	8,7
DHR-37	37	39,0	+0,25	1,85	1,00	1,75		39,8		6,2	3,9	2,5	4,7	3,0	36,6	19,8	1,5	8,8
DHR-38	38	40,0		1,85	1,00	1,75		40,8		6,3	3,9	2,5	4,8	3,0	38,3	22,5	1,5	9,1
DHR-40	40	42,5		2,15	1,25	2,00		43,5	+0,90	6,5	3,9	2,5	5,1	3,8	58,4	27,0	2,0	10,9
DHR-42	42	44,5		2,15	1,25	2,00		45,5	-0,39	6,7	4,1	2,5	5,6	3,8	58,5	28,4	2,0	11,0
DHR-45	45	47,5		2,15	1,25	2,00		48,5		7,0	4,3	2,5	6,3	3,8	56,5	30,2	2,0	10,7
DHR-47	47	49,5		2,15	1,25	2,00	-0,07	50,5		7,2	4,4	2,5	6,7	3,8	57,0	31,4	2,0	10,8
DHR-50	50	53,0		2,65	1,50	2,50		54,2		7,5	4,6	2,5	8,8	4,5	95,5	40,5	2,0	19,0
DHR-52	52	55,0		2,65	1,50	2,50		56,2		7,7	4,7	2,5	9,9	4,5	94,6	42,0	2,0	18,8
DHR-55	55	58,0		2,65	1,50	2,50		59,2		8,0	5,0	2,5	10,4	4,5	94,7	44,4	2,0	19,6
DHR-60	60	63,0		3,15	1,50	3,00		64,2	+1,10	8,5	5,4	2,5	15,9	4,5	137,0	48,3	2,0	29,2
DHR-62	62	65,0		3,15	1,50	3,00		66,2	-0,46	8,6	5,5	2,5	16,1	4,5	137,0	49,8	2,0	29,2
DHR-64	64	67,0	+0,30	3,15	1,50	3,00		68,2		8,7	5,6	3,0	16,5	4,5	137,0	51,4	2,0	30,0
DHR-65	65	68,0		3,15	1,50	3,00	-0,08	69,2		8,7	5,8	3,0	16,6	4,5	174,0	51,8	2,5	30,0
DHR-68	68	71,0		3,15	1,50	3,00		72,5		8,8	6,1	3,0	17,2	4,5	174,0	54,5	2,5	30,6
DHR-70	70	73,0		3,15	1,50	3,00		74,5		9,0	6,2	3,0	18,0	4,5	171,0	56,2	2,5	30,3
DHR-72	72	75,0		3,15	1,50	3,00		76,5		9,2	6,4	3,0	21,7	4,5	172,0	58,0	2,5	30,3
DHR-75	75	78,0		3,15	1,50	3,00		79,5		9,3	6,6	3,0	22,6	4,5	170,0	60,0	2,5	30,3
DHR-80	80	83,5		4,15	1,75	4,00		85,5		9,5	7,0	3,0	33,2	5,3	308,0	74,6	2,5	56,0
DHR-85	85	88,5		4,15	1,75	4,00		90,5	+1,30	9,7	7,2	3,5	33,8	5,3	358,0	79,5	3,0	55,0
DHR-90	90	93,5	+0,35	4,15	1,75	4,00	-0,10	95,5	-0,54	10,0	7,6	3,5	41,3	5,3	354,0	84,0	3,0	56,0
DHR-95	95	98,5		4,15	1,75	4,00		100,5		10,3	8,1	3,5	46,7	5,3	347,0	88,6	3,0	56,0
DHR-100	100	103,5		4,15	1,75	4,00		105,5		10,5	8,4	3,5	50,7	5,3	335,0	93,1	3,0	55,0

***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

ALL DIMENSIONS IN MILLIMETERS.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	HV	HRC
DHR	20-48	470-580	47-54
	50-100	435-530	44-51

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DHR	ALL	470-580	47-54	84-87.5	66-72

Axially Assembled, External Reinforced, Metric

The DSR is an extra thick version of a regular DSH retaining ring. As such, it is stronger and can withstand greater thrust loads than its standard counterpart.

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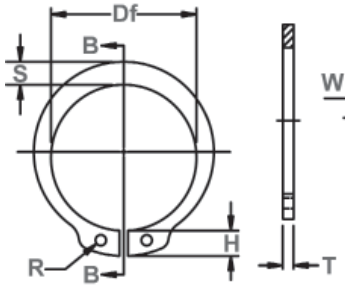
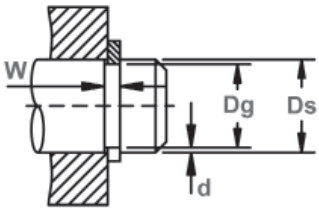
DSR Shaft Rings

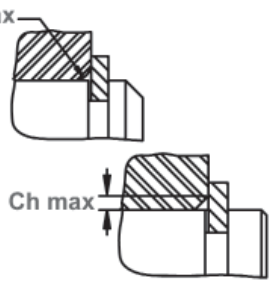
DIN 471 - Heavy Type



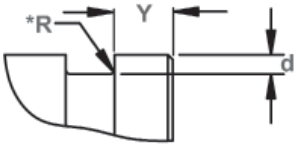
Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



*The radius "R" on the load side must not exceed 0.1T.

Alternate Design (Manufacturer's Option)

RING NO.	SHAFT DIA.	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. load w/ R/Ch. Max.	RPM Limits
	Ds	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSR-12	12	11,5		1,60	0,25	1,50		11,0		3,4	1,8	1,7	0,75	0,7	11,30	1,53	1,0	4,5	75000
DSR-15	15	14,3		1,60	0,35	1,50		13,8	+0,10	4,8	2,4	2,0	1,20	0,7	15,50	3,20	1,0	4,5	50000
DSR-16	16	15,2	-0,11	1,60	0,40	1,50		14,7	-0,36	5,0	2,5	2,0	1,20	1,2	16,70	3,26	1,0	4,5	48000
DSR-17	17	16,2		1,60	0,40	1,50		15,7		5,0	2,6	2,0	1,24	1,2	18,00	4,32	1,0	4,5	46000
DSR-18	18	17,0		1,60	0,50	1,50	-0,06	16,5		5,1	2,7	2,0	1,54	1,5	26,60	5,50	1,5	5,8	43000
DSR-19	19	18,0		1,60	0,50	1,50		17,5		5,1	2,7	2,0	1,45	1,5	26,60	5,78	1,5	5,9	28000
DSR-20	20	19,0	-0,13	1,85	0,50	1,75		18,5		5,5	3,0	2,0	2,25	1,5	36,30	5,60	1,5	8,2	32000
DSR-22	22	21,0		1,85	0,50	1,75		20,5		6,0	3,1	2,0	2,30	1,5	36,00	5,60	1,5	8,1	29000
DSR-24	24	22,9		1,85	0,55	1,75		22,2		6,3	3,2	2,0	2,70	1,7	34,20	7,95	1,5	7,6	29000
DSR-25	25	23,9		2,15	0,55	2,00		23,2	+0,21	6,4	3,4	2,0	3,35	1,7	45,00	8,30	1,5	10,3	25000
DSR-26	26	24,4		2,15	0,80	2,00		23,6	-0,42	6,6	3,3	2,0	3,65	2,4	44,00	10,70	1,5	10,0	27000
DSR-27	27	25,5	-0,21	2,15	0,75	2,00		24,7		6,6	3,4	2,0	3,85	2,3	45,50	10,30	1,5	10,6	25000
DSR-28	28	26,6		2,15	0,70	2,00		25,9		6,5	3,5	2,0	3,90	2,1	57,00	10,00	1,5	13,4	22000
DSR-29	29	27,6		2,15	0,70	2,00		26,9		6,5	3,8	2,0	4,30	2,1	56,50	10,40	1,5	13,3	22000
DSR-30	30	28,6		2,15	0,70	2,00		27,9		6,5	4,1	2,0	5,00	2,1	57,00	10,70	1,5	13,6	21000
DSR-32	32	30,3		2,15	0,85	2,00		29,6		6,5	4,1	2,5	5,40	2,5	57,00	12,90	1,5	13,6	20000
DSR-34	34	32,3		2,65	0,85	2,50	-0,07	31,5	+0,25	6,6	4,2	2,5	6,80	2,5	87,00	16,40	1,5	15,6	18000
DSR-35	35	33,0		2,65	1,00	2,50		32,2	-0,50	6,7	4,2	2,5	7,10	3,0	86,00	17,80	1,5	15,4	17000
DSR-36	36	34,0		2,65	1,00	2,50		33,2		6,7	4,2	2,5	7,50	3,0	101,50	20,10	2,0	18,3	16000
DSR-38	38	36,0		2,65	1,00	2,50		35,2		6,8	4,3	2,5	8,00	3,0	101,00	21,20	2,0	18,6	15000
DSR-40	40	37,5		2,65	1,25	2,50		36,5		7,0	4,4	2,5	8,20	3,8	104,00	25,30	2,0	19,3	14000
DSR-42	42	39,5	-0,25	2,65	1,25	2,50		38,5		7,2	4,5	2,5	9,60	3,8	102,00	26,70	2,0	19,2	13000
DSR-44	44	41,5		2,65	1,25	2,50		40,5	+0,39	7,2	4,5	2,5	10,40	3,8	101,00	27,90	2,0	19,1	12000
DSR-45	45	42,5		2,65	1,25	2,50		41,5	-0,90	7,5	4,7	2,5	10,80	3,8	100,00	28,60	2,0	19,1	11000
DSR-48	48	45,5		2,65	1,25	2,50		44,5		7,8	5,0	2,5	12,20	3,8	101,00	30,70	2,0	19,5	10000
DSR-50	50	47,0		3,15	1,50	3,00		45,8		8,0	5,1	2,5	14,80	4,5	165,00	38,20	2,0	32,4	11000
DSR-52	52	49,0		3,15	1,50	3,00		47,8		8,2	5,2	2,5	15,40	4,5	165,00	39,70	2,5	26,0	10000
DSR-55	55	52,0		3,15	1,50	3,00	-0,08	50,8		8,5	5,4	2,5	17,00	4,5	161,00	42,00	2,5	25,6	9000
DSR-58	58	55,0		3,15	1,50	3,00		53,8		8,8	5,6	2,5	19,40	4,5	160,00	44,30	2,5	26,0	8000
DSR-60	60	57,0		3,15	1,50	3,00		55,8		9,0	5,8	2,5	20,00	4,5	156,00	46,00	2,5	25,4	8000
DSR-65	65	62,0	-0,30	4,15	1,50	4,00		60,8	+0,46	9,3	6,3	3,0	31,00	4,5	346,00	49,80	2,5	58,0	7000
DSR-70	70	67,0		4,15	1,50	4,00		65,5	-1,10	9,5	6,6	3,0	32,20	4,5	343,00	53,80	2,5	59,0	7000
DSR-75	75	72,0		4,15	1,50	4,00		70,5		9,7	7,0	3,0	39,80	4,5	333,00	57,60	2,5	58,0	6000
DSR-80	80	76,5		4,15	1,75	4,00	-0,10	74,5		9,8	7,4	3,0	42,40	5,3	328,00	71,60	3,0	50,0	6000
DSR-85	85	81,5		4,15	1,75	4,00		79,5		10,0	7,8	3,5	47,00	5,3	383,00	76,30	3,0	59,4	6000
DSR-90	90	86,5	-0,35	4,15	1,75	4,00		84,5	+0,54	10,2	10,2	3,5	55,60	5,3	386,00	80,80	3,0	61,0	5000
DSR-95	95	91,5		4,15	1,75	4,00		89,5	-1,30	10,2	8,6	3,5	61,20	5,3	378,00	85,50	3,5	52,0	5000
DSR-100	100	96,5		4,15	1,75	4,00		94,5		10,5	9,0	3,5	72,00	5,3	368,00	90,00	3,5	51,6	4000

***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM. ALL DIMENSIONS IN MILLIMETERS.**

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	HV	HRC
DSR	12-48	470-580	47-54
	50-100	435-530	44-51

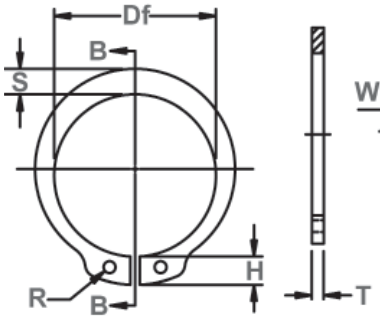
HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DSR	ALL	470-580	47-54	84-87.5	66-72

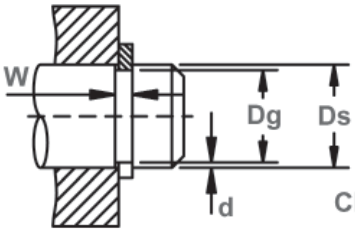
DSH Shaft Rings
(DIN 471)

Axially Assembled, External, Metric

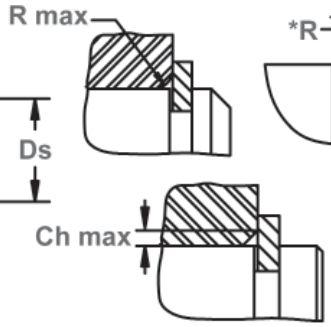
Once installed in the groove of a shaft, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



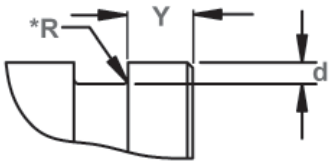
Free Diameter & Ring Measurements With Section B-B



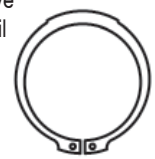
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Groove Detail

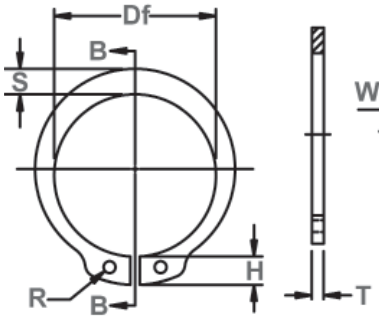

Alternate Design Manufacturer's Option


Alternate Lug Design Manufacturer's Option

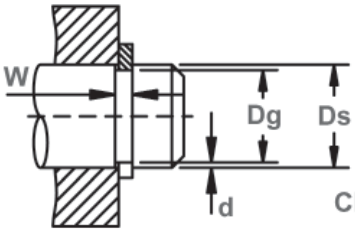

Alternate Design Manufacturer's Option sizes > -165

RING NO.	SHAFT DIA. (mm)	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. Load w/Ch Max.	RPM Limits
	Ds	Dg	TOL.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSH-3	3	2,8		0,50	0,10	0,40		2,7		1,9	0,8	1,0	0,017	0,3	0,47	0,1	0,5	0,27	360000
DSH-4	4	3,8	-0,04	0,50	0,10	0,40		3,7	+0,04	2,2	0,9	1,0	0,022	0,3	0,50	0,2	0,5	0,30	211000
DSH-5	5	4,8		0,70	0,10	0,60	-0,05	4,7	-0,15	2,5	1,1	1,0	0,066	0,3	1,00	0,2	0,5	0,80	154000
DSH-6	6	5,7		0,80	0,15	0,70		5,6		2,7	1,3	1,2	0,084	0,5	1,45	0,4	0,5	0,90	114000
DSH-7	7	6,7		0,90	0,15	0,80		6,5	+0,06	3,1	1,4	1,2	0,121	0,5	2,60	0,5	0,5	1,40	121000
DSH-8	8	7,6	-0,06	0,90	0,20	0,80		7,4	-0,18	3,2	1,5	1,2	0,158	0,6	3,00	0,8	0,5	2,00	96000
DSH-9	9	8,6		1,10	0,20	1,00		8,4		3,3	1,7	1,2	0,300	0,6	3,50	0,9	0,5	2,40	85000
DSH-10	10	9,6		1,10	0,20	1,00		9,3		3,3	1,8	1,5	0,340	0,6	4,00	1,0	1,0	2,40	84000
DSH-11	11	10,5		1,10	0,25	1,00		10,2		3,3	1,8	1,5	0,410	0,8	4,50	1,4	1,0	2,40	70000
DSH-12	12	11,5		1,10	0,25	1,00		11,0		3,3	1,8	1,7	0,500	0,8	5,00	1,5	1,0	2,40	75000
DSH-13	13	12,4		1,10	0,30	1,00		11,9	+0,10	3,4	2,0	1,7	0,530	0,9	5,80	2,0	1,0	2,40	66000
DSH-14	14	13,4	-0,11	1,10	0,30	1,00		12,9	-0,36	3,5	2,1	1,7	0,640	0,9	6,40	2,1	1,0	2,40	58000
DSH-15	15	14,3		1,10	0,35	1,00		13,8		3,6	2,2	1,7	0,670	1,1	6,90	2,6	1,0	2,40	50000
DSH-16	16	15,2		1,10	0,40	1,00		14,7		3,7	2,2	1,7	0,700	1,2	7,40	3,2	1,0	2,40	45000
DSH-17	17	16,2		1,10	0,40	1,00		15,7		3,8	2,3	1,7	0,820	1,2	8,00	3,4	1,0	2,40	41000
DSH-18	18	17,0		1,30	0,50	1,20		16,5		3,9	2,4	2,0	1,110	1,5	17,00	4,5	1,5	3,75	39000
DSH-19	19	18,0		1,30	0,50	1,20		17,5		3,9	2,5	2,0	1,220	1,5	17,00	4,8	1,5	3,80	35000
DSH-20	20	19,0		1,30	0,50	1,20	-0,06	18,5		4,0	2,6	2,0	1,300	1,5	17,10	5,0	1,5	3,85	32000
DSH-21	21	20,0	-0,13	1,30	0,50	1,20		19,5	+0,13	4,1	2,7	2,0	1,420	1,5	16,80	5,3	1,5	3,75	29000
DSH-22	22	21,0		1,30	0,50	1,20		20,5	-0,42	4,2	2,8	2,0	1,500	1,5	16,90	5,6	1,5	3,80	27000
DSH-23	23	22,0	-0,15	1,30	0,50	1,20		21,5		4,3	2,9	2,0	1,630	1,5	16,60	5,9	1,5	3,80	25000
DSH-24	24	22,9		1,30	0,55	1,20		22,2		4,4	3,0	2,0	1,770	1,7	16,10	6,7	1,5	3,65	27000
DSH-25	25	23,9		1,30	0,55	1,20		23,2		4,4	3,0	2,0	1,900	1,7	16,20	7,0	1,5	3,70	25000
DSH-26	26	24,9		1,30	0,55	1,20		24,2		4,5	3,1	2,0	1,960	1,7	16,10	7,3	1,5	3,70	24000
DSH-27	27	25,6	-0,21	1,30	0,70	1,20		24,9	+0,21	4,6	3,1	2,0	2,080	2,1	16,40	9,6	1,5	3,80	22500
DSH-28	28	26,6		1,60	0,70	1,50		25,9	-0,42	4,7	3,2	2,0	2,920	2,1	32,10	10,0	1,5	7,50	21200
DSH-29	29	27,6		1,60	0,70	1,50		26,9		4,8	3,4	2,0	3,200	2,1	31,80	10,3	1,5	7,45	20000
DSH-30	30	28,6		1,60	0,70	1,50		27,9		5,0	3,5	2,0	3,320	2,1	32,10	10,7	1,5	7,65	18900
DSH-31	31	29,3		1,60	0,85	1,50		28,6		5,1	3,5	2,5	3,450	2,6	31,50	13,4	2,0	5,60	17900
DSH-32	32	30,3		1,60	0,85	1,50		29,6		5,2	3,6	2,5	3,540	2,6	31,20	13,8	2,0	5,55	16900
DSH-33	33	31,3	-0,25	1,60	0,85	1,50		30,5	+0,25	5,2	3,7	2,5	3,690	2,6	31,60	14,3	2,0	5,65	17400
DSH-34	34	32,3		1,60	0,85	1,50		31,5	-0,50	5,4	3,8	2,5	3,800	2,6	31,30	14,7	2,0	5,60	16100
DSH-35	35	33,0		1,60	1,00	1,50		32,2		5,6	3,9	2,5	4,000	3,0	30,80	17,8	2,0	5,55	15500

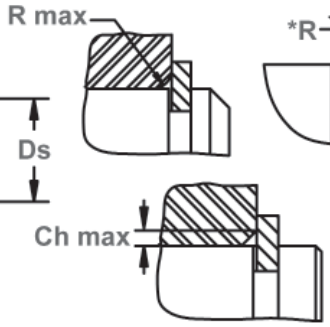
ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1T.**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**
FOR HARDNESS SPECIFICATIONS, SEE END OF SECTION.



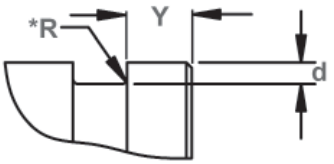
Free Diameter & Ring Measurements With Section B-B



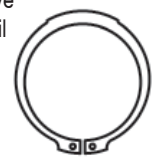
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Groove Detail



Alternate Design Manufacturer's Option

Alternate Lug Design Manufacturer's Option

Alternate Design Manufacturer's Option sizes > -165

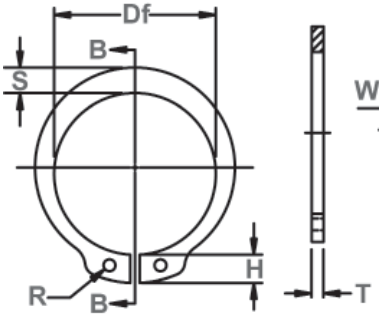
RING NO.	SHAFT DIA. (mm)	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. Load W/Ch Max.	RPM Limits
	Ds	Dg	TOL.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSH-36	36	34,0		1,85	1,00	1,75		33,2		5,6	4,0	2,5	5,000	3,0	49,40	18,3	2,0	9,00	14500
DSH-37	37	35,0		1,85	1,00	1,75		34,2	+0,25	5,7	4,1	2,5	5,370	3,0	50,00	18,8	2,0	9,15	14100
DSH-38	38	36,0		1,85	1,00	1,75		35,2	-0,50	5,8	4,2	2,5	5,620	3,0	49,50	19,3	2,0	9,10	13600
DSH-39	39	37,0		1,85	1,00	1,75		36,0		5,9	4,3	2,5	5,850	3,0	49,80	19,9	2,0	9,25	14500
DSH-40	40	37,5		1,85	1,25	1,75		36,5		6,0	4,4	2,5	6,030	3,8	51,00	25,3	2,0	9,50	14300
DSH-41	41	38,5		1,85	1,25	1,75		37,5		6,2	4,5	2,5	6,215	3,8	50,10	26,0	2,0	9,40	13500
DSH-42	42	39,5	-0,25	1,85	1,25	1,75	-0,06	38,5	+0,39	6,5	4,5	2,5	6,500	3,8	50,00	26,7	2,0	9,45	13000
DSH-44	44	41,5		1,85	1,25	1,75		40,5	-0,90	6,6	4,6	2,5	7,000	3,8	48,50	28,0	2,0	9,20	11800
DSH-45	45	42,5		1,85	1,25	1,75		41,5		6,7	4,7	2,5	7,500	3,8	49,0	28,6	2,0	9,35	11400
DSH-46	46	43,5		1,85	1,25	1,75		42,5		6,7	4,8	2,5	7,600	3,8	48,9	29,4	2,0	9,40	10900
DSH-47	47	44,5		1,85	1,25	1,75		43,5		6,8	4,9	2,5	7,500	3,8	49,5	30,0	2,0	9,55	11000
DSH-48	48	45,5		1,85	1,25	1,75		44,5		6,9	5,0	2,5	7,900	3,8	49,4	30,7	2,0	9,55	10000
DSH-50	50	47,0		2,15	1,50	2,00		45,8		6,9	5,1	2,5	10,20	4,5	73,3	38,0	2,0	14,40	11000
DSH-52	52	49,0		2,15	1,50	2,00		47,8		7,0	5,2	2,5	11,10	4,5	73,1	39,7	2,5	11,50	10000
DSH-54	54	51,0		2,15	1,50	2,00		49,8		7,1	5,3	2,5	11,30	4,5	71,2	41,2	2,5	11,30	9000
DSH-55	55	52,0		2,15	1,50	2,00		50,8		7,2	5,4	2,5	11,40	4,5	71,4	42,0	2,5	11,40	9000
DSH-56	56	53,0		2,15	1,50	2,00		51,8		7,3	5,5	2,5	11,80	4,5	70,8	42,8	2,5	11,30	9000
DSH-57	57	54,0		2,15	1,50	2,00		52,8		7,3	5,5	2,5	12,20	4,5	70,9	43,7	2,5	11,40	8000
DSH-58	58	55,0		2,15	1,50	2,00		53,8		7,3	5,6	2,5	12,60	4,5	71,1	44,3	2,5	11,50	8000
DSH-60	60	57,0		2,15	1,50	2,00		55,8		7,4	5,8	2,5	12,90	4,5	69,2	46,0	2,5	11,30	8000
DSH-62	62	59,0		2,15	1,50	2,00	-0,07	57,8		7,5	6,0	2,5	14,30	4,5	69,3	47,5	2,5	11,40	7000
DSH-63	63	60,0	-0,30	2,15	1,50	2,00		58,8		7,6	6,2	2,5	15,90	4,5	70,2	48,3	2,5	11,60	7000
DSH-65	65	62,0		2,65	1,50	2,50		60,8		7,8	6,3	3,0	18,20	4,5	135,0	49,8	2,5	22,70	7000
DSH-67	67	64,0		2,65	1,50	2,50		62,5	+0,46	7,9	6,4	3,0	20,30	4,5	136,0	51,3	2,5	23,00	7000
DSH-68	68	65,0		2,65	1,50	2,50		63,5	-1,10	8,0	6,5	3,0	21,80	4,5	135,0	52,2	2,5	23,10	7000
DSH-70	70	67,0		2,65	1,50	2,50		65,5		8,1	6,6	3,0	22,00	4,5	134,0	53,8	2,5	23,00	7000
DSH-72	72	69,0		2,65	1,50	2,50		67,5		8,2	6,8	3,0	22,50	4,5	131,0	55,3	2,5	22,80	6000
DSH-75	75	72,0		2,65	1,50	2,50		70,5		8,4	7,0	3,0	24,60	4,5	130,0	57,6	2,5	22,80	6000
DSH-77	77	74,0		2,65	1,50	2,50		72,5		8,5	7,2	3,0	25,70	4,5	131,0	59,3	3,0	19,70	6000
DSH-78	78	75,0		2,65	1,50	2,50		73,5		8,6	7,3	3,0	26,20	4,5	131,0	60,0	3,0	19,70	5000
DSH-80	80	76,5		2,65	1,75	2,50		74,5		8,6	7,4	3,0	27,30	5,3	128,0	71,6	3,0	19,50	6000
DSH-82	82	78,5		2,65	1,75	2,50		76,5		8,7	7,6	3,0	31,20	5,3	128,0	73,5	3,0	19,60	6000
DSH-85	85	81,5	-0,35	3,15	1,75	3,00	-0,08	79,5		8,7	7,8	3,5	36,40	5,3	215,0	76,2	3,0	33,40	6000

ALL DIMENSIONS IN MILLIMETERS.
*The radius "R" on the load side must not exceed 0.1T.
*** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.
FOR HARDNESS SPECIFICATIONS, SEE END OF SECTION.

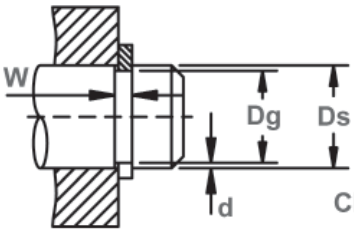
DSH Shaft Rings
(DIN 471)

Axially Assembled, External, Metric

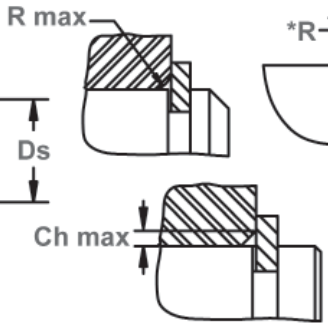
Once installed in the groove of a shaft, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



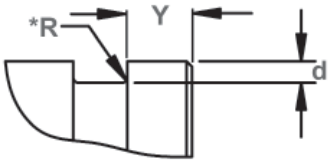
Free Diameter & Ring Measurements With Section B-B



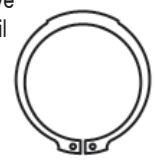
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Groove Detail

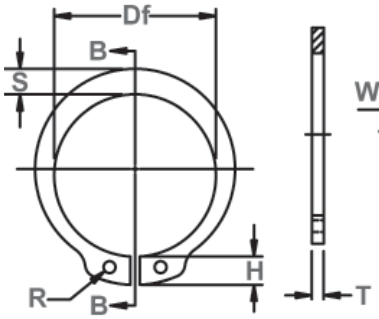

Alternate Design Manufacturer's Option


Alternate Lug Design Manufacturer's Option

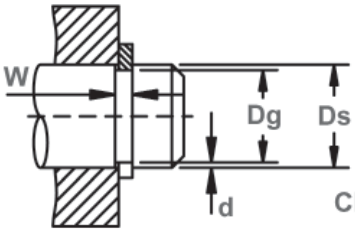

Alternate Design Manufacturer's Option sizes > -165

RING NO.	SHAFT DIA. (mm)	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. Load w/Ch Max.	RPM Limits
	Ds	Dg	TOL.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSH-87	87	83,5		3,15	1,75	3,00		81,5		8,8	7,9	3,5	39,80	5,3	222,0	78,2	3,0	34,80	5000
DSH-88	88	84,5		3,15	1,75	3,00		82,5		8,8	8,0	3,5	41,20	5,3	221,0	79,0	3,0	34,80	5000
DSH-90	90	86,5		3,15	1,75	3,00		84,5		8,8	8,2	3,5	44,50	5,3	217,0	80,0	3,0	34,40	5000
DSH-92	92	88,5	-0,35	3,15	1,75	3,00	-0,08	86,5		9,0	8,4	3,5	46,00	5,3	217,0	82,0	3,5	29,60	5000
DSH-95	95	91,5		3,15	1,75	3,00		89,5		9,4	8,6	3,5	49,00	5,3	212,0	85,0	3,5	29,20	5000
DSH-97	97	93,5		3,15	1,75	3,00		91,5		9,4	8,8	3,5	50,20	5,3	211,0	87,0	3,5	29,40	4000
DSH-97	98	94,5		3,15	1,75	3,00		91,5		9,4	8,8	3,5	50,20	5,3	208,0	88,0	3,5	29,00	4000
DSH-100	100	96,5		3,15	1,75	3,00		94,5		9,6	9,0	3,5	53,70	5,3	206,0	90,0	3,5	29,00	4000
DSH-102	102	98,0		4,15	2,00	4,00		95,0		9,7	9,2	3,5	78,00	6,0	482,0	104,0	3,5	68,50	5000
DSH-105	105	101,0		4,15	2,00	4,00		98,0	+0,54	9,9	9,9	3,5	80,00	6,0	471,0	107,0	3,5	67,70	5000
DSH-107	107	103,0		4,15	2,00	4,00		100,0	-1,30	10,0	9,5	3,5	81,00	6,0	465,0	110,0	3,5	67,30	5000
DSH-107	108	104,0		4,15	2,00	4,00		100,0		10,0	9,5	3,5	81,00	6,0	459,0	111,0	3,5	66,30	4000
DSH-110	110	106,0		4,15	2,00	4,00		103,0		10,1	9,6	3,5	82,00	6,0	457,0	113,0	3,5	66,90	4000
DSH-112	112	108,0	-0,54	4,15	2,00	4,00		105,0		10,3	9,7	3,5	83,00	6,0	451,0	115,0	3,5	66,60	4000
DSH-115	115	111,0		4,15	2,00	4,00		108,0		10,6	9,8	3,5	84,00	6,0	438,0	118,0	3,5	65,50	4000
DSH-117	117	113,0		4,15	2,00	4,00		110,0		10,8	10,0	3,5	85,00	6,0	437,0	120,0	3,5	65,60	4000
DSH-117	118	114,0		4,15	2,00	4,00		110,0		10,8	10,0	3,5	85,00	6,0	430,0	121,0	3,5	64,80	4000
DSH-120	120	116,0		4,15	2,00	4,00		113,0		11,0	10,2	3,5	86,00	6,0	424,0	123,0	3,5	64,50	4000
DSH-122	122	118,0		4,15	2,00	4,00		115,0		11,2	10,3	4,0	88,00	6,0	418,0	125,0	4,0	56,60	4000
DSH-125	125	121,0		4,15	2,00	4,00	-0,10	118,0		11,4	10,4	4,0	90,00	6,0	411,0	128,0	4,0	56,50	3000
DSH-127	127	123,0		4,15	2,00	4,00		120,0		11,4	10,5	4,0	95,00	6,0	407,0	130,0	4,0	56,10	3000
DSH-127	128	124,0		4,15	2,00	4,00		120,0		11,4	10,5	4,0	95,00	6,0	401,0	131,0	4,0	55,60	3000
DSH-130	130	126,0		4,15	2,00	4,00		123,0		11,6	10,7	4,0	100,0	6,0	395,0	134,0	4,0	55,20	3000
DSH-132	132	128,0		4,15	2,00	4,00		125,0		11,7	10,8	4,0	103,0	6,0	396,0	136,0	4,0	55,60	3000
DSH-135	135	131,0		4,15	2,00	4,00		128,0		11,8	11,0	4,0	104,0	6,0	389,0	139,0	4,0	55,40	3000
DSH-137	137	133,0		4,15	2,00	4,00		130,0		11,9	11,0	4,0	107,0	6,0	380,0	141,0	4,0	54,40	3000
DSH-137	138	134,0	-0,63	4,15	2,00	4,00		130,0	+0,63	11,9	11,0	4,0	107,0	6,0	381,0	142,0	4,0	54,70	3000
DSH-140	140	136,0		4,15	2,00	4,00		133,0	-1,50	12,0	11,2	4,0	110,0	6,0	376,0	144,0	4,0	54,40	3000
DSH-142	142	138,0		4,15	2,00	4,00		135,0		12,1	11,3	4,0	112,0	6,0	370,0	146,0	4,0	54,00	3000
DSH-145	145	141,0		4,15	2,00	4,00		138,0		12,2	11,5	4,0	115,0	6,0	367,0	149,0	4,0	53,80	3000
DSH-147	147	143,0		4,15	2,00	4,00		140,0		12,3	11,6	4,0	116,0	6,0	361,0	151,0	4,0	53,50	3000
DSH-147	148	144,0		4,15	2,00	4,00		140,0		12,3	11,6	4,0	116,0	6,0	357,0	152,0	4,0	53,00	2000
DSH-150	150	145,0		4,15	2,50	4,00		142,0		13,0	11,8	4,0	120,0	7,5	357,0	193,0	4,0	53,40	2000

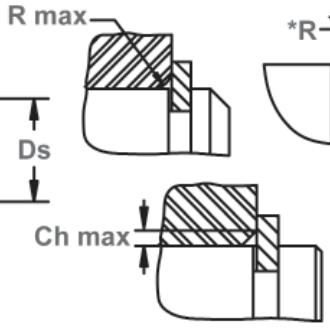
ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1T.**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**
FOR HARDNESS SPECIFICATIONS, SEE END OF SECTION.



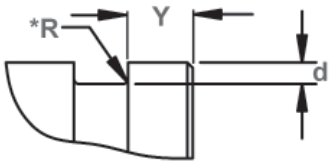
Free Diameter & Ring Measurements With Section B-B



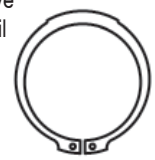
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Groove Detail


Alternate Design Manufacturer's Option


Alternate Lug Design Manufacturer's Option


Alternate Design Manufacturer's Option sizes > -165

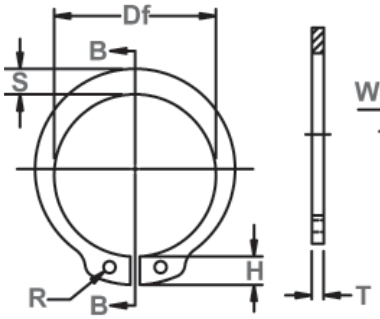
RING NO.	SHAFT DIA. (mm)	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. Load w/Ch Max.	RPM Limits
	Ds	Dg	TOL.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSH-152	152	147,0		4,15	2,50	4,00		143,0		13,0	11,9	4,0	128,0	7,5	356,0	195,0	4,0	53,10	3000
DSH-155	155	150,0		4,15	2,50	4,00		146,0		13,0	12,0	4,0	135,0	7,5	352,0	199,0	4,0	52,60	3000
DSH-157	157	152,0		4,15	2,50	4,00		148,0		13,1	12,0	4,0	140,0	7,5	352,0	202,0	4,0	52,50	3000
DSH-157	158	153,0		4,15	2,50	4,00		148,0		13,1	12,0	4,0	140,0	7,5	353,0	203,0	4,0	52,70	3000
DSH-160	160	155,0		4,15	2,50	4,00		151,0		13,3	12,2	4,0	150,0	7,5	349,0	206,0	4,0	52,20	3000
DSH-162	162	157,0		4,15	2,50	4,00		152,5		13,3	12,3	4,0	155,0	7,5	348,0	208,0	5,0	41,70	3000
DSH-165	165	160,0		4,15	2,50	4,00		155,5		13,5	12,5	4,0	160,0	7,5	345,0	212,0	5,0	41,40	3000
DSH-167	167	162,0		4,15	2,50	4,00		157,5		13,5	12,9	4,0	163,0	7,5	354,0	215,0	5,0	42,50	3000
DSH-167	168	163,0	-0,63	4,15	2,50	4,00	-0,10	157,5	+0,63	13,5	12,9	4,0	163,0	7,5	353,0	216,0	5,0	42,40	2000
DSH-170	170	165,0		4,15	2,50	4,00		160,5	-1,50	13,5	12,9	4,0	170,0	7,5	349,0	219,0	5,0	41,90	2000
DSH-170	172	167,0		4,15	2,50	4,00		160,5		13,5	12,9	4,0	170,0	7,5	344,0	221,0	5,0	41,30	2000
DSH-175	175	170,0		4,15	2,50	4,00		165,5		13,5	12,9	4,0	180,0	7,5	340,0	225,0	5,0	40,70	2000
DSH-177	177	172,0		4,15	2,50	4,00		167,5		14,2	13,5	4,0	183,0	7,5	335,0	228,0	5,0	40,20	2000
DSH-177	178	173,0		4,15	2,50	4,00		167,5		14,2	13,5	4,0	183,0	7,5	349,0	229,0	5,0	42,00	2000
DSH-180	180	175,0		4,15	2,50	4,00		170,5		14,2	13,5	4,0	190,0	7,5	345,0	232,0	5,0	41,40	2000
DSH-180	182	177,0		4,15	2,50	4,00		170,5		14,2	13,5	4,0	190,0	7,5	341,0	235,0	5,0	41,00	2000
DSH-185	185	180,0		4,15	2,50	4,00		175,5		14,2	13,5	4,0	200,0	7,5	336,0	238,0	5,0	40,40	2000
DSH-187	187	182,0		4,15	2,50	4,00		177,5		14,2	14,0	4,0	203,0	7,5	338,0	241,0	5,0	40,50	2000
DSH-187	188	183,0		4,15	2,50	4,00		177,5		14,2	14,0	4,0	203,0	7,5	337,0	242,0	5,0	40,60	2000
DSH-190	190	185,0		4,15	2,50	4,00		180,5		14,2	14,0	4,0	210,0	7,5	333,0	245,0	5,0	40,00	2000
DSH-190	192	187,0		4,15	2,50	4,00		180,5		14,2	14,0	4,0	210,0	7,5	330,0	248,0	5,0	39,60	2000
DSH-195	195	190,0		4,15	2,50	4,00		185,5		14,2	14,0	4,0	220,0	7,5	325,0	251,0	5,0	39,00	2000
DSH-197	197	192,0		4,15	2,50	4,00		187,5		14,2	14,0	4,0	223,0	7,5	322,0	254,0	5,0	38,60	2000
DSH-197	198	193,0		4,15	2,50	4,00		187,5		14,2	14,0	4,0	223,0	7,5	322,0	255,0	5,0	38,70	2000
DSH-200	200	195,0		4,15	2,50	4,00		190,5	+0,72	14,2	14,0	4,0	230,0	7,5	319,0	258,0	5,0	38,30	2000
DSH-202	202	196,0	-0,72	5,15	3,00	5,00		190,0	-1,70	14,2	14,0	4,0	235,0	9,0	624,0	312,0	6,0	62,50	2000
DSH-205	205	199,0		5,15	3,00	5,00		193,0		14,2	14,0	4,0	243,0	9,0	611,0	317,0	6,0	61,30	2000
DSH-205	207	201,0		5,15	3,00	5,00		193,0		14,2	14,0	4,0	243,0	9,0	608,0	320,0	6,0	60,90	2000
DSH-205	208	202,0		5,15	3,00	5,00		193,0		14,2	14,0	4,0	243,0	9,0	605,0	321,0	6,0	60,50	2000
DSH-210	210	204,0		5,15	3,00	5,00	-0,12	198,0		14,2	14,0	4,0	248,0	9,0	598,0	325,0	6,0	59,90	2000
DSH-210	212	206,0		5,15	3,00	5,00		198,0		14,2	14,0	4,0	248,0	9,0	593,0	328,0	6,0	59,50	2000
DSH-215	215	209,0		5,15	3,00	5,00		203,0		14,2	14,0	4,0	260,0	9,0	585,0	332,0	6,0	58,50	2000
DSH-215	217	211,0		5,15	3,00	5,00		203,0		14,2	14,0	4,0	260,0	9,0	580,0	336,0	6,0	58,10	2000
DSH-215	218	212,0		5,15	3,00	5,00		203,0		14,2	14,0	4,0	260,0	9,0	577,0	337,0	6,0	57,80	2000

ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1T.**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**
FOR HARDNESS SPECIFICATIONS, SEE END OF SECTION.

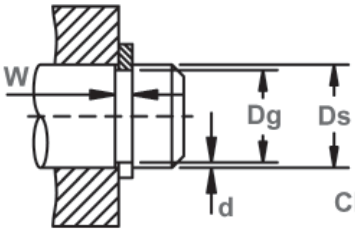
DSH Shaft Rings
(DIN 471)

Axially Assembled, External, Metric

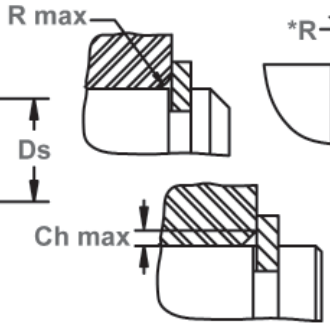
Once installed in the groove of a shaft, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



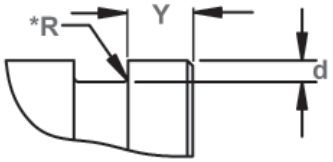
Free Diameter & Ring Measurements With Section B-B



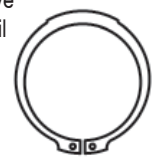
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Groove Detail


Alternate Design Manufacturer's Option


Alternate Lug Design Manufacturer's Option


Alternate Design Manufacturer's Option sizes > -165

RING NO.	SHAFT DIA. (mm)	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. Load w/Ch Max.	RPM Limits
	Ds	Dg	TOL.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSH-220	220	214,0		5,15	3,00	5,00		208,0		14,2	14,0	4,0	265,0	9,0	572,0	340,0	6,0	57,30	2000
DSH-220	222	216,0		5,15	3,00	5,00		208,0		14,2	14,0	4,0	265,0	9,0	567,0	343,0	6,0	56,80	2000
DSH-225	225	219,0		5,15	3,00	5,00		213,0		14,2	14,0	4,0	280,0	9,0	559,0	349,0	6,0	56,00	2000
DSH-225	227	221,0		5,15	3,00	5,00		213,0		14,2	14,0	4,0	280,0	9,0	555,0	351,0	6,0	55,50	1000
DSH-225	228	222,0		5,15	3,00	5,00		213,0		14,2	14,0	4,0	280,0	9,0	552,0	353,0	6,0	55,40	1000
DSH-230	230	224,0		5,15	3,00	5,00		218,0		14,2	14,0	4,0	290,0	9,0	548,0	356,0	6,0	55,00	1000
DSH-230	232	226,0		5,15	3,00	5,00		218,0		14,2	14,0	4,0	290,0	9,0	543,0	359,0	6,0	54,50	1000
DSH-235	235	229,0		5,15	3,00	5,00		223,0		14,2	14,0	4,0	305,0	9,0	537,0	364,0	6,0	53,80	1000
DSH-235	237	231,0	-0,72	5,15	3,00	5,00	-0,12	223,0	+0,72	14,2	14,0	4,0	305,0	9,0	532,0	367,0	6,0	53,40	1000
DSH-235	238	232,0		5,15	3,00	5,00		223,0	-1,70	14,2	14,0	4,0	305,0	9,0	530,0	369,0	6,0	53,00	1000
DSH-240	240	234,0		5,15	3,00	5,00		228,0		14,2	14,0	4,0	310,0	9,0	530,0	372,0	6,0	53,00	1000
DSH-240	242	236,0		5,15	3,00	5,00		228,0		14,2	14,0	4,0	310,0	9,0	520,0	375,0	6,0	52,20	1000
DSH-245	245	239,0		5,15	3,00	5,00		233,0		14,2	14,0	4,0	325,0	9,0	515,0	380,0	6,0	51,50	1000
DSH-245	247	241,0		5,15	3,00	5,00		233,0		14,2	14,0	4,0	325,0	9,0	511,0	383,0	6,0	51,20	1000
DSH-245	248	242,0		5,15	3,00	5,00		233,0		14,2	14,0	4,0	325,0	9,0	508,0	385,0	6,0	50,90	1000
DSH-250	250	244,0		5,15	3,00	5,00		238,0		14,2	14,0	4,0	335,0	9,0	504,0	388,0	6,0	50,50	1000
DSH-250	252	244,0		5,15	4,00	5,00		238,0		16,2	16,0	5,0	335,0	12,0	563,0	519,0	6,0	56,40	1000
DSH-255	255	247,0		5,15	4,00	5,00		240,0		16,2	16,0	5,0	348,0	12,0	557,0	525,0	6,0	55,70	1000
DSH-255	257	249,0		5,15	4,00	5,00		240,0		16,2	16,0	5,0	348,0	12,0	551,0	529,0	6,0	55,20	1000
DSH-255	258	250,0		5,15	4,00	5,00		240,0		16,2	16,0	5,0	348,0	12,0	550,0	531,0	6,0	55,10	1000
DSH-260	260	252,0	-0,81	5,15	4,00	5,00		245,0		16,2	16,0	5,0	355,0	12,0	540,0	535,0	6,0	54,60	1000
DSH-260	262	254,0		5,15	4,00	5,00		245,0		16,2	16,0	5,0	355,0	12,0	542,0	540,0	6,0	54,40	1000

ALL DIMENSIONS IN MILLIMETERS.
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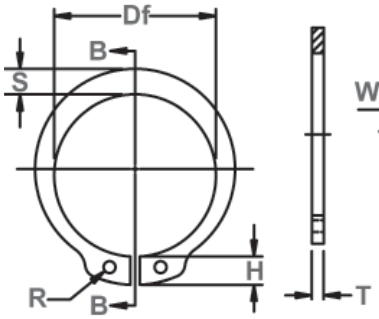
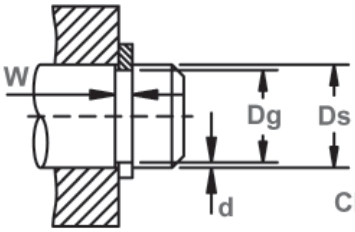
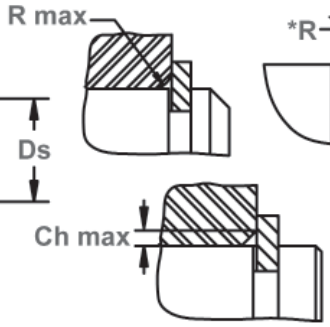
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**
FOR HARDNESS SPECIFICATIONS, SEE END OF SECTION.



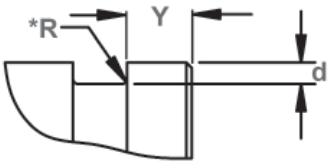
Free Diameter & Ring Measurements With Section B-B



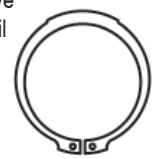
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Groove Detail


Alternate Design Manufacturer's Option


Alternate Lug Design Manufacturer's Option


Alternate Design Manufacturer's Option sizes > -165

RING NO.	SHAFT DIA. (mm)	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. Load w/Ch Max.	RPM Limits
	Ds	Dg	TOL.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSH-265	265	257,0		5,15	4,00	5,00		250,0	+0,72	16,2	16,0	5,0	370,0	12,0	536,0	546,0	6,0	53,70	1000
DSH-265	267	259,0		5,15	4,00	5,00		250,0	-1,70	16,2	16,0	5,0	370,0	12,0	532,0	550,0	6,0	53,30	1000
DSH-265	268	260,0		5,15	4,00	5,00		250,0		16,2	16,0	5,0	370,0	12,0	529,0	553,0	6,0	53,00	1000
DSH-270	270	262,0		5,15	4,00	5,00		255,0		16,2	16,0	5,0	375,0	12,0	525,0	556,0	6,0	52,50	1000
DSH-270	272	264,0		5,15	4,00	5,00		255,0		16,2	16,0	5,0	375,0	12,0	522,0	560,0	6,0	52,00	1000
DSH-275	275	267,0		5,15	4,00	5,00		260,0		16,2	16,0	5,0	390,0	12,0	516,0	566,0	6,0	51,00	1000
DSH-275	277	269,0		5,15	4,00	5,00		260,0		16,2	16,0	5,0	390,0	12,0	513,0	571,0	6,0	51,00	1000
DSH-275	278	270,0		5,15	4,00	5,00		260,0		16,2	16,0	5,0	390,0	12,0	510,0	574,0	6,0	51,00	1000
DSH-280	280	272,0		5,15	4,00	5,00		265,0		16,2	16,0	5,0	398,0	12,0	508,0	576,0	6,0	50,00	1000
DSH-280	282	274,0	-0,81	5,15	4,00	5,00	-0,12	265,0		16,2	16,0	5,0	398,0	12,0	503,0	580,0	6,0	50,00	1000
DSH-285	285	277,0		5,15	4,00	5,00		270,0	+0,81	16,2	16,0	5,0	410,0	12,0	499,0	587,0	6,0	50,00	1000
DSH-285	287	279,0		5,15	4,00	5,00		270,0	-2,00	16,2	16,0	5,0	410,0	12,0	494,0	591,0	6,0	49,00	1000
DSH-285	288	280,0		5,15	4,00	5,00		270,0		16,2	16,0	5,0	410,0	12,0	493,0	594,0	6,0	49,00	1000
DSH-290	290	282,0		5,15	4,00	5,00		275,0		16,2	16,0	5,0	418,0	12,0	490,0	599,0	6,0	49,00	1000
DSH-290	292	284,0		5,15	4,00	5,00		275,0		16,2	16,0	5,0	418,0	12,0	487,0	603,0	6,0	48,00	1000
DSH-295	295	287,0		5,15	4,00	5,00		280,0		16,2	16,0	5,0	430,0	12,0	481,0	609,0	6,0	48,00	1000
DSH-295	297	289,0		5,15	4,00	5,00		280,0		16,2	16,0	5,0	430,0	12,0	479,0	613,0	6,0	48,00	1000
DSH-295	298	290,0		5,15	4,00	5,00		280,0		16,2	16,0	5,0	430,0	12,0	476,0	615,0	6,0	47,00	1000
DSH-300	300	292,0		5,15	4,00	5,00		285,0		16,2	16,0	5,0	440,0	12,0	475,0	619,0	6,0	47,00	1000
DSH-305	305	295,0		6,20	5,00	6,00		288,0		20,2	20,0	6,0	738,0	15,0	1036,0	785,0	7,0	89,00	1000
DSH-310	310	300,0		6,20	5,00	6,00	-0,15	293,0		20,2	20,0	6,0	750,0	15,0	1016,0	796,0	7,0	87,00	1000
DSH-315	315	305,0		6,20	5,00	6,00		298,0		20,2	20,0	6,0	760,0	15,0	1007,0	811,0	7,0	86,00	1000

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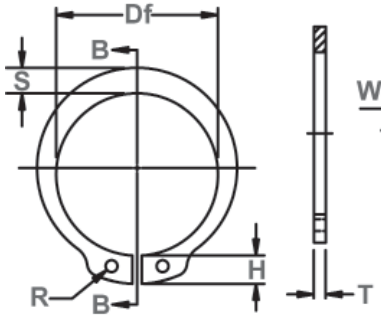
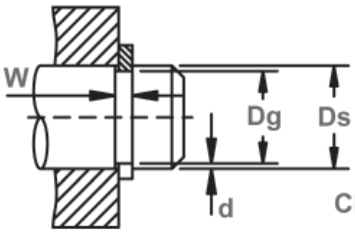
DSH Shaft Rings
(DIN 471)

Axially Assembled, External, Metric

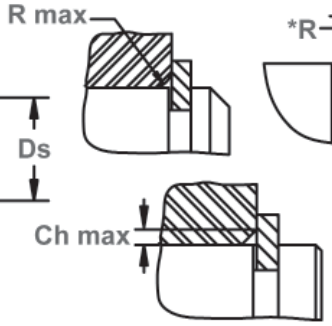
Once installed in the groove of a shaft, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



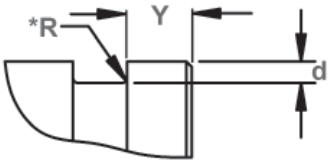
Free Diameter & Ring Measurements With Section B-B



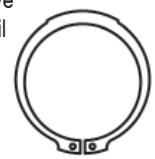
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Groove Detail


Alternate Design Manufacturer's Option


Alternate Lug Design Manufacturer's Option

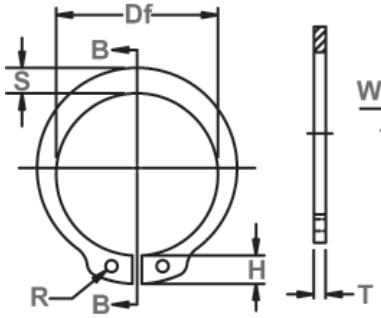

Alternate Design Manufacturer's Option sizes > -165

RING NO.	SHAFT DIA. (mm)	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. Load w/Ch Max.	RPM Limits
	Ds	Dg	TOL.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSH-320	320	310,0	-0,81	6,20	5,00	6,00		303,0	+0,81	20,2	20,0	6,0	770,0	15,0	988,0	825,0	7,0	85,00	1000
DSH-325	325	315,0		6,20	5,00	6,00		308,0	-2,00	20,2	20,0	6,0	787,0	15,0	975,0	837,0	7,0	83,00	1000
DSH-330	330	320,0		6,20	5,00	6,00		313,0		20,2	20,0	6,0	800,0	15,0	958,0	850,0	7,0	82,00	1000
DSH-335	335	325,0		6,20	5,00	6,00		318,0		20,2	20,0	6,0	826,0	15,0	945,0	864,0	7,0	81,00	1000
DSH-340	340	330,0		6,20	5,00	6,00		323,0		20,2	20,0	6,0	840,0	15,0	932,0	876,0	7,0	80,00	1000
DSH-345	345	335,0		6,20	5,00	6,00		328,0		20,2	20,0	6,0	845,0	15,0	917,0	890,0	7,0	79,00	1000
DSH-350	350	340,0		6,20	5,00	6,00		333,0		20,2	20,0	6,0	850,0	15,0	906,0	903,0	7,0	77,00	1000
DSH-355	355	345,0		6,20	5,00	6,00		338,0		20,2	20,0	6,0	865,0	15,0	894,0	916,0	7,0	76,00	1000
DSH-360	360	350,0	-0,89	6,20	5,00	6,00	-0,15	343,0		20,2	20,0	6,0	880,0	15,0	880,0	928,0	7,0	75,00	1000
DSH-365	365	355,0		6,20	5,00	6,00		348,0		20,2	20,0	6,0	885,0	15,0	868,0	942,0	7,0	74,00	1000
DSH-370	370	360,0		6,20	5,00	6,00		353,0	+0,90	20,2	20,0	6,0	890,0	15,0	856,0	955,0	7,0	73,00	1000
DSH-375	375	365,0		6,20	5,00	6,00		358,0	-2,00	20,2	20,0	6,0	910,0	15,0	847,0	968,0	7,0	72,00	1000
DSH-380	380	370,0		6,20	5,00	6,00		363,0		20,2	20,0	6,0	930,0	15,0	833,0	980,0	7,0	71,00	1000
DSH-385	385	375,0		6,20	5,00	6,00		368,0		20,2	20,0	6,0	940,0	15,0	823,0	994,0	7,0	70,00	1000
DSH-390	390	380,0		6,20	5,00	6,00		373,0		20,2	20,0	6,0	950,0	15,0	814,0	1008,0	7,0	70,00	1000
DSH-395	395	385,0		6,20	5,00	6,00		378,0		20,2	20,0	6,0	990,0	15,0	803,0	1021,0	7,0	69,00	1000
DSH-400	400	390,0		6,20	5,00	6,00		383,0		20,2	20,0	6,0	1040,0	15,0	793,0	1033,0	7,0	69,00	1000
DSH-410	410	398,0		7,20	6,00	7,00		390,0		26,2	26,0	6,0	1320,0	18,0	1616,0	1269,0	7,0	139,0	1000
DSH-420	420	408,0		7,20	6,00	7,00		400,0		26,2	26,0	6,0	1360,0	18,0	1569,0	1300,0	7,0	135,0	1000
DSH-430	430	418,0	-1,00	7,20	6,00	7,00		410,0	+1,00	26,2	26,0	6,0	1390,0	18,0	1540,0	1332,0	7,0	132,0	1000
DSH-440	440	428,0		7,20	6,00	7,00		420,0	-2,00	26,2	26,0	6,0	1420,0	18,0	1500,0	1363,0	7,0	129,0	1000
DSH-450	450	438,0		7,20	6,00	7,00		430,0		26,2	26,0	6,0	1450,0	18,0	1472,0	1393,0	7,0	126,0	1000

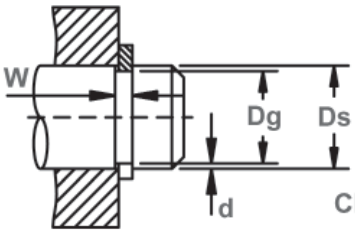
ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1T.**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

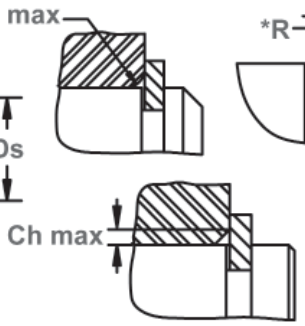
RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DSH	ALL	470-580	47-54	84-87.5	66-72



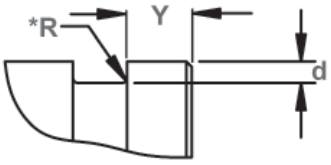
Free Diameter & Ring Measurements With Section B-B



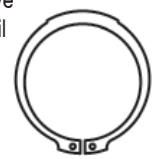
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Groove Detail


Alternate Design Manufacturer's Option


Alternate Lug Design Manufacturer's Option


Alternate Design Manufacturer's Option sizes > -165

RING NO.	SHAFT DIA. (mm)	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. Load w/Ch Max.	RPM Limits
	Ds	Dg	TOL.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSH-460	460	448,0		7,20	6,00	7,00		440,0		26,2	26,0	6,0	1520,0	18,0	1443,0	1426,0	7,0	124,0	1000
DSH-470	470	458,0		7,20	6,00	7,00		450,0		26,2	26,0	6,0	1590,0	18,0	1413,0	1457,0	7,0	121,0	1000
DSH-480	480	468,0		7,20	6,00	7,00		460,0		26,2	26,0	6,0	1660,0	18,0	1383,0	1489,0	7,0	119,0	500
DSH-490	490	478,0		7,20	6,00	7,00		470,0	+1,00	26,2	26,0	6,0	1725,0	18,0	1355,0	1520,0	7,0	116,0	500
DSH-500	500	488,0		7,20	6,00	7,00		480,0	-2,00	26,2	26,0	6,0	1790,0	18,0	1329,0	1550,0	7,0	114,0	500
DSH-510	510	496,0		8,20	7,00	8,00		485,0		26,2	26,0	6,0	2300,0	21,0	1952,0	1843,0	7,0	167,0	1000
DSH-520	520	506,0		8,20	7,00	8,00	-0,15	495,0		26,2	26,0	6,0	2350,0	21,0	1910,0	1880,0	7,0	164,0	500
DSH-530	530	516,0		8,20	7,00	8,00		505,0		26,2	26,0	6,0	2400,0	21,0	1878,0	1916,0	7,0	161,0	500
DSH-540	540	526,0		8,20	7,00	8,00		515,0		26,2	26,0	6,0	2445,0	21,0	1846,0	1953,0	7,0	158,0	400
DSH-550	550	536,0	-1,00	8,20	7,00	8,00		525,0		26,2	26,0	6,0	2490,0	21,0	1812,0	1986,0	7,0	155,0	400
DSH-560	560	546,0		8,20	7,00	8,00		535,0		26,2	26,0	6,0	2580,0	21,0	1777,0	2026,0	7,0	153,0	400
DSH-570	570	556,0		8,20	7,00	8,00		545,0	+1,50	26,2	26,0	6,0	2670,0	21,0	1750,0	2063,0	7,0	150,0	400
DSH-580	580	566,0		8,20	7,00	8,00		555,0	-3,00	26,2	26,0	6,0	2760,0	21,0	1718,0	2100,0	7,0	147,0	400
DSH-590	590	576,0		8,20	7,00	8,00		565,0		26,2	26,0	6,0	2840,0	21,0	1689,0	2136,0	7,0	145,0	400
DSH-600	600	586,0		8,20	7,00	8,00		575,0		26,2	26,0	6,0	2920,0	21,0	1600,0	2170,0	7,0	143,0	300
DSH-650	650	634,0		9,30	8,00	9,00		620,0		34,0	34,0	6,0	3770,0	24,0	2810,0	2640,0	7,0	242,0	400
DSH-700**	700	684,0		9,30	8,00	9,00		670,0		34,0	34,0	6,0	4070,0	24,0	2615,0	2890,0	7,0	225,0	300
DSH-750**	750	732,0		9,30	9,00	9,00		715,0		34,0	34,0	9,0	4640,0	27,0	2450,0	3490,0	7,0	207,0	190
DSH-800**	800	782,0		9,30	9,00	9,00	-0,2	765,0		34,0	34,0	9,0	5330,0	27,0	2299,0	3730,0	7,0	195,0	300
DSH-850**	850	830,0		9,30	10,00	9,00		810,0		34,0	34,0	9,0	6030,0	30,0	2166,0	4400,0	7,0	183,0	300
DSH-900**	900	880,0		9,30	10,00	9,00		860,0	+2,00	34,0	34,0	9,0	6640,0	30,0	2047,0	4650,0	7,0	173,0	200
DSH-950**	950	928,0		9,30	11,00	9,00		900,0	-4,00	34,0	34,0	9,0	7260,0	33,0	1945,0	5400,0	7,0	165,0	200
DSH-1000**	1000	978,0		9,30	11,00	9,00		950,0		34,0	34,0	9,0	8130,0	33,0	1851,0	5700,0	7,0	157,0	200

ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1T.**
**** THESE PARTS ARE MADE WITH A CONSTANT SECTION WIDTH (NO TAPER)**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DSH	3 & 4	435-530	44-51	82.5-86 HR30N**
	5-17	435-530	44-51	63-69.5 HR30N
	18-1000	435-530	44-51	-

*WHERE APPLICABLE
** HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

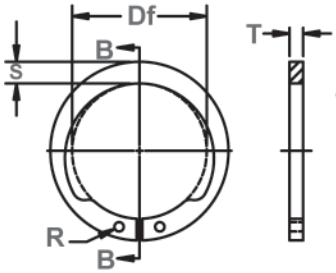
RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DSH	3 & 4	470-580	47-54	84-87.5 HR30N**
	5-17	470-580	47-54	66-72 HR30N
	18-48	470-580	47-54	-
	50-200	435-530	44-51	-
	202-300	390-470	40-47	-
	305-1000	370-415	38-43	-

*WHERE APPLICABLE
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

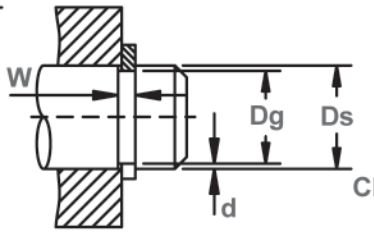
DSI Shaft Rings

Axially Assembled, External Inverted, Metric

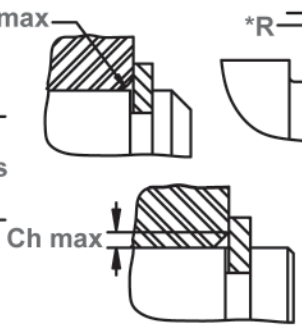
Functions like a DSH ring in a shaft, only the lugs are "reversed." This version reduces the distance the lugs of the standard DSH extend beyond the circumference of the shaft. The shaft can then be used in an application where clearance is minimal.



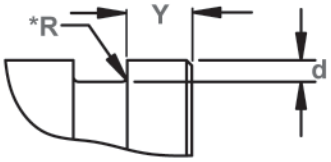
Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions

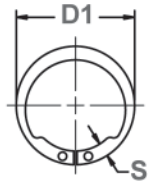


Maximum corner Radius & Chamfer



The radius "R" on the load side must not exceed 0.1T

Alternate Design (Manufacturer's Option)

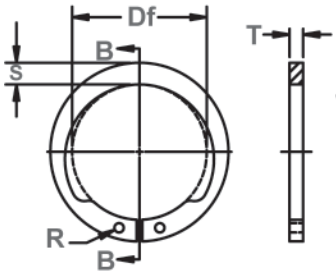


Measuring Free Diameter (Df) DSI SERIES Df=D1-2S

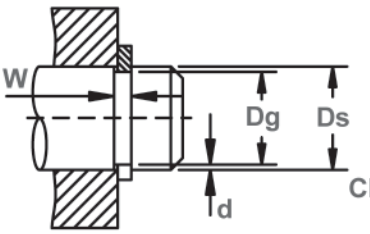
RING NO.	SHAFT DIA.	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		MAX. SEC.		HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. load w/ R/Ch. Max.	RPM Limits
	Ds	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	S	Tol.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSI-12	12	11,5		1,10	0,25	1,00		11,00		2,1		1,3	0,50	0,7	4,5	0,70	1,0	2,4	79000
DSI-13	13	12,4		1,10	0,30	1,00		11,90		2,1		1,3	0,56	0,9	5,5	0,90	1,0	2,4	64000
DSI-14	14	13,4		1,10	0,30	1,00		12,90	+0,10	2,1		1,3	0,58	0,9	6,0	0,97	1,0	2,4	56000
DSI-15	15	14,3	-0,11	1,10	0,35	1,00		13,80	-0,36	2,2		1,3	0,66	1,0	6,5	1,22	1,0	2,4	50000
DSI-16	16	15,2		1,10	0,40	1,00		14,70		2,3		1,3	0,72	1,2	7,0	1,48	1,0	2,5	45000
DSI-17	17	16,2		1,10	0,40	1,00		15,70		2,4		1,3	0,81	1,2	8,1	1,57	1,0	2,6	41000
DSI-18	18	17,0		1,30	0,50	1,20		16,50		2,6		1,5	1,14	1,5	14,8	2,07	1,5	3,2	39000
DSI-20	20	19,0		1,30	0,50	1,20		18,50		2,8		1,5	1,43	1,5	14,6	2,30	1,5	3,1	32000
DSI-21	21	20,0	-0,15	1,30	0,50	1,20		19,35	+0,13	2,8		1,5	1,53	1,5	14,4	2,42	1,5	3,1	29000
DSI-22	22	21,0		1,30	0,50	1,20	-0,06	20,50	-0,42	3,0		1,5	1,63	1,5	14,2	2,53	1,5	3,1	27000
DSI-23	23	22,0		1,30	0,50	1,20		21,50		3,1	±0,1	1,5	1,78	1,5	14,0	2,66	1,5	3,1	25000
DSI-24	24	22,9		1,30	0,55	1,20		22,20		3,2		1,5	1,90	1,6	14,0	3,03	1,5	3,1	27000
DSI-25	25	23,9		1,30	0,55	1,20		23,20		3,4		1,5	2,10	1,6	14,1	3,18	1,5	3,2	25000
DSI-26	26	24,9	-0,21	1,30	0,55	1,20		24,20	+0,21	3,5		1,5	2,18	1,6	14,1	3,30	1,5	3,2	25000
DSI-28	28	26,6		1,60	0,70	1,50		25,90	-0,42	3,8		2,0	3,18	2,1	28,0	4,50	1,5	6,4	22000
DSI-30	30	28,6		1,60	0,70	1,50		27,90		3,9		2,0	3,58	2,1	27,5	4,86	1,5	6,3	19000
DSI-32	32	30,3		1,60	0,85	1,50		29,60		4,0		2,0	3,88	2,5	27,0	6,25	2,0	4,7	17000
DSI-34	34	32,3	-0,25	1,60	0,85	1,50		31,50	+0,25	3,5		2,0	3,60	2,5	26,6	6,67	2,0	4,6	15000
DSI-35	35	33,0		1,60	1,00	1,50		32,20	-0,50	4,2		2,0	4,53	3,0	26,6	8,00	2,0	4,6	16000
DSI-38	38	35,8		1,85	1,10	1,75		34,50		4,5		2,0	5,50	3,3	42,0	10,60	2,0	7,8	15000

***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

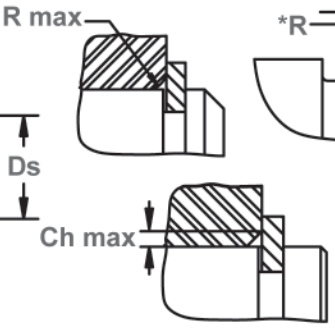
ALL DIMENSIONS IN MILLIMETERS.



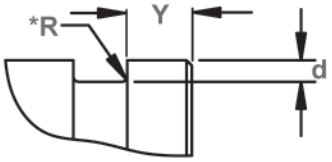
Free Diameter & Ring Measurements With Section B-B



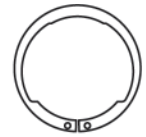
Shaft Diameter & Groove Dimensions



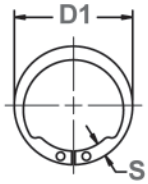
Maximum corner Radius & Chamfer



The radius "R" on the load side must not exceed 0.1T



Alternate Design (Manufacturer's Option)



Measuring Free Diameter (Df) DSI SERIES Df=D1-2S

RING NO.	SHAFT DIA.	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		MAX. SEC.		HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. load w/ R/Ch. Max.	RPM Limits
	Ds	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	S	Tol.	R Min.	kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSI-40	40	37,5		1,85	1,25	1,75		36,50		4,7		2,0	6,49	3,8	42,0	12,60	2,0	7,8	15000
DSI-42	42	39,5		1,85	1,25	1,75		38,50		4,7		2,0	6,51	3,8	42,0	13,30	2,0	7,8	13000
DSI-45	45	42,5	-0,25	1,85	1,25	1,75	-0,06	41,50	+0,39 -0,90	4,7		2,0	7,80	3,8	41,5	14,30	2,0	7,8	11000
DSI-47	47	44,5		1,85	1,25	1,75		43,50		5,0		2,0	8,09	3,8	41,0	15,00	2,0	7,8	10000
DSI-48	48	45,5		1,85	1,25	1,75		44,50		5,2	±0,2	2,0	8,48	3,8	41,0	15,80	2,0	7,8	10000
DSI-50	50	47,0		2,15	1,50	2,00		45,80		5,2		2,5	9,84	4,5	58,0	19,20	2,0	11,6	10000
DSI-55	55	52,0		2,15	1,50	2,00		50,80		5,8		2,5	11,42	4,5	58,0	21,00	2,5	9,3	9000
DSI-58	58	55,0		2,15	1,50	2,00		53,80		5,8		2,5	13,00	4,5	56,0	22,20	2,5	9,2	8000
DSI-60	60	57,0		2,15	1,50	2,00		55,80		5,8		2,5	13,80	4,5	55,5	23,00	2,5	9,1	7000
DSI-65	65	62,0	-0,30	2,65	1,50	2,50	-0,07	60,80		6,0		2,5	20,75	4,5	104,0	24,80	2,5	17,6	6000
DSI-70	70	67,0		2,65	1,50	2,50		65,50	+0,46 -1,10	6,5		2,5	23,70	4,5	103,0	27,00	2,5	17,6	6000
DSI-72	72	69,0		2,65	1,50	2,50		67,50		6,5		2,5	24,70	4,5	104,0	27,70	2,5	18,0	6000
DSI-75	75	72,0		2,65	1,50	2,50		70,50		6,5		2,5	27,50	4,5	100,0	29,20	2,5	17,7	5000
DSI-80	80	76,5		2,65	1,75	2,50		74,50		7,0	±0,3	2,5	28,90	5,3	96,0	36,60	3,0	14,6	6000
DSI-82	82	78,5		2,65	1,75	2,50		76,50		7,0		2,5	29,65	5,3	100,0	37,40	3,0	15,4	5000
DSI-85	85	81,5		3,15	1,75	3,00		79,50		7,4		3,0	39,50	5,3	167,0	38,30	3,0	25,6	5000
DSI-87	87	83,5	-0,35	3,15	1,75	3,00		81,50		7,4		3,0	40,00	5,3	164,0	39,20	3,0	25,5	5000
DSI-90	90	86,5		3,15	1,75	3,00	-0,08	84,50	+0,54 -1,30	7,4		3,0	41,92	5,3	157,0	41,70	3,0	24,8	4000
DSI-95	95	91,5		3,15	1,75	3,00		89,50		8,0		3,0	47,70	5,3	152,0	42,70	3,5	21,0	4000
DSI-100	100	96,5		3,15	1,75	3,00		94,50		8,0		3,0	49,92	5,3	144,0	45,80	3,5	20,5	4000

***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

ALL DIMENSIONS IN MILLIMETERS.

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DSI	ALL	470-580	47-54	84-87.5	66-72

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

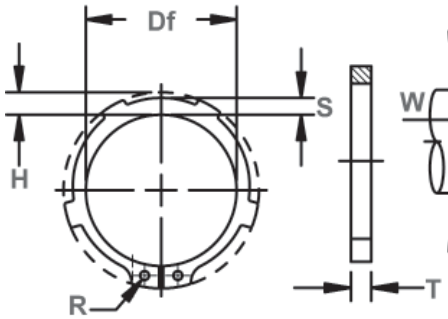
RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DSI	12-17	470-580	47-54	66-72 HR30N
	18-48	470-580	47-54	-
	50-100	435-530	44-51	-

*WHERE APPLICABLE

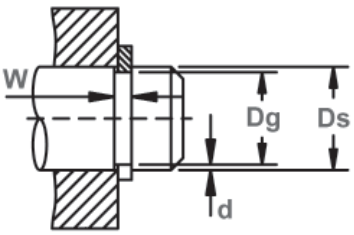
DST Shaft Rings (DIN 983)

Axially Assembled, External Teeth, Metric

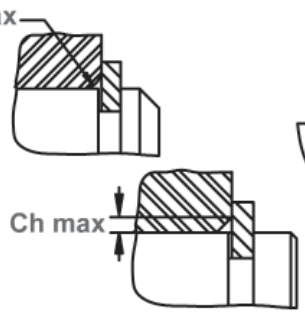
Similar in design to the DSH external ring, this features several "teeth" equally distributed along the circumference of the ring. The increased shoulder offered by the teeth is particularly effective in retaining applications with large radii or chamfers.



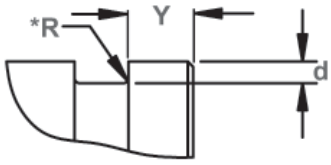
Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer

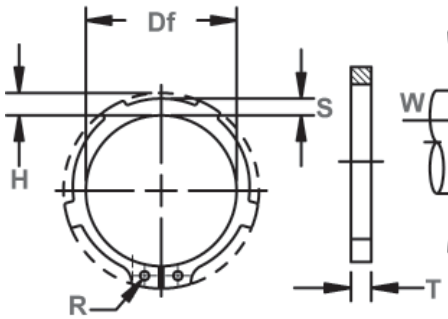


*The radius "R" on the load side must not exceed 0.1T

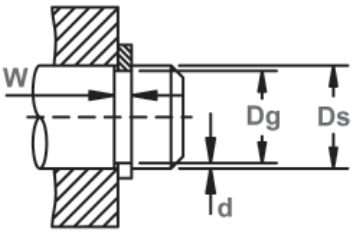
RING NO.	SHAFT DIA.	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. load w/ R/Ch. Max.	RPM Limits
	Ds	Dg	Tol.	W	d	T	Tol.	Df	Tol.	H Max.	S	R Min.	kg/ 1000	Y	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DST-16	16	15,2		1,10	0,40	1,00		14,7		3,5	2,3	1,7	0,82	1,2	7,4	3,26	1,0	2,4	45000
DST-17	17	16,2	-0,11	1,10	0,40	1,00		15,7	+0,10	3,6	2,4	1,7	0,93	1,2	8,0	3,46	1,0	2,4	41000
DST-18	18	17,0		1,30	0,50	1,20		16,5	-0,36	3,7	2,5	2,0	1,24	1,5	17,0	4,58	1,5	3,7	38000
DST-19	19	18,0		1,30	0,50	1,20		17,5		3,7	2,6	2,0	1,35	1,5	17,0	4,85	1,5	3,8	33000
DST-20	20	19,0		1,30	0,50	1,20		18,5		3,8	2,6	2,0	1,45	1,5	17,1	5,06	1,5	3,8	30000
DST-22	22	21,0	-0,15	1,30	0,50	1,20		20,5	+0,13	4,0	2,8	2,0	1,77	1,5	16,9	5,65	1,5	3,8	26000
DST-23	23	22,0		1,30	0,50	1,20		21,5	-0,42	4,1	2,9	2,0	1,84	1,5	16,6	5,90	1,5	3,8	24000
DST-24	24	22,9		1,30	0,55	1,20		22,2		4,2	3,0	2,0	1,98	1,6	16,1	6,75	1,5	3,6	26000
DST-25	25	23,9		1,30	0,55	1,20		23,2		4,3	3,0	2,0	2,12	1,6	16,2	7,05	1,5	3,7	24000
DST-26	26	24,9	-0,21	1,30	0,55	1,20		24,2		4,4	3,1	2,0	2,18	1,6	16,1	7,34	1,5	3,7	22000
DST-28	28	26,6		1,60	0,70	1,50	-0,06	25,9	+0,21	4,5	3,3	2,0	3,15	2,1	32,1	10,00	1,5	7,5	20000
DST-29	29	27,6		1,60	0,70	1,50		26,9	-0,42	4,7	3,4	2,0	3,35	2,1	31,8	10,30	1,5	7,4	19000
DST-30	30	28,6		1,60	0,70	1,50		27,9		4,7	3,4	2,0	3,65	2,1	32,1	10,70	1,5	7,6	18000
DST-32	32	30,3		1,60	0,85	1,50		29,6		5,0	3,6	2,5	4,00	2,5	31,2	13,80	2,0	5,5	16000
DST-34	34	32,3		1,60	0,85	1,50		31,5		5,1	3,8	2,5	4,15	2,5	31,3	14,70	2,0	5,6	16000
DST-35	35	33,0		1,60	1,00	1,50		32,2	+0,25	5,2	3,8	2,5	4,38	3,0	30,8	17,80	2,0	5,5	15000
DST-37	37	35,0		1,85	1,00	1,75		34,2	-0,50	5,4	4,0	2,5	6,30	3,0	50,0	18,80	2,0	9,1	13000
DST-38	38	36,0	-0,25	1,85	1,00	1,75		35,2		5,5	4,1	2,5	6,50	3,0	49,5	19,30	2,0	9,1	13000
DST-40	40	37,5		1,85	1,25	1,75		36,5		7,2	4,2	2,5	7,00	3,8	51,0	25,30	2,0	9,5	14000
DST-42	42	39,5		1,85	1,25	1,75		38,5	+0,39	7,2	4,5	2,5	7,50	3,8	50,0	26,70	2,0	9,4	13000
DST-45	45	42,5		1,85	1,25	1,75		41,5	-0,90	7,2	4,6	2,5	8,50	3,8	49,0	28,60	2,0	9,3	11000
DST-47	47	44,5		1,85	1,25	1,75		43,5		7,2	4,8	2,5	8,70	3,8	49,5	30,00	2,0	9,5	10000

***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

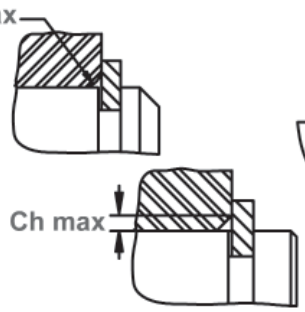
ALL DIMENSIONS IN MILLIMETERS.



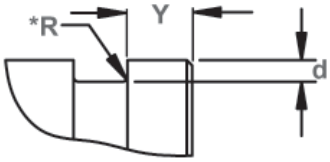
Free Diameter & Ring Measurements
With Section B-B



Shaft Diameter &
Groove Dimensions



Maximum Corner
Radius & Chamfer



*The radius "R" on the load side
must not exceed 0.1T

RING NO.	SHAFT DIA.	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad/ Cham.	Max. load w/ R/Ch. Max.	RPM Limits
	Ds	Dg	Tol.	W	d	T	Tol.	Df	Tol.	H Max.	S	R Min.	kg/ 1000	Y	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DST-48	48	45,5	-0,25	1,85	1,25	1,75	-0,06	44,5	+0,39	7,2	4,9	2,5	8,90	3,8	49,4	30,70	2,0	9,5	9000
DST-50	50	47,0		2,15	1,50	2,00		45,8	-0,90	8,2	5,0	2,5	11,50	4,5	73,3	38,00	2,0	14,4	10000
DST-55	55	52,0		2,15	1,50	2,00		50,8		8,2	5,4	2,5	12,99	4,5	71,4	42,00	2,5	11,4	8000
DST-57	57	54,0		2,15	1,50	2,00		52,8		8,2	5,6	2,5	14,00	4,5	70,9	43,70	2,5	11,4	8000
DST-58	58	55,0		2,15	1,50	2,00		53,8		8,2	5,7	2,5	14,30	4,5	71,1	44,30	2,5	11,5	8000
DST-60	60	57,0		2,15	1,50	2,00		55,8		8,2	5,8	2,5	14,80	4,5	69,3	46,00	2,5	11,3	7000
DST-62	62	59,0		2,15	1,50	2,00	-0,07	57,8		8,2	5,9	2,5	15,90	4,5	69,3	47,50	2,5	11,4	7000
DST-65	65	62,0	-0,30	2,65	1,50	2,50		60,8	+0,46	10,2	6,2	3,0	21,70	4,5	135,0	49,80	2,5	22,7	6000
DST-67	67	64,0		2,65	1,50	2,50		62,5	-1,10	10,2	6,4	3,0	22,60	4,5	136,0	51,30	2,5	23,0	7000
DST-68	68	65,0		2,65	1,50	2,50		63,5		10,2	6,5	3,0	23,50	4,5	135,0	52,20	2,5	23,0	7000
DST-70	70	67,0		2,65	1,50	2,50		65,5		10,2	6,6	3,0	25,10	4,5	134,0	53,80	2,5	23,0	6000
DST-75	75	72,0		2,65	1,50	2,50		70,5		10,2	7,0	3,0	28,20	4,5	130,0	57,60	2,5	22,8	6000
DST-80	80	76,5		2,65	1,75	2,50		74,5		10,2	7,4	3,0	30,75	5,3	128,0	71,60	3,0	19,5	6000
DST-85	85	81,5		3,15	1,75	3,00		79,5		10,2	7,8	3,5	39,50	5,3	215,0	76,20	3,0	33,4	5000
DST-90	90	86,5	-0,35	3,15	1,75	3,00	-0,08	84,5		10,2	8,2	3,5	47,70	5,3	217,0	80,20	3,0	33,4	5000
DST-95	95	91,5		3,15	1,75	3,00		89,5		10,2	8,6	3,5	53,00	5,3	212,0	85,50	3,5	29,3	4000
DST-100	100	96,5		3,15	1,75	3,00		94,5	+0,54	10,2	9,0	3,5	56,60	5,3	206,0	90,00	3,5	29,0	4000
DST-110	110	106,0	-0,54	4,15	2,00	4,00		103,0	-1,30	12,2	9,6	3,5	84,60	6,0	457,0	113,00	3,5	66,9	4000
DST-120	120	116,0		4,15	2,00	4,00	-0,10	113,0		14,2	10,1	3,5	89,70	6,0	424,0	123,00	3,5	64,5	4000
DST-130	130	126,0	-0,63	4,15	2,00	4,00		123,0		14,2	10,7	4,0	105,00	6,0	395,0	134,00	4,0	55,2	3000
DST-140	140	136,0		4,15	2,00	4,00		133,0		14,2	11,2	4,0	115,00	6,0	376,0	144,00	4,0	54,4	3000

***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

ALL DIMENSIONS IN MILLIMETERS.

NUMBER OF TEETH (INCLUDING LUGS)

RING TYPE	SIZE RANGE	# TEETH
DST	16-58	6
	60-140	8

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DST	ALL	470-580	47-54	84-87.5	66-72

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

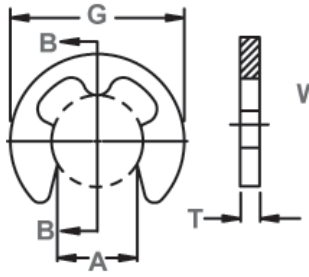
RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DST	16 & 17	470-580	47-54	66-72 HR30N
	18-48	470-580	47-54	-
	50-140	435-530	44-51	-

*WHERE APPLICABLE

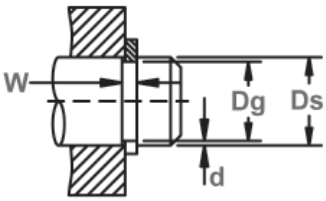
DE Shaft Rings
(DIN 6799)**

Radially Assembled, External E, Metric

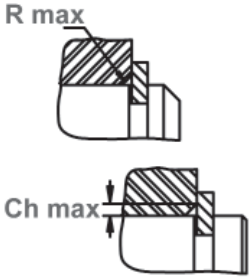
Perhaps the most popular and widely used radial retaining ring is the "E" (so named because it is shaped like the letter "E"). Three prongs make contact with the bottom of the groove and provide a shoulder for effective retention of assemblies.



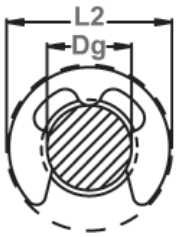
Ring Measurements



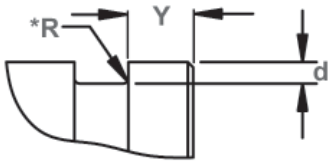
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Clearance Diameter Installed In Groove



Edge Margin (Y)
The radius "R" on the load side must not exceed 0.1T.

RING NO.	NOM SIZE	SHAFT DIA. (mm)		GROOVE SIZE				RING SIZE & WEIGHT					CLEARANCE		SUPPLEMENTARY DATA						
				DIAMETER		WIDTH		THICKNESS ***		GAP		WEIGHT	FREE O.D.	IN-STALLED IN GROOVE	EDGE MARGIN	Thrust Load Ring*	THRUST LOAD Groove		Allow-able Rad/ Cham	Max. load w/ R /Ch Max.	RPM Limits
	Dg	From	To	Dg	Tol.	W	Tol.	T	Tol.	A	Tol.	kg/ 1000	G Ref.	L2 Max.	Y Min.	Pr kN	Pg kN	Ds'	R/Ch Max.	P'r kN	
DE-0,8	0,8	1,0	1,4	0,8	-0,04	0,24	+0,04	0,2		0,58		0,003	1,95	2,25	0,4	0,08	0,03	1,2	0,3	0,04	50000
DE-1,2	1,2	1,4	2,0	1,2		0,34	-0,00	0,3		1,01		0,009	2,90	3,25	0,6	0,12	0,04	1,5	0,4	0,06	47000
DE-1,5	1,5	2,0	2,5	1,5	-0,06	0,44		0,4		1,28	±0,04	0,021	3,90	4,25	0,8	0,22	0,07	2,0	0,6	0,11	42000
DE-1,9	1,9	2,5	3,0	1,9		0,54		0,5		1,61		0,040	4,40	4,8	1,0	0,35	0,10	2,5	0,7	0,17	40000
DE-2,3	2,3	3,0	4,0	2,3		0,64		0,6		1,94		0,069	5,90	6,3	1,0	0,50	0,15	3,0	0,9	0,24	38000
DE-3,2	3,2	4,0	5,0	3,2		0,64		0,6	±0,02	2,70		0,088	6,90	7,3	1,0	0,65	0,22	4,0	0,9	0,32	35000
DE-4	4,0	5,0	7,0	4,0	-0,075	0,74	+0,05	0,7		3,34		0,158	8,85	9,3	1,2	0,95	0,25	5,0	1,0	0,47	32000
DE-5	5,0	6,0	8,0	5,0		0,74	-0,00	0,7		4,11	±0,048	0,236	10,85	11,3	1,2	1,15	0,90	7,0	1,0	0,60	28000
DE-6	6,0	7,0	9,0	6,0		0,74		0,7		5,26		0,255	11,80	12,3	1,2	1,35	1,10	8,0	1,1	0,70	25000
DE-7	7,0	8,0	11,0	7,0		0,94		0,9		5,84		0,474	13,80	14,3	1,5	1,80	1,25	9,0	1,3	1,00	22000
DE-8	8,0	9,0	12,0	8,0	-0,09	1,05		1,0		6,52		0,660	15,75	16,3	1,8	2,50	1,42	10,0	1,5	1,25	20000
DE-9	9,0	10,0	14,0	9,0		1,15		1,1		7,63	±0,058	1,090	18,20	18,8	2,0	3,00	1,60	11,0	1,6	1,50	17000
DE-10	10,0	11,0	15,0	10,0		1,25		1,2		8,32		1,250	19,70	20,4	2,0	3,50	1,70	12,0	1,8	1,75	15000
DE-12	12,0	13,0	18,0	12,0	-0,11	1,35	+0,08	1,3	±0,03	10,45		1,630	22,70	23,4	2,5	4,70	3,10	15,0	1,9	2,30	13000
DE-15	15,0	16,0	24,0	15,0		1,55	-0,00	1,5		12,61	±0,07	3,370	28,70	29,4	3,0	7,80	7,00	20,0	2,2	3,30	11000
DE-19	19,0	20,0	31,0	19,0		1,80		1,75		15,92		6,420	36,50	37,6	3,5	11	10,00	25,0	2,5	3,60	7600
DE-24	24,0	25,0	38,0	24,0	-0,13	2,05		2,00		21,88	±0,084	8,550	43,50	44,6	4,0	15	13,00	30,0	3,0	4,00	5500
DE-30	30,0	32,0	42,0	30,0		2,55		2,50		25,80		13,50	51,30	52,6	4,5	23	16,50	36,0	3,5	5,30	4200

ALL DIMENSIONS IN MILLIMETERS.
*** SHARP CORNER ABUTMENT.**
The radius "R" on the load side must not exceed 0.1T.
***** DIN6799 only defines rings in carbon steel. Rings in other materials are dimensioned as defined in Rotor Clip specific drawings. These are available from the Rotor Clip Technical Sales department.***
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DE	0.8-1.5	435-530	44-51	82.5-86 HR15N**
	1.9	435-530	44-51	82.5-86 HR15N
	2.3-9	435-530	44-51	63-69.5 HR30N
	10-30	435-530	44-51	-

*WHERE APPLICABLE
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DE	ALL	470-580	47-54	84-87.5	66-72

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DE	0.8-1.5	360-415	37-43	79-82 HR15N**
	1.9	360-415	37-43	79-82 HR15N
	2.3-9	360-415	37-43	56.5-62 HR30N
	10-30	360-415	37-43	-

*WHERE APPLICABLE
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DE	0.8-1.5	460-580	46-54	83.5-87.5 HR15N**
	1.9	460-580	46-54	83.5-87.5 HR15N
	2.3-9	460-580	46-54	65-72 HR30N
	10-30	460-580	46-54	-

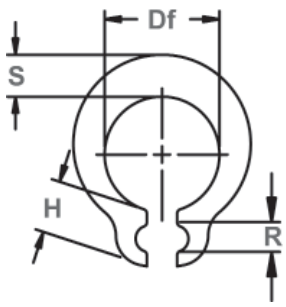
*WHERE APPLICABLE
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

Installation tools can be found at **rotorclip.com/pliers_tools_applicators_kits**

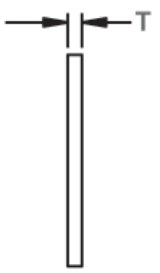
External, Self-Locking Friction, Metric

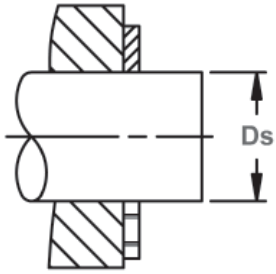
The DSF ring resembles a regular DSH ring except that it its designed to function on a shaft without a groove. The design of the ring causes it to exert significant gripping power uniformly on the shaft (except where the gap occurs.)

DSF Shaft Rings

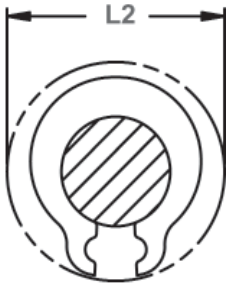


Free Diameter & Ring Measurements





Shaft Diameter



Clearance Diameter Installed on Shaft

RING NO.	SHAFT DIA. (mm)	RING SIZE & WEIGHT							SUPPLEMENTARY DATA		
		FREE DIAMETER		THICKNESS	LUG HEIGHT	MAX. SECTION	NOTCH	WEIGHT	CLEARANCE Released Over Shaft	THRUST LOAD	RPM Limits
	Ds	Df	Tol.	T	H Max.	S Ref.	R Min.	kg/ 1000	L2	Pr kN	
DSF-1,5	1,5	1,40	±0,02	0,4	1,7	0,7	0,9	0,013	5,1	40	350000
DSF-2	2	1,90		0,6	1,9	1,0	0,9	0,036	6,0	50	260000
DSF-2,2	2,2	2,05	±0,025	0,6	1,9	1,1	0,9	0,038	6,2	50	270000
DSF-2,5	2,5	2,35	±0,030	0,6	1,9	1,2	0,9	0,045	6,5	60	220000
DSF-2,8	2,8	2,65	±0,035	0,6	2,0	1,3	0,9	0,057	7,0	70	190000
DSF-3	3	2,85	±0,04	0,6	2,1	1,4	0,9	0,065	7,4	75	170000
DSF-3,5	3,5	3,30	±0,05	0,6	2,3	1,6	0,9	0,081	8,3	90	150000
DSF-4	4	3,80	±0,06	0,8	2,7	1,8	1,2	0,154	9,6	100	125000
DSF-4,5	4,5	4,25		0,8	2,9	2,0	1,3	0,173	10,5	120	120000
DSF-5	5	4,75		0,8	2,9	2,2	1,3	0,200	11,0	130	100000
DSF-5,5	5,5	5,20	±0,075	0,8	3,0	2,2	1,3	0,216	11,7	150	90000
DSF-6	6	5,70		1,00	3,2	2,4	1,4	0,402	12,6	170	81000
DSF-7	7	6,70		1,00	3,4	2,7	1,4	0,428	14,0	180	63000
DSF-8	8	7,70	±0,09	1,00	3,5	3,0	1,4	0,524	15,2	200	52000
DSF-9	9	8,65		1,20	4,7	3,3	2,0	0,808	18,6	230	46000
DSF-10	10	9,65		1,20	4,7	3,5	2,0	0,944	19,6	250	39000
DSF-10,5	10,5	10,20		1,20	4,0	3,8	1,5	1,100	18,7	260	34000
DSF-11	11	10,60		1,20	4,8	4,2	2,0	1,208	20,8	280	37000
DSF-12	12	11,60		1,20	4,8	4,6	2,0	1,454	21,8	300	33000
DSF-13	13	12,55		1,20	5,3	5,0	2,0	1,750	23,8	320	31000
DSF-13,8	13,8	13,30	±0,11	1,50	5,1	5,4	2,2	2,492	24,8	350	30000
DSF-14	14	13,50		1,50	5,1	5,4	2,2	2,456	25,0	350	29000
DSF-15	15	14,50		1,50	5,1	5,6	2,2	2,716	26,4	400	26000
DSF-16	16	15,40		1,50	5,6	5,8	2,5	2,940	27,8	500	26000
DSF-17	17	16,35		1,75	6,0	6,2	2,5	4,010	29,5	600	24000
DSF-18	18	17,30		1,75	6,1	6,6	2,5	4,460	31,4	700	23000
DSF-20	20	19,30		1,75	6,1	7,1	2,5	5,270	34,4	700	20000
DSF-22	22	21,20		1,75	6,6	7,4	2,5	6,060	37,0	750	18000
DSF-24	24	23,15	±0,13	1,75	6,6	7,8	2,5	7,000	39,8	750	16000
DSF-25	25	24,15		1,75	6,6	8,2	2,5	7,450	41,6	750	15000
DSF-30	30	29,00		1,75	9,0	9,0	2,5	10,000	48,2	750	12000

ALL DIMENSIONS IN MILLIMETERS.

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DSF	ALL	470-580	47-54	84-87.5	66-72

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

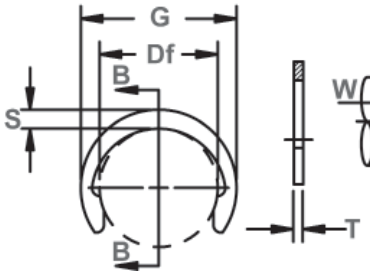
RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DSF	1.5	485-560	48-53	84.5-87 HR15N**
	2-8	485-560	48-53	66.5-71 HR30N
	9-30	485-560	48-53	-

*WHERE APPLICABLE

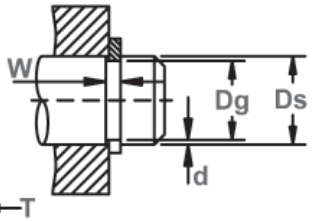
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

DC Shaft Rings

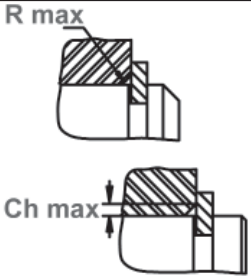
Radially Assembled, External Crescent, Metric
Ideal for low clearance applications where radial installation is preferred.



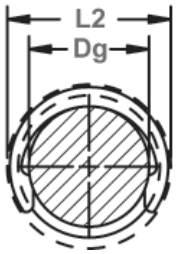
Free Diameter & Ring Measurements With Section B-B



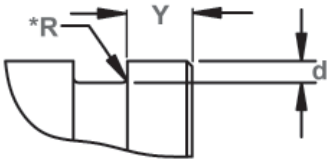
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



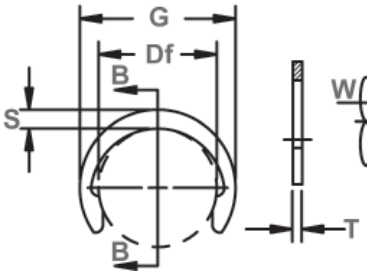
Clearance Diameter Installed in Groove



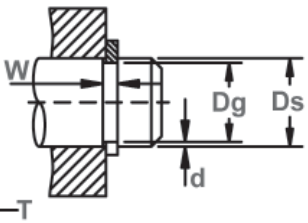
Edge Margin (Y)
*The radius "R" on the load side must not exceed 0.1T.

RING NO.	SHAFT DIA. (mm)	GROOVE SIZE				RING SIZE & WEIGHT					CLEARANCE			SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		MAX. SEC.	WGHT.	FREE O.D.	INSTALLED IN GROOVE	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allowable Rad/Cham	Max Load w/ R/Ch Max	RPM Limits
	Ds	Dg	Tol.	W Min.	d Ref.	T	Tol.	Df	Tol.	S max ref.	kg/ 1000	G Ref.	L2 Max.	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DC-3	3	2,3		0,44	0,35	0,40		2,18	±0,06	0,90	0,02	3,98	4,1	1,0	0,50	0,24	0,40	0,40	95000
DC-4	4	3,2	-0,07	0,44	0,40	0,40		3,00		1,00	0,04	5,00	5,2	1,2	0,50	0,37	0,40	0,40	90000
DC-5	5	4,0		0,64	0,50	0,60	-0,05	3,80		1,20	0,08	6,20	6,4	1,5	1,10	0,58	0,60	0,70	88000
DC-6	6	5,0		0,74	0,50	0,70		4,80	±0,08	1,30	0,11	7,40	7,6	1,5	1,65	0,72	0,70	1,10	80000
DC-7	7	6,0		0,85	0,50	0,80		5,80		1,40	0,13	8,60	8,8	1,5	2,20	0,85	0,80	1,30	69000
DC-8	8	7,0	-0,09	0,85	0,50	0,80		6,80		1,60	0,17	10,00	10,2	1,5	2,20	0,98	0,80	1,30	67000
DC-9	9	8,0		1,10	0,50	1,00		7,80	±0,09	1,70	0,22	11,20	11,4	1,5	3,50	1,10	1,00	2,00	58000
DC-10	10	9,0		1,10	0,50	1,00		8,75		1,70	0,26	12,15	12,4	1,5	3,70	1,24	1,00	2,00	50000
DC-11	11	10,0		1,10	0,50	1,00		9,65		1,80	0,29	13,20	13,6	1,5	4,00	1,35	1,00	2,00	40000
DC-12	12	10,9		1,10	0,55	1,00		10,55		1,90	0,32	14,35	14,7	1,7	4,20	1,65	1,00	2,00	35000
DC-13	13	11,8		1,10	0,60	1,00		11,40		2,00	0,36	15,40	15,8	1,8	4,50	1,90	1,00	2,00	30000
DC-14	14	12,7		1,10	0,65	1,00	-0,06	12,30		2,00	0,40	16,30	16,7	2,0	5,00	2,20	1,00	2,00	27000
DC-15	15	13,6	-0,11	1,10	0,70	1,00		13,20	±0,18	2,10	0,46	17,40	17,8	2,1	5,50	2,60	1,00	2,00	25000
DC-16	16	14,5		1,10	0,75	1,00		14,10		2,20	0,54	18,50	18,9	2,3	5,80	3,00	1,00	2,00	24000
DC-17	17	15,4		1,10	0,80	1,00		14,90		2,25	0,64	19,40	19,9	2,4	6,00	3,40	1,00	2,00	23000
DC-18	18	16,3		1,30	0,85	1,20		15,80		2,30	0,72	20,40	20,9	2,6	8,50	3,70	1,20	2,80	21000
DC-19	19	17,2		1,30	0,90	1,20		16,70		2,40	0,80	21,50	22,0	2,7	9,00	4,30	1,20	2,80	21000
DC-20	20	18,1	-0,21	1,30	0,95	1,20		17,55		2,55	0,87	22,65	23,2	2,9	9,40	4,70	1,20	3,00	20000

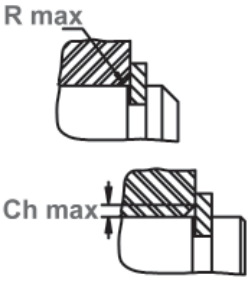
ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1 T**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MIN.**



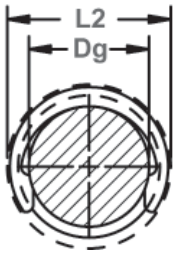
Free Diameter & Ring Measurements With Section B-B



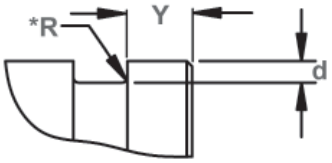
Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Clearance Diameter Installed in Groove



Edge Margin (Y)
*The radius "R" on the load side must not exceed 0.1T.

RING NO.	SHAFT DIA. (mm)	GROOVE SIZE				RING SIZE & WEIGHT					CLEARANCE			SUPPLEMENTARY DATA					
		DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		MAX. SEC.	WGHT.	FREE O.D.	INSTALLED IN GROOVE	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allowable Rad/Cham	Max Load w/ R/Ch Max	RPM Limits
	Ds	Dg	Tol.	W Min.	d Ref.	T	Tol.	Df	Tol.	S max ref.	kg/ 1000	G Ref.	L2 Max.	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DC-22	22	19,9		1,30	1,05	1,20		19,40		2,80	1,10	25,00	25,5	3,2	10,00	5,70	1,20	3,00	17000
DC-23	23	20,8		1,30	1,10	1,20		20,20		2,90	1,15	26,00	26,6	3,3	10,50	6,20	1,20	3,20	15000
DC-24	24	21,7		1,30	1,15	1,20		21,10		3,00	1,52	27,10	27,7	3,5	11,00	6,80	1,20	3,20	15000
DC-25	25	22,6	-0,21	1,30	1,20	1,20		22,00	±0,21	3,15	1,74	28,30	28,9	3,6	11,50	7,50	1,20	3,20	15000
DC-26	26	23,5		1,30	1,25	1,20		22,90		3,25	1,88	29,40	30,0	3,8	12,00	8,00	1,20	3,20	15000
DC-28	28	25,2		1,60	1,40	1,50		24,60		3,50	2,32	31,60	32,2	4,2	16,50	9,70	1,50	5,50	13000
DC-30	30	27,0		1,60	1,50	1,50		26,30		3,70	2,43	33,70	34,4	4,5	17,00	11,00	1,50	5,60	13000
DC-32	32	28,8		1,60	1,60	1,50	-0,06	28,10		4,00	3,02	36,10	36,8	4,6	18,00	12,50	1,50	5,80	13000
DC-35	35	31,5		1,60	1,75	1,50		30,80		4,30	3,30	39,40	40,1	5,3	20,00	15,00	1,50	5,80	11000
DC-36	36	32,4		1,85	1,80	1,75		31,70	±0,25	4,40	4,40	40,50	41,2	5,4	25,00	16,00	1,75	8,30	10000
DC-38	38	34,2		1,85	1,90	1,75		33,40		4,60	4,62	42,60	43,4	5,7	26,00	17,50	1,75	8,50	10000
DC-40	40	36,0		1,85	2,00	1,75		35,20		4,90	5,05	45,00	45,8	6,0	27,50	20,00	1,75	8,80	9000
DC-42	42	37,8	-0,25	1,85	2,10	1,75		37,00		5,10	5,46	47,20	48,0	6,3	28,00	21,50	1,75	8,90	9000
DC-45	45	40,5		1,85	2,25	1,75		39,60		5,50	5,98	50,60	51,5	6,8	30,00	25,00	1,75	9,00	8000
DC-48	48	43,2		1,85	2,40	1,75		42,30	±0,39	5,90	7,82	54,10	55,0	7,2	32,00	28,00	1,75	9,00	8000
DC-50	50	45,0		2,15	2,50	2,00		44,00		6,20	8,85	56,40	57,4	7,5	39,50	31,00	2,00	12,00	7000
DC-52	52	47,0		2,15	2,50	2,00	-0,07	46,00		6,30	9,33	58,60	59,6	7,5	41,00	32,00	2,00	12,00	7000
DC-55	55	50,0		2,15	2,50	2,00		48,50		6,50	10,40	61,50	63,0	7,5	43,00	34,00	2,00	12,00	7000

ALL DIMENSIONS IN MILLIMETERS.
***The radius "R" on the load side must not exceed 0.1 T**
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MIN.**

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DC	3 & 4	435-530	44-51	82.5-86 HR15N**
	5-17	435-530	44-51	63-69.5 HR30N
	18-55	435-530	44-51	-

*WHERE APPLICABLE
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DC	ALL	470-580	47-54	84-87.5	66-72

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

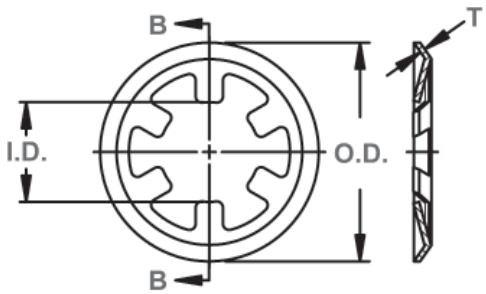
RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DC	3 & 4	485-545	48-52	84.5-86.5 HR15N**
	5-17	485-545	48-52	66.5-70.5 HR30N
	18-55	485-545	48-52	-

*WHERE APPLICABLE
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

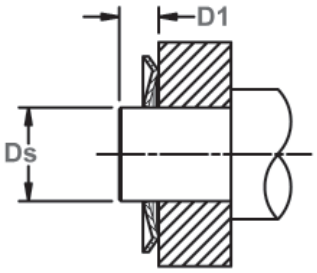
DTX Shaft Rings

Self-Locking, External "Push-On", Metric

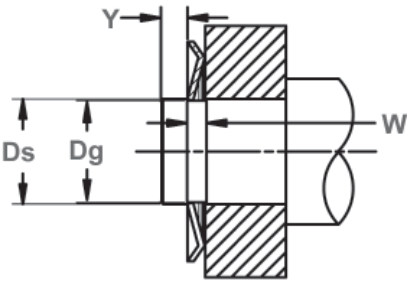
This ring features a curved outer rim with a series of prongs protruding into the center. The ends create interference with the shaft when the ring is installed and a load introduced to the other side.



Free Diameter & Ring Measurements With Section B-B



Installation View Without Groove



Installation View With Groove

RING NO.	SHAFT DIAMETER		GROOVE SIZE DIMENSIONS			RING DIMENSIONS				SUPPLEMENTARY DATA			
	Ds	TOL.	Dg	Tol.	W Min.	I.D.	O.D.	No. Of Prongs	THICK-NESS T	WEIGHT Per 1000 kg.	Min. Dis-tance D1	THRUST LOAD N	EDGE MARGIN Y
DTX-1,5	1,5		1,40		0,4	1,40	6,0	3	0,25	0,040	1,5	100	1,0
DTX-2	2,0	+0,00	1,90	-0,060	0,4	1,85	6,5	3	0,25	0,042	1,5	150	1,0
DTX-3	3,0	-0,060	2,90		0,4	2,80	8,0	4	0,25	0,066	1,5	200	1,0
DTX-4	4,0		3,90		0,4	3,80	9,0	4	0,25	0,078	2,0	220	1,0
DTX-5	5,0	+0,00	4,90	-0,075	0,4	4,80	10,0	4	0,25	0,082	2,0	230	1,0
DTX-6	6,0	-0,075	5,90		0,4	5,80	11,0	4	0,25	0,094	2,5	240	1,5
DTX-7	7,0		6,90		0,4	6,80	12,0	5	0,25	0,110	2,5	250	1,5
DTX-8	8,0	+0,00	7,85	-0,090	0,4	7,75	13,0	5	0,25	0,122	2,5	250	1,5
DTX-9	9,0	-0,090	8,85		0,6	8,75	14,0	5	0,30	0,208	2,5	300	1,5
DTX-10	10,0		9,85		0,6	9,75	16,0	6	0,30	0,232	3,0	320	1,5
DTX-12	12,0		11,85		0,6	11,70	18,0	6	0,30	0,255	3,0	350	1,5
DTX-14	14,0		13,80	-0,110	0,6	13,70	20,5	6	0,30	0,310	3,0	400	1,5
DTX-15	15,0	+0,00	14,80		1,0	14,60	23,0	8	0,50	0,750	3,0	600	2,0
DTX-16	16,0	-0,110	15,80		1,0	15,60	24,5	8	0,40	0,710	3,0	700	2,0
DTX-17	17,0		16,80		1,0	16,60	26,0	8	0,50	0,950	3,5	800	2,0
DTX-18	18,0		17,80		1,0	17,60	27,0	8	0,40	0,810	3,5	850	2,0
DTX-19	19,0		18,80		1,0	18,60	28,0	8	0,50	0,950	3,5	900	2,0
DTX-20	20,0		19,75		1,0	19,50	29,0	8	0,50	1,090	3,5	950	2,0
DTX-22	22,0		21,75		1,0	21,50	31,0	8	0,50	1,150	3,5	1000	2,0
DTX-23	23,0	+0,00	22,75	-0,130	1,0	22,50	31,5	8	0,50	1,220	4,0	1050	2,0
DTX-25	25,0	-0,130	24,75		1,0	24,50	34,0	8	0,50	1,490	4,0	1100	2,0
DTX-28	28,0		27,75		1,0	27,50	37,0	8	0,50	1,550	4,0	1200	2,0
DTX-30	30,0		29,75		1,0	29,50	40,0	8	0,50	1,630	4,0	1300	2,0
DTX-35	35,0	+0,00	34,75		1,0	34,50	46,0	8	0,50	2,100	4,0	1400	2,0
DTX-45	45,0	-0,160	44,75		1,5	44,50	60,0	8	0,50	2,700	4,0	1500	2,0

ALL DIMENSIONS IN MILLIMETERS.

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DTX	ALL	470-580	47-54	84-87.5	66-72

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DTX	1.5-14	435-530	44-51	82.5-86 HR15N**
	15-45	435-530	44-51	82.5-86 HR15N

*WHERE APPLICABLE
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

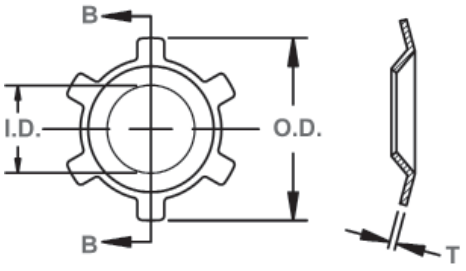
RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DTX	1.5-14	450-520	45-50	83-85.5 HR15N**
	15-45	450-520	45-50	83-85.5 HR15N

*WHERE APPLICABLE
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

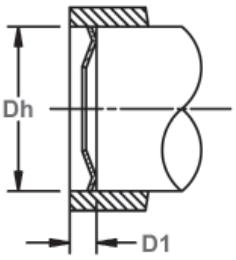
Self-Locking, Internal "Push-On", Metric

The internal version of the TX with a curved inner rim and a series of prongs protruding outward. The ends create interference with the housing when the ring is installed and a load introduced to the other side.

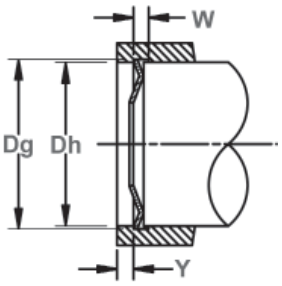
DTI Housing Rings



Free Diameter & Ring Measurements With Section B-B



Installation View Without Groove



Installation View With Groove

RING NO.	HOUSING DIAMETER		GROOVE SIZE DIMENSIONS			RING DIMENSIONS		No. Of Prongs	THICK-NESS	SUPPLEMENTARY DATA WEIGHT Per 1000 Pcs.	Min. Dis-tance	THRUST LOAD	EDGE MARGIN
	Dh	TOL.	Dg	Tol.	W Min.	I.D.	O.D.		T	kg.	D1	N	Y
DTI-8	8,0	+0,09	8,10	+0,060	0,4	4,0	8,25	6	0,25	0,048	2,0	300	1,0
DTI-10	10,0	-0,00	10,10		0,4	5,0	10,20	6	0,25	0,068	2,0	350	1,0
DTI-12	12,0		12,10		0,4	6,0	12,25	6	0,25	0,112	2,5	450	1,0
DTI-14	14,0		14,10		0,5	8,0	14,25	6	0,30	0,172	2,5	500	1,0
DTI-15	15,0	+0,11	15,10	+0,075	0,5	9,0	15,25	6	0,30	0,192	2,5	550	1,0
DTI-16	16,0	-0,00	16,15		0,5	10,0	16,30	6	0,30	0,206	2,5	600	1,5
DTI-17	17,0		17,15		0,5	11,0	17,30	8	0,30	0,236	3,0	650	1,5
DTI-18	18,0		18,15		0,8	10,5	18,30	8	0,40	0,380	3,0	700	1,5
DTI-19,8	19,8		20,00		0,8	11,0	20,20	8	0,50	0,604	3,5	800	1,5
DTI-20	20,0		20,20	+0,110	0,8	11,0	20,35	8	0,40	0,512	3,5	800	1,5
DTI-22	22,0	+0,13	22,20		1,0	13,0	22,35	8	0,50	0,680	3,5	800	2,0
DTI-25	25,0	-0,00	25,20		1,0	16,0	25,35	10	0,50	0,810	3,5	800	2,0
DTI-26	26,0		26,20		1,0	17,0	26,40	10	0,50	0,856	3,5	850	2,0
DTI-28	28,0		28,20		1,0	19,0	28,40	10	0,50	0,922	3,5	850	2,0
DTI-30	30,0		30,20		1,0	21,0	30,40	8	0,50	1,010	4,0	900	2,0
DTI-32	32,0		32,20		1,0	22,5	32,40	12	0,50	1,210	4,0	900	2,0
DTI-35	35,0	+0,160	35,20	+0,130	1,0	25,0	35,40	12	0,50	1,320	4,0	900	2,0
DTI-40	40,0	-0,00	40,20		1,0	30,0	40,40	12	0,50	1,720	4,0	950	2,0
DTI-45	45,0		45,20		1,0	35,0	45,40	12	0,50	1,830	4,0	950	2,0
DTI-46	46,0		46,20		1,0	36,0	46,50	12	0,50	1,870	4,0	1000	2,0
DTI-50	50,0		50,20		1,0	39,0	50,50	12	0,50	2,160	4,0	1000	2,0

ALL DIMENSIONS IN MILLIMETERS.

HARDNESS RANGES: STAINLESS STEEL RINGS (DIN 1.4122 X39CrMo17)

RING TYPE	SIZE RANGE	HARDNESS			
		HV	HRC	15N	30N
DTI	ALL	470-580	47-54	84-87.5	66-72

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DTI	8-20***	435-530	44-51	82.5-86 HR15N**
	19.8, 22-50	435-530	44-51	82.5-86 HR15N

*WHERE APPLICABLE
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.
***EXCLUDING DTI-19.8

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

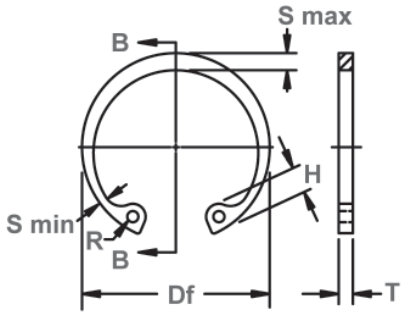
RING TYPE	SIZE RANGE	HARDNESS		
		VICKERS	ROCKWELL	
			HRC	LOWER SCALE*
DTI	8-20***	450-520	45-50	83-85.5 HR15N**
	19.8, 22-50	450-520	45-50	83-85.5 HR15N

*WHERE APPLICABLE
**HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.
***EXCLUDING DTI-19.8

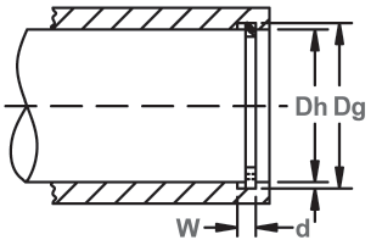
MHO Housing Rings

Axially Assembled, Internal, ANSI Metric

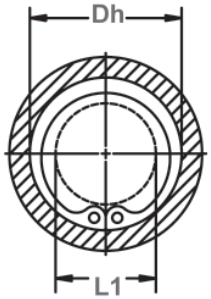
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



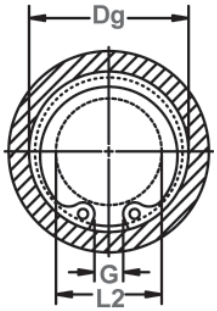
Free Diameter & Ring Measurements With Section B-B



Housing Diameter & Groove Dimensions



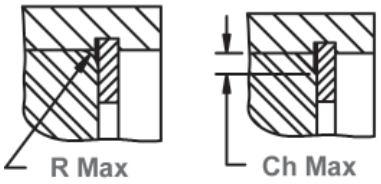
Clearance Diameter Compressed In Housing



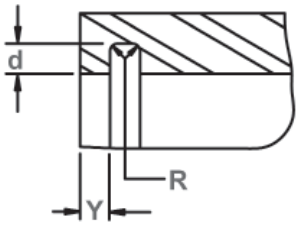
Clearance Diameter & Gap Width Released In Groove

RING NO.	HOUSING DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD (kN) Sqr. corner abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wt. Per 1000 pcs.	Com-pressed in housing	Re-leased in Groove	Ring (Safety Factor of 4)	Groove (Safety Factor of 2)
	Ds mm	Ds INCH	Dg	tol	F.I.M.*	W	tol	d	Df	tol	T	tol	kg	L1	L2	Pr	Pg
MHO-8	8	0.315	8.40	+0.06	0.03	0.50	+0.10	0.20	8.80		0.4		0.05	4.4	4.8	2.4	1.0
MHO-9	9	0.354	9.45		0.03	0.70		0.23	10.00		0.6		0.11	4.6	5.0	4.4	1.2
MHO-10	10	0.393	10.50		0.03	0.70		0.25	11.10		0.6		0.14	5.5	6.0	4.9	1.5
MHO-11	11	0.433	11.60		0.05	0.70		0.30	12.20		0.6		0.17	5.7	6.3	5.4	2.0
MHO-12	12	0.472	12.65		0.05	0.70		0.33	13.30		0.6		0.19	6.7	7.3	5.8	2.4
MHO-13	13	0.512	13.70		0.05	1.00		0.35	14.25	+0.25	0.9		0.35	6.8	7.5	8.9	2.6
MHO-14	14	0.551	14.80	+0.10	0.05	1.00		0.40	15.45	-0.13	0.9		0.39	6.9	7.7	9.7	3.2
MHO-15	15	0.591	15.85		0.05	1.00		0.43	16.60		0.9		0.42	7.9	8.7	10.4	3.7
MHO-16	16	0.630	16.90		0.10	1.00		0.45	17.70		0.9		0.47	8.8	9.7	11.0	4.2
MHO-17	17	0.669	18.00		0.10	1.00		0.50	18.90		0.9		0.52	9.8	10.8	11.7	4.9
MHO-18	18	0.708	19.05		0.10	1.00		0.53	20.05		0.9		0.58	10.3	11.3	12.3	5.5
MHO-19	19	0.748	20.10		0.10	1.00		0.55	21.10		0.9		0.59	11.4	12.5	13.1	6.0
MHO-20	20	0.787	21.15		0.10	1.00		0.57	22.25		0.9		0.70	11.6	12.7	13.7	6.6
MHO-21	21	0.826	22.20		0.10	1.00	+0.15	0.60	23.30		0.9	±0.06	0.82	12.6	13.8	14.5	7.3
MHO-22	22	0.866	23.30		0.10	1.20		0.65	24.40		1.1		0.90	13.5	14.8	22.5	8.3
MHO-23	23	0.905	24.35	+0.15	0.10	1.20		0.67	25.45	+0.40	1.1		1.00	14.5	15.9	23.5	8.9
MHO-24	24	0.945	25.40		0.10	1.20		0.70	26.55	-0.25	1.1		1.09	15.5	16.9	24.8	9.7
MHO-25	25	0.984	26.60		0.10	1.20		0.80	27.75		1.1		1.26	16.5	18.1	25.7	11.6
MHO-26	26	1.023	27.70		0.15	1.20		0.85	28.85		1.1		1.3	17.5	19.2	26.8	12.7
MHO-27	27	1.063	28.80		0.15	1.40		0.90	29.95		1.3		1.7	17.4	19.2	33.0	14.0
MHO-28	28	1.102	29.80		0.15	1.40		0.90	31.10		1.3		1.8	18.2	20.0	34.0	14.6
MHO-30	30	1.181	31.90		0.15	1.40		0.95	33.40		1.3		2.0	20.0	21.9	37.0	16.5
MHO-32	32	1.260	33.90		0.15	1.40		0.95	35.35	+0.65	1.3		2.2	22.0	23.9	39.0	17.6
MHO-34	34	1.339	36.10		0.15	1.40		1.05	37.75	-0.50	1.3		2.3	24.0	26.1	42.0	20.6
MHO-35	35	1.378	37.20	+0.20	0.15	1.40		1.10	38.75		1.3		2.3	25.0	27.2	43.0	22.3
MHO-36	36	1.417	38.30		0.15	1.40		1.15	40.00		1.3		2.6	26.0	28.3	44.0	23.9
MHO-37	37	1.457	39.30		0.15	1.40		1.15	41.05		1.3		2.9	27.0	29.3	45.0	24.6
MHO-38	38	1.496	40.40		0.15	1.40		1.20	42.15		1.3		3.0	28.0	30.4	46.0	26.4

*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & HOUSING.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR PLATED RINGS ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.10 for ring sizes -8 thru -17; 0.2 for ring sizes -18 thru -30; 0.3 for ring sizes -32 thru -55
0.4 for ring sizes -56 thru -250

Alternate Lug Design
For Larger Sizes
(Manufacturer's Option)

Alternate Design
(Manufacturer's Option)

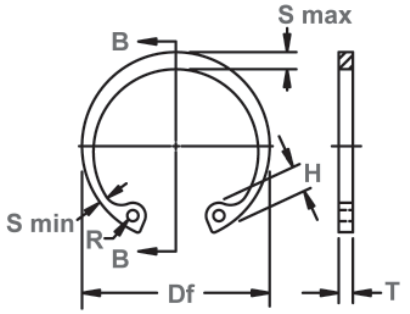
RING NO.	LUG HEIGHT	MAXIMUM SECTION	MINIMUM SECTION	HOLE DIAMETER	GAP WIDTH Ring in Groove	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max	EDGE MARGIN
	H nom	S max/Ref.	S min/Ref.	R min	G	R max	Ch max	P'r	Y
MHO-8	1.7	0.85	0.45	0.8	1.40	0.4	0.3	0.8	0.6
MHO-9	2.1	1.25	0.65	1.0	1.50	0.5	0.35	2.0	0.7
MHO-10	2.1	1.30	0.70	1.0	1.85	0.5	0.35	2.0	0.8
MHO-11	2.5	1.30	0.70	1.0	1.95	0.6	0.4	2.0	0.9
MHO-12	2.5	1.35	0.75	1.0	2.25	0.6	0.4	2.0	1.0
MHO-13	2.9	1.35	0.90	1.2	2.35	0.7	0.5	4.0	1.1
MHO-14	3.3	1.60	0.90	1.2	2.65	0.7	0.5	4.0	1.2
MHO-15	3.3	1.65	0.95	1.5	2.80	0.7	0.5	4.0	1.3
MHO-16	3.4	1.70	0.95	1.5	2.80	0.7	0.5	4.0	1.4
MHO-17	3.4	1.70	0.95	1.5	3.35	0.75	0.6	4.0	1.5
MHO-18	3.6	1.80	1.00	1.5	3.40	0.75	0.6	4.0	1.6
MHO-19	3.6	1.80	1.00	1.5	3.40	0.8	0.65	4.0	1.7
MHO-20	4.0	2.00	1.10	1.5	3.80	0.9	0.7	4.0	1.7
MHO-21	4.0	2.10	1.20	1.5	4.20	0.9	0.7	4.0	1.8
MHO-22	4.0	2.10	1.20	1.5	4.30	0.9	0.7	7.4	1.9
MHO-23	4.0	2.20	1.20	1.5	4.90	1.0	0.8	7.4	2.0
MHO-24	4.0	2.30	1.30	1.5	5.20	1.0	0.8	7.4	2.1
MHO-25	4.0	2.60	1.30	1.5	6.00	1.0	0.8	7.4	2.4
MHO-26	4.0	2.70	1.40	1.5	5.70	1.2	1.0	7.4	2.6
MHO-27	4.6	2.80	1.40	1.9	5.90	1.2	1.0	10.8	2.7
MHO-28	4.6	2.90	1.50	1.9	6.00	1.2	1.0	10.8	2.7
MHO-30	4.6	3.00	1.50	1.9	6.00	1.2	1.0	10.8	2.9
MHO-32	4.6	3.10	1.60	1.9	7.30	1.2	1.0	10.8	2.9
MHO-34	4.6	3.20	1.60	1.9	7.60	1.2	1.0	10.8	3.2
MHO-35	4.6	3.30	1.60	1.9	8.00	1.2	1.0	10.8	3.3
MHO-36	4.6	3.40	1.70	1.9	8.30	1.2	1.0	10.8	3.5
MHO-37	4.6	3.40	1.70	1.9	8.40	1.2	1.0	10.8	3.5
MHO-38	4.6	3.40	1.70	1.9	8.60	1.2	1.0	10.8	3.6

FOR HARDNESS SPECIFICATIONS, SEE END OF THE SECTION.

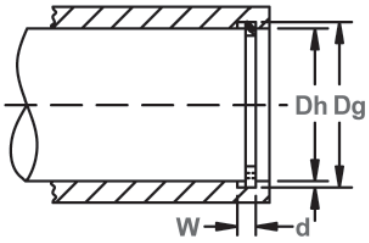
MHO Housing Rings

Axially Assembled, Internal, ANSI Metric

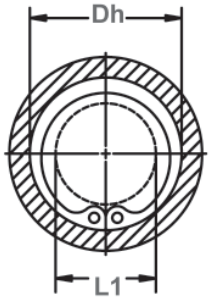
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



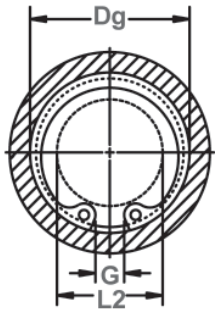
Free Diameter & Ring Measurements With Section B-B



Housing Diameter & Groove Dimensions



Clearance Diameter Compressed In Housing



Clearance Diameter & Gap Width Released In Groove

RING NO.	HOUSING DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD (kN) Sqr. corner abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wt. Per 1000 pcs.	Com-pressed in housing	Re-leased in Groove	Ring (Safety Factor of 4)	Groove (Safety Factor of 2)
	Ds mm	Ds INCH	Dg	tol	F.I.M.*	W	tol	d	Df	tol	T	tol	kg	L1	L2	Pr	Pg
MHO-40	40	1.575	42.40		0.15	1.75		1.20	44.25		1.6		4.0	29.2	31.6	62.0	27.7
MHO-42	42	1.654	44.50		0.15	1.75		1.25	46.60		1.6		4.7	29.7	32.2	65.0	30.2
MHO-45	45	1.772	47.60		0.15	1.75		1.30	49.95	+0.90	1.6		5.1	32.3	34.9	69.0	33.8
MHO-46	46	1.811	48.70	+0.20	0.20	1.75	+0.20	1.35	51.05	-0.65	1.6		5.2	33.3	36.0	71.0	36.0
MHO-47	47	1.850	49.80		0.20	1.75		1.40	52.15		1.6		5.8	34.3	37.1	72.0	38.0
MHO-48	48	1.890	50.90		0.20	1.75		1.45	53.30		1.6		6.1	35.0	37.9	74.0	40.0
MHO-50	50	1.969	53.10		0.20	1.75		1.55	55.35		1.6		6.2	36.9	40.0	77.0	45.0
MHO-52	52	2.047	55.30		0.20	2.15		1.65	57.90		2.0		8.1	38.6	41.9	99.0	50.0
MHO-55	55	2.165	58.40		0.20	2.15		1.70	61.10		2.0		8.9	40.8	44.2	105.0	54.0
MHO-57	57	2.244	60.50		0.20	2.15		1.75	63.25		2.0		9.9	42.2	45.7	109.0	58.0
MHO-58	58	2.283	61.60		0.20	2.15		1.80	64.40		2.0		10.1	43.2	46.8	111.0	60.0
MHO-60	60	2.362	63.80		0.20	2.15		1.90	66.80		2.0	±0.08	10.5	45.5	49.3	115.0	66.0
MHO-62	62	2.441	65.80		0.20	2.15		1.90	68.60	+1.00	2.0		11.5	47.0	50.8	119.0	68.0
MHO-63	63	2.480	66.90		0.20	2.15		1.95	69.90	-0.75	2.0		11.6	47.8	51.7	120.0	71.0
MHO-65	65	2.559	69.00		0.20	2.55		2.00	72.20		2.4		15.4	49.4	53.4	149.0	75.0
MHO-68	68	2.677	72.20	+0.30	0.20	2.55	+0.20	2.10	75.70		2.4		15.9	52.0	56.2	156.0	82.0
MHO-70	70	2.756	74.40		0.20	2.55		2.20	77.50		2.4		16.1	53.8	58.2	161.0	88.0
MHO-72	72	2.835	76.50		0.20	2.55		2.25	79.60		2.4		16.3	55.9	60.4	166.0	93.0
MHO-75	75	2.953	79.70		0.20	2.55		2.35	83.30		2.4		19.3	58.2	62.9	172.0	101.0
MHO-78	78	3.071	82.80		0.20	2.95		2.40	86.80		2.8		24.0	61.2	66.0	209.0	108.0
MHO-80	80	3.150	85.00		0.20	2.95		2.50	89.10		2.8		25.9	63.0	68.0	215.0	115.0
MHO-82	82	3.228	87.20		0.25	2.95		2.60	91.10	+1.40	2.8		27.2	63.5	68.7	220.0	122.0
MHO-85	85	3.346	90.40		0.25	2.95		2.70	94.40	-1.40	2.8		29.5	66.8	72.2	228.0	131.0
MHO-88	88	3.464	93.60		0.25	2.95		2.80	97.90		2.8		31.3	69.6	75.2	236.0	141.0
MHO-90	90	3.543	95.70		0.25	2.95		2.85	100.00		2.8		32.6	71.6	77.3	241.0	147.0
MHO-92	92	3.622	97.80		0.25	2.95		2.90	102.20		2.8		33.1	73.6	79.4	247.0	153.0

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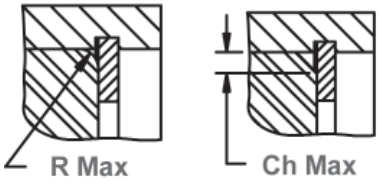
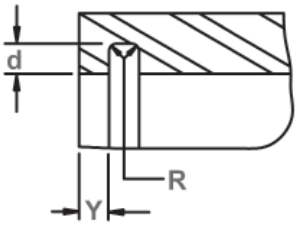
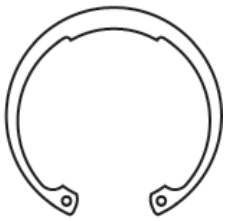


Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.10 for ring sizes -8 thru -17; 0.2 for ring sizes -18 thru -30; 0.3 for ring sizes -32 thru -55
0.4 for ring sizes -56 thru -250

Alternate Lug Design
For Larger Sizes
(Manufacturer's Option)



Alternate Design
(Manufacturer's Option)

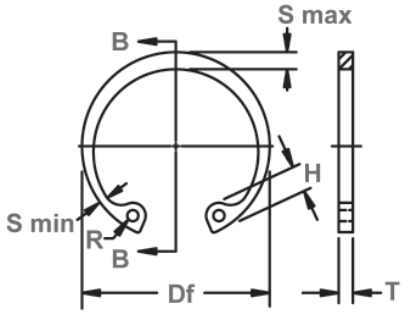
RING NO.	LUG HEIGHT	MAXIMUM SECTION	MINIMUM SECTION	HOLE DIAMETER	GAP WIDTH Ring in Groove	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max	EDGE MARGIN
	H nom	S max/Ref.	S min/Ref.	R min	G	R max	Ch max	P'r	Y
MHO-40	5.1	4.00	2.00	1.9	9.70	1.7	1.3	17.4	3.6
MHO-42	5.8	4.20	2.10	1.9	9.00	1.7	1.3	17.4	3.7
MHO-45	6.0	4.30	2.10	1.9	9.60	1.7	1.3	17.4	3.9
MHO-46	6.0	4.30	2.10	2.3	9.70	1.7	1.3	17.4	4.0
MHO-47	6.0	4.30	2.20	2.3	10.00	1.7	1.3	17.4	4.2
MHO-48	6.0	4.50	2.30	2.3	10.50	1.7	1.3	17.4	4.3
MHO-50	6.0	4.60	2.30	2.3	12.10	1.7	1.3	17.4	4.6
MHO-52	6.4	4.70	2.30	2.3	11.70	2.0	1.6	27.4	5.0
MHO-55	6.7	5.10	2.50	2.3	11.90	2.0	1.6	27.4	5.1
MHO-57	6.9	5.20	2.50	2.3	12.50	2.0	1.6	27.4	5.3
MHO-58	6.9	5.30	2.60	2.3	13.00	2.0	1.6	27.4	5.4
MHO-60	6.9	5.30	2.60	2.3	12.70	2.0	1.6	27.4	5.7
MHO-62	7.1	5.30	2.60	2.7	14.00	2.0	1.6	27.4	5.7
MHO-63	7.1	5.40	2.70	2.7	14.20	2.0	1.6	27.4	5.9
MHO-65	7.4	5.60	2.80	2.7	14.20	2.0	1.6	42.0	6.0
MHO-68	7.6	5.80	2.90	2.7	14.40	2.3	1.8	39.0	6.3
MHO-70	7.6	5.80	2.90	2.7	16.10	2.3	1.8	39.0	6.6
MHO-72	7.6	5.80	2.90	2.7	17.40	2.3	1.8	39.0	6.7
MHO-75	7.9	6.20	3.10	2.7	16.80	2.3	1.8	54.0	7.1
MHO-78	7.9	6.50	3.20	3.1	17.60	2.5	2.0	54.0	7.2
MHO-80	7.9	6.70	3.30	3.1	17.20	2.5	2.0	54.0	7.5
MHO-82	8.7	6.90	3.40	3.1	18.80	2.6	2.1	54.0	7.8
MHO-85	8.7	7.00	3.60	3.1	19.10	2.6	2.1	54.0	8.1
MHO-88	8.7	7.30	3.60	3.1	20.40	2.8	2.2	54.0	8.4
MHO-90	8.7	7.40	3.60	3.1	21.40	2.8	2.2	54.0	8.6
MHO-92	8.7	7.60	3.80	3.1	22.20	2.9	2.4	54.0	8.7

FOR HARDNESS SPECIFICATIONS, SEE END OF THE SECTION.

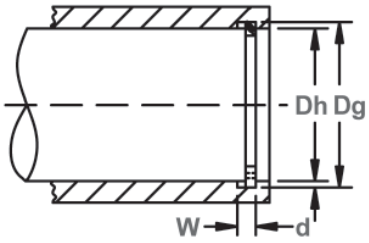
MHO Housing Rings

Axially Assembled, Internal, ANSI Metric

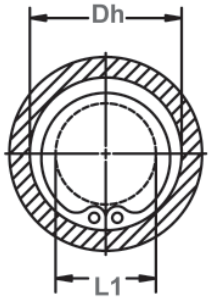
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



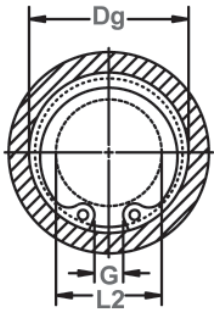
Free Diameter & Ring Measurements With Section B-B



Housing Diameter & Groove Dimensions



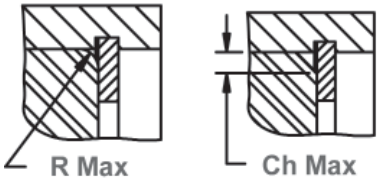
Clearance Diameter Compressed In Housing



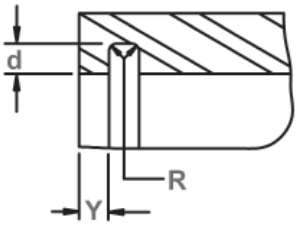
Clearance Diameter & Gap Width Released In Groove

RING NO.	HOUSING DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD (kN) Sqr. corner abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wt. Per 1000 pcs.	Com-pressed in housing	Re-leased in Groove	Ring (Safety Factor of 4)	Groove (Safety Factor of 2)
	Ds mm	Ds INCH	Dg	tol	F.I.M.*	W	tol	d	Df	tol	T	tol	kg	L1	L2	Pr	Pg
MHO-95	95	3.740	101.00	+0.30	0.25	2.95		3.00	105.60		2.8		35.4	76.7	82.7	255.0	164.0
MHO-98	98	3.858	104.20		0.25	2.95		3.10	109.00		2.8		39.4	78.3	84.5	263.0	174.0
MHO-100	100	3.937	106.30		0.25	2.95		3.15	110.70		2.8		39.9	80.3	86.6	269.0	181.0
MHO-102	102	4.016	108.40		0.25	2.95		3.20	112.40		2.8		42.2	82.2	88.6	273.0	187.0
MHO-105	105	4.134	111.50		0.25	2.95	+0.20	3.25	115.80		2.8		44.0	85.1	91.6	281.0	196.0
MHO-108	108	4.252	114.60		0.25	2.95		3.30	119.20		2.8	±0.08	45.8	88.1	94.7	290.0	205.0
MHO-110	110	4.331	116.70		0.25	2.95		3.35	120.80	+1.65	2.8		47.6	88.4	95.1	295.0	212.0
MHO-115	115	4.528	121.90		0.25	2.95		3.45	126.00	-1.65	2.8		50.3	93.2	100.1	309.0	227.0
MHO-120	120	4.724	127.00		0.25	2.95		3.50	132.40		2.8		56.2	98.2	105.2	321.0	241.0
MHO-125	125	4.921	132.10	+0.40	0.25	2.95		3.55	137.10		2.8		60.0	103.1	110.2	335.0	255.0
MHO-130	130	5.118	137.20		0.25	2.95		3.60	142.50		2.8		63.5	108.0	115.2	349.0	269.0
MHO-135	135	5.315	142.30		0.25	3.40		3.65	148.50		3.2		79	110.4	117.7	415.0	283.0
MHO-140	140	5.512	147.40		0.25	3.40		3.70	154.10		3.2		83	115.3	122.7	429.0	298.0
MHO-145	145	5.709	152.50		0.25	3.40		3.75	159.50		3.2	±0.10	87	120.4	127.9	444.0	313.0
MHO-150	150	5.906	157.60		0.25	3.40		3.80	164.50		3.2		89	125.3	132.9	460.0	327.0
MHO-155	155	6.102	162.70		0.30	3.40		3.85	168.80		3.2		91	130.4	138.1	475.0	343.0
MHO-160	160	6.299	167.80		0.30	4.25		3.90	175.10		4.0		121	133.8	141.6	613.0	359.0
MHO-165	165	6.496	172.90		0.30	4.25		3.95	180.30	+2.05	4.0		127	138.7	146.6	632.0	374.0
MHO-170	170	6.693	178.00		0.30	4.25		4.00	185.60	-2.05	4.0		138	143.6	151.6	651.0	390.0
MHO-175	175	6.890	183.20		0.30	4.25	+0.25	4.10	191.30		4.0		147	146.0	154.2	670.0	403.0
MHO-180	180	7.087	188.40		0.30	4.25		4.20	196.60		4.0		156	151.4	159.8	690.0	434.0
MHO-185	185	7.283	193.60		0.30	5.10		4.30	202.70		4.8		194	154.7	163.3	851.0	457.0
MHO-190	190	7.480	198.80		0.30	5.10		4.40	207.70		4.8	±0.12	220	159.5	168.3	873.0	480.0
MHO-200	200	7.874	209.00	+0.50	0.30	5.10		4.50	217.80		4.8		235	169.2	178.2	919.0	517.0
MHO-210	210	8.268	219.40		0.30	5.10		4.70	230.30	+2.30	4.8		275	177.5	186.9	965.0	566.0
MHO-220	220	8.661	230.00		0.30	5.10		5.00	240.50	-2.30	4.8		285	184.1	194.1	1000.0	608.0
MHO-230	230	9.055	240.60		0.30	5.10		5.30	251.40		4.8		330	194.0	204.6	1060.0	686.0
MHO-240	240	9.449	251.00		0.30	5.10		5.50	262.30		4.8		365	200.4	211.4	1090.0	725.0
MHO-250	250	9.843	261.40		0.30	5.10		5.70	273.30		4.8		375	210.0	221.4	1150.0	808.0

*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & HOUSING.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR PLATED RINGS ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**

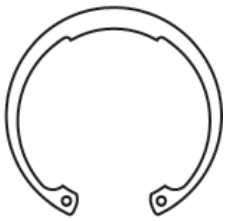


Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.10 for ring sizes -8 thru -17; 0.2 for ring sizes -18 thru -30; 0.3 for ring sizes -32 thru -55
0.4 for ring sizes -56 thru -250

Alternate Lug Design
For Larger Sizes
(Manufacturer's Option)



Alternate Design
(Manufacturer's Option)

RING NO.	LUG HEIGHT	MAXIMUM SECTION	MINIMUM SECTION	HOLE DIAMETER	GAP WIDTH Ring in Groove	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max	EDGE MARGIN
	H nom	S max/Ref.	S min/Ref.	R min	G	R max	Ch max	P'r	Y
MHO-95	8.7	7.80	3.90	3.1	22.60	3.0	2.5	54.0	9.0
MHO-98	9.4	8.10	4.10	3.1	22.60	3.0	2.5	54.0	9.3
MHO-100	9.4	8.20	4.10	3.1	24.10	3.1	2.5	54.0	9.5
MHO-102	9.4	8.40	4.20	3.1	25.50	3.2	2.6	54.0	9.6
MHO-105	9.4	8.40	4.30	3.1	26.00	3.3	2.6	54.0	9.8
MHO-108	9.4	8.50	4.60	3.1	26.40	3.5	2.7	54.0	9.9
MHO-110	10.3	8.70	4.60	3.8	27.50	3.6	2.8	54.0	10.1
MHO-115	10.3	8.90	4.60	3.8	29.40	3.7	2.9	54.0	10.4
MHO-120	10.3	9.40	4.60	3.8	27.20	3.9	3.1	54.0	10.5
MHO-125	10.3	9.50	4.70	3.8	30.30	4.0	3.2	54.0	10.7
MHO-130	10.3	9.80	4.90	3.8	31.00	4.0	3.2	54.0	10.8
MHO-135	11.6	10.40	5.00	3.8	30.40	4.3	3.4	67.0	11.0
MHO-140	11.6	10.40	5.00	3.8	30.40	4.3	3.4	67.0	11.1
MHO-145	11.6	10.60	5.30	3.8	31.60	4.3	3.4	67.0	11.3
MHO-150	11.6	10.80	5.40	3.8	33.50	4.3	3.4	67.0	11.4
MHO-155	11.6	10.80	5.40	3.8	37.00	4.3	3.4	67.0	11.6
MHO-160	12.3	10.90	5.40	4.6	35.00	4.5	3.6	102.0	11.7
MHO-165	12.3	11.10	5.60	4.6	33.10	4.6	3.7	102.0	11.9
MHO-170	12.3	11.40	5.60	4.6	38.20	4.6	3.7	102.0	12.0
MHO-175	13.5	11.60	5.70	4.6	37.70	4.8	3.8	102.0	12.3
MHO-180	13.5	12.00	5.90	4.6	39.00	5.0	4.0	102.0	12.6
MHO-185	14.2	12.40	6.00	4.6	37.30	5.1	4.1	151.0	12.9
MHO-190	14.2	12.90	6.30	4.6	35.00	5.3	4.3	151.0	13.2
MHO-200	14.2	13.30	6.50	4.6	43.90	5.4	4.3	151.0	13.5
MHO-210	15.2	14.20	6.90	4.6	40.60	5.8	4.6	151.0	14.1
MHO-220	16.8	15.00	7.30	4.6	38.30	6.1	4.9	151.0	15.0
MHO-230	16.8	15.50	7.50	4.6	49.00	6.3	5.1	151.0	15.9
MHO-240	18.7	16.30	7.70	4.6	45.40	6.6	5.3	151.0	16.5
MHO-250	18.7	16.70	7.80	4.6	53.00	6.7	5.4	151.0	17.1

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MHO	8	15N	82.5-86
	9-26	30N	63-69.5
	27-250	C	44-51

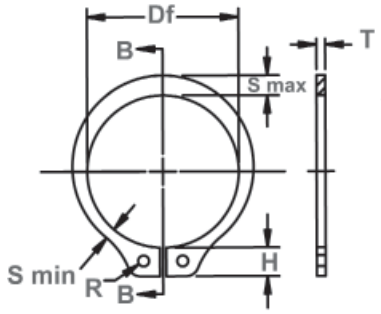
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MHO	8	15N	86-88
	9-13	30N	69.5-73
	14-20	30N	68.5-72
	21-26	30N	67.5-71
	27-250	C	48-52

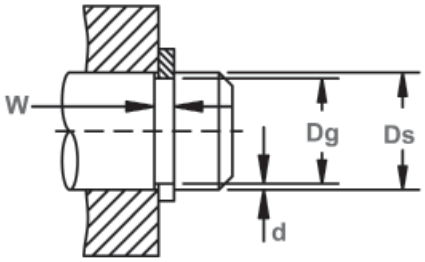
MSH Shaft Rings

Axially Assembled, External, ANSI Metric

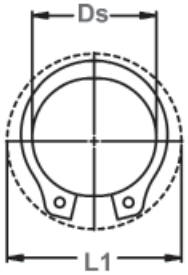
Once installed in the groove of a shaft, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



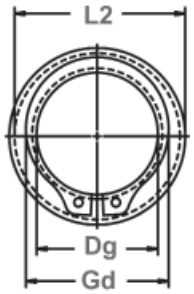
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



Clearance Diameter Expanded Over Shaft



Clearance Diameter & Gaging Diameter Released in Groove.

RING NO.	SHAFT DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD (kN) Sqr. corner abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS ***		Wt. Per 1000 pcs.	Ex-panded over Shaft	Re-leased in Groove	Ring (Safety Factor of 4)	Groove (Safety Factor of 2)
	Ds mm	Ds INCH	Dg	tol	F.I.M.**	W	tol	d	Df	tol	T	tol	kg	L1	L2	Pr	Pg
MSH-4*	4	0.157	3.80		0.03	0.32	+0.05	0.10	3.60	+0.05	0.25	±0.05	0.017	7.0	6.8	0.6	0.2
MSH-5*	5	0.197	4.75	-0.08	0.03	0.50	+0.10	0.13	4.55	-0.10	0.40		0.029	8.2	7.9	1.1	0.3
MSH-6*	6	0.236	5.70		0.03	0.50		0.15	5.45		0.40		0.040	9.1	8.8	1.4	0.4
MSH-7	7	0.275	6.60		0.05	0.70		0.20	6.35		0.60		0.10	12.3	11.8	2.6	0.7
MSH-8	8	0.315	7.50	-0.10	0.05	0.70		0.25	7.15		0.60		0.12	13.6	13.0	3.1	1.0
MSH-9	9	0.354	8.45		0.05	0.70		0.28	8.15	+0.05	0.60		0.15	14.5	13.8	3.5	1.2
MSH-10	10	0.393	9.40		0.05	0.70		0.30	9.00	-0.15	0.60		0.19	15.5	14.7	3.9	1.5
MSH-11	11	0.433	10.35		0.05	0.70		0.33	10.00		0.60		0.23	16.4	15.6	4.3	1.8
MSH-12	12	0.472	11.35		0.05	0.70		0.33	10.85		0.60		0.24	17.4	16.6	4.7	2.0
MSH-13	13	0.512	12.30	-0.12	0.10	1.00		0.35	11.90		0.90		0.44	19.7	18.8	7.5	2.2
MSH-14	14	0.551	13.25		0.10	1.00		0.38	12.90		0.90		0.49	20.7	19.7	8.1	2.6
MSH-15	15	0.591	14.15		0.10	1.00		0.43	13.80		0.90		0.54	21.7	20.6	8.7	3.2
MSH-16	16	0.630	15.10		0.10	1.00		0.45	14.70		0.90		0.59	22.7	21.6	9.3	3.5
MSH-17	17	0.669	16.10		0.10	1.00		0.45	15.75		0.90	±0.06	0.64	23.7	22.6	9.9	4.0
MSH-18	18	0.708	17.00		0.10	1.20	+0.15	0.50	16.65		1.10		0.92	26.2	25.0	16.0	4.4
MSH-19	19	0.748	17.95		0.10	1.20		0.53	17.60	+0.15	1.10		0.95	27.2	25.9	16.9	4.9
MSH-20	20	0.787	18.85		0.10	1.20		0.58	18.35	-0.25	1.10		1.0	28.2	26.8	17.8	5.7
MSH-21	21	0.826	19.80	-0.15	0.10	1.20		0.60	19.40		1.10		1.1	29.2	27.7	18.6	6.2
MSH-22	22	0.866	20.70		0.10	1.20		0.65	20.30		1.10		1.3	30.3	28.7	19.6	7.0
MSH-23	23	0.905	21.65		0.10	1.20		0.67	21.25		1.10		1.4	31.3	29.6	20.5	7.6
MSH-24	24	0.945	22.60		0.10	1.20		0.70	22.20		1.10		1.5	34.1	32.4	21.4	8.2
MSH-25	25	0.984	23.50		0.10	1.20		0.75	23.10		1.10		1.6	35.1	33.3	22.3	9.2
MSH-26	26	1.023	24.50		0.10	1.20		0.75	24.05		1.10		1.8	36.0	34.2	23.2	9.6
MSH-27	27	1.063	25.45		0.10	1.40		0.78	24.95		1.30		2.2	37.8	35.9	28.4	10.3
MSH-28	28	1.102	26.40		0.10	1.40		0.80	25.80		1.30		2.3	38.8	36.9	28.4	11.0
MSH-30	30	1.181	28.35		0.15	1.40		0.83	27.90		1.30		2.5	40.8	38.8	31.6	12.3
MSH-32	32	1.260	30.20	-0.20	0.15	1.40		0.90	29.60	+0.25	1.30		2.8	42.8	40.7	33.6	14.1
MSH-34	34	1.339	32.00		0.15	1.40		1.00	31.40	-0.40	1.30		3.1	44.9	42.5	36.0	16.7
MSH-35	35	1.378	32.90		0.15	1.40		1.05	32.30		1.30		3.3	45.9	43.4	37.0	18.1
MSH-36	36	1.417	33.85		0.15	1.40		1.06	33.25		1.30		3.6	48.6	46.1	38.0	18.9
MSH-38	38	1.496	35.80		0.15	1.40		1.10	35.20		1.30		4.0	50.6	48.0	40.0	20.5
MSH-40	40	1.575	37.70		0.15	1.75		1.15	36.75		1.60		5.6	54.0	51.3	52.0	22.6
MSH-42	42	1.654	39.60		0.15	1.75		1.20	38.80		1.60		6.3	56.0	53.2	54.0	24.8
MSH-43	43	1.683	40.50	-0.30	0.15	1.75		1.25	39.65	+0.35	1.60		6.7	57.0	54.0	55.0	26.4
MSH-45	45	1.772	42.40		0.15	1.75	+0.20	1.30	41.60	-0.50	1.60	±0.08	7.0	59.0	55.9	58.0	28.8
MSH-46	46	1.811	43.30		0.15	1.75		1.35	42.55		1.60		7.3	60.0	56.8	59.0	30.4
MSH-48	48	1.890	45.20		0.15	1.75		1.40	44.40		1.60		7.7	62.4	59.1	62.0	33.0
MSH-50	50	1.969	47.20		0.15	1.75		1.40	46.20		1.60		8.2	64.4	61.1	64.0	35.0

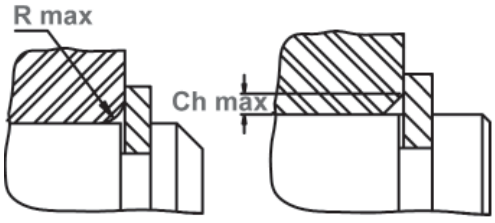
*SIZES -4 THRU -6 STANDARD MATERIAL- CARBON STEEL; OPTIONAL MATERIAL- BERYLLIUM COPPER.

** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & SHAFT.

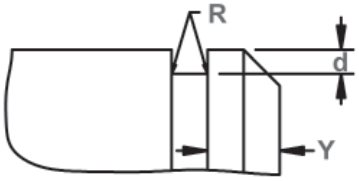
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL.

FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.

***FOR PLATED RINGS ADD 0.05 TO THE LISTED MAXIMUM THICKNESS (T) AND BEVELED END THICKNESS (U) VALUES.



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.10 for ring sizes -7 thru -18; 0.2 for ring sizes -19 thru -30; 0.3 for ring sizes -32 thru -50
0.4 for ring sizes -52 thru -100

Alternate Lug Design For Sizes MSH-4 Thru MSH-6

Alternate Design (Manufacturer's Option)

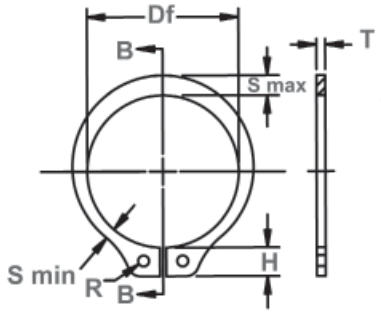
RING NO.	LUG HEIGHT	MAXIMUM SECTION	MINIMUM SECTION	HOLE DIAMETER	GAGING DIA.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (kN)	EDGE MARGIN	R.P.M. LIMITS Standard Material
	H nom	S max/Ref.	S min/Ref.	R min	Gd	R max	Ch max	P'r	Y	RPM
MSH-4*	1.35	0.65	0.40	0.6	4.90	0.35	0.25	0.2	0.3	70000
MSH-5*	1.40	0.65	0.40	0.6	5.85	0.35	0.25	0.5	0.4	70000
MSH-6*	1.40	0.75	0.50	0.6	6.95	0.35	0.25	0.5	0.5	70000
MSH-7	2.05	0.90	0.60	1.0	8.05	0.45	0.3	2.1	0.6	60000
MSH-8	2.20	1.00	0.65	1.0	9.15	0.5	0.35	2.1	0.8	55000
MSH-9	2.20	1.15	0.75	1.0	10.35	0.6	0.35	2.1	0.8	48000
MSH-10	2.20	1.30	0.80	1.0	11.50	0.7	0.4	2.1	0.9	42000
MSH-11	2.20	1.40	0.85	1.0	12.60	0.75	0.45	2.1	1.0	38000
MSH-12	2.20	1.50	0.90	1.0	13.80	0.8	0.45	2.1	1.0	34000
MSH-13	2.80	1.60	0.95	1.2	15.05	0.8	0.5	4.0	1.0	31000
MSH-14	2.80	1.70	1.00	1.2	15.60	0.9	0.5	4.0	1.2	28000
MSH-15	2.80	1.80	1.05	1.2	17.20	1.0	0.6	4.0	1.3	27000
MSH-16	2.80	2.05	1.15	1.2	18.35	1.1	0.6	4.0	1.4	25000
MSH-17	2.80	2.10	1.15	1.2	19.35	1.1	0.6	4.0	1.4	24000
MSH-18	3.45	2.25	1.25	1.3	20.60	1.2	0.7	6.0	1.5	23000
MSH-19	3.45	2.35	1.30	1.3	21.70	1.2	0.7	6.0	1.6	21500
MSH-20	3.45	2.40	1.35	1.3	22.65	1.2	0.7	6.0	1.7	20000
MSH-21	3.45	2.50	1.40	1.3	23.80	1.3	0.7	6.0	1.8	19000
MSH-22	3.45	2.70	1.50	1.3	24.90	1.3	0.8	6.0	1.9	18500
MSH-23	3.45	2.80	1.60	1.3	26.00	1.3	0.8	6.0	2.0	18000
MSH-24	4.20	2.90	1.60	1.9	27.15	1.4	0.8	6.0	2.1	17500
MSH-25	4.20	2.90	1.70	1.9	28.10	1.4	0.8	6.0	2.3	17000
MSH-26	4.20	3.00	1.70	1.9	29.25	1.5	0.9	6.0	2.3	16500
MSH-27	4.60	3.10	1.80	1.9	30.35	1.5	0.9	8.6	2.3	16300
MSH-28	4.60	3.20	1.80	1.9	31.45	1.6	1.0	8.6	2.4	15800
MSH-30	4.60	3.30	1.80	1.9	33.60	1.6	1.0	8.6	2.5	15000
MSH-32	4.60	3.60	1.90	1.9	35.90	1.7	1.0	8.6	2.7	14800
MSH-34	4.60	3.80	2.00	1.9	37.90	1.7	1.1	8.6	3.0	14000
MSH-35	4.60	3.90	2.10	1.9	39.00	1.8	1.1	8.6	3.1	13500
MSH-36	5.40	4.10	2.20	1.9	40.20	1.9	1.2	8.6	3.2	13300
MSH-38	5.40	4.30	2.30	3.1	42.50	2.0	1.2	8.6	3.3	12700
MSH-40	6.00	4.40	2.30	3.1	44.50	2.1	1.2	13.2	3.4	12000
MSH-42	6.00	4.60	2.40	3.1	46.90	2.2	1.3	13.2	3.6	11000
MSH-43	6.00	4.70	2.50	3.1	47.90	2.3	1.4	13.2	3.8	10800
MSH-45	6.00	4.80	2.60	3.1	50.00	2.3	1.4	13.2	3.9	10000
MSH-46	6.00	4.90	2.60	3.1	50.90	2.4	1.4	13.2	4.0	9500
MSH-48	6.20	5.00	2.60	3.1	53.00	2.4	1.4	13.2	4.2	8800
MSH-50	6.20	5.10	2.70	3.1	55.20	2.4	1.4	13.2	4.2	8000

FOR HARDNESS SPECIFICATIONS SEE END OF THE SECTION.

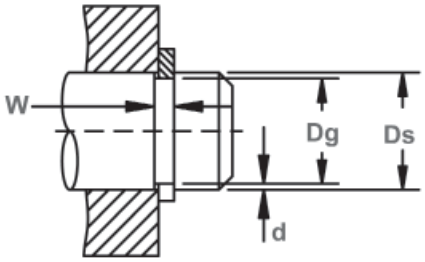
MSH Shaft Rings

Axially Assembled, External, ANSI Metric

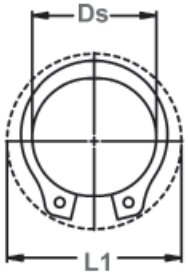
Once installed in the groove of a shaft, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.



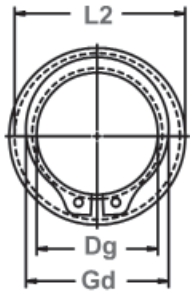
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



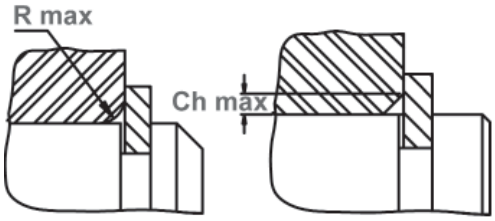
Clearance Diameter Expanded Over Shaft



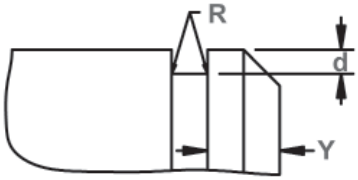
Clearance Diameter & Gaging Diameter Released in Groove.

RING NO.	SHAFT DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD (kN) Sqr. corner abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS ***		Wt. Per 1000 pcs.	Ex-panded over Shaft	Re-leased in Groove	Ring (Safety Factor of 4)	Groove (Safety Factor of 2)
	Ds mm	Ds INCH	Dg	tol	F.I.M.**	W	tol	d	Df	tol	T	tol	kg	L1	L2	Pr	Pg
MSH-54	54	2.126	51.00	-0.30	0.15	2.15		1.50	49.90		2.00		11.8	69.6	66.1	87.0	40.0
MSH-55	55	2.165	51.80		0.15	2.15		1.60	50.60		2.00		11.9	70.6	66.9	89.0	44.0
MSH-57	57	2.244	53.80		0.20	2.15		1.60	52.90	+0.35	2.00		12.5	72.6	68.9	91.0	45.0
MSH-58	58	2.283	54.70		0.20	2.15		1.65	53.60	-0.65	2.00		12.6	73.6	69.8	93.0	46.0
MSH-60	60	2.362	56.70		0.20	2.15		1.65	55.80		2.00		13.2	75.6	71.8	97.0	49.0
MSH-62	62	2.441	58.60		0.20	2.15		1.70	57.30		2.00		13.4	77.6	73.6	100.0	52.0
MSH-65	65	2.559	61.60		0.20	2.15		1.70	60.40		2.00		15.4	80.6	76.6	105.0	54.0
MSH-68	68	2.677	64.50		0.20	2.15		1.75	63.10		2.00		16.3	83.6	79.5	110.0	58.0
MSH-70	70	2.756	66.40		0.20	2.55	+0.20	1.80	64.60		2.40	±0.08	19.3	88.1	83.9	136.0	62.0
MSH-72	72	2.835	68.30	-0.40	0.20	2.55		1.85	66.60		2.40		20.6	90.1	85.8	140.0	65.0
MSH-75	75	2.953	71.20		0.20	2.55		1.90	69.00		2.40		22.6	93.1	88.7	147.0	69.0
MSH-78	78	3.071	74.00		0.20	2.55		2.00	72.00	+0.50	2.40		21.5	95.4	92.1	151.0	76.0
MSH-80	80	3.150	75.90		0.20	2.55		2.05	74.20	-0.75	2.40		26.8	97.9	93.1	155.0	80.0
MSH-82	82	3.228	77.80		0.20	2.55		2.10	76.40		2.40		28.1	100.0	95.1	159.0	84.0
MSH-85	85	3.346	80.60		0.20	2.55		2.20	78.60		2.40		29.0	103.0	97.9	165.0	91.0
MSH-88	88	3.464	83.50		0.20	2.95		2.25	81.40		2.80		32.2	107.0	100.8	199.0	97.0
MSH-90	90	3.543	85.40		0.20	2.95		2.30	83.20		2.80		33.1	109.0	103.6	204.0	101.0
MSH-95	95	3.740	90.20		0.20	2.95		2.40	88.10		2.80		37.6	114.0	108.6	215.0	112.0
MSH-100	100	3.852	95.20		0.20	2.95		2.42	92.50		2.80		43.1	119.5	113.7	227.0	123.0

**** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL.
FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR PLATED RINGS ADD 0.05 TO THE LISTED MAXIMUM THICKNESS (T) AND BEVELED END THICKNESS (U) VALUES.**



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.10 for ring sizes -7 thru -18; 0.2 for ring sizes -19 thru -30; 0.3 for ring sizes -32 thru -50
0.4 for ring sizes -52 thru -100

Alternate Lug Design For Sizes MSH-4 Thru MSH-6

Alternate Design (Manufacturer's Option)

RING NO.	LUG HEIGHT	MAXIMUM SECTION	MINIMUM SECTION	HOLE DIAMETER	GAGING DIA.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (kN)	EDGE MARGIN	R.P.M. LIMITS Standard Material
	H nom	S max/Ref.	S min/Ref.	R min	Gd	R max	Ch max	P'r	Y	RPM
MSH-54	6.80	5.40	2.90	3.1	59.50	2.5	1.5	22.0	4.5	7500
MSH-55	6.80	5.40	2.90	3.1	60.40	2.5	1.5	22.0	4.8	7400
MSH-57	6.80	5.60	3.00	3.1	62.70	2.6	1.5	22.0	4.8	7200
MSH-58	6.80	5.60	3.00	3.1	63.60	2.6	1.6	22.0	4.9	7100
MSH-60	6.80	5.70	3.00	3.1	65.80	2.6	1.6	22.0	4.9	7000
MSH-62	6.80	5.80	3.00	3.1	67.90	2.7	1.6	22.0	5.1	6900
MSH-65	6.80	6.00	3.10	3.1	71.20	2.8	1.7	22.0	5.1	6700
MSH-68	6.80	6.20	3.30	3.1	74.50	2.9	1.7	22.0	5.3	6500
MSH-70	7.80	6.30	3.30	3.1	76.40	2.9	1.7	32.0	5.4	6400
MSH-72	7.80	6.40	3.30	3.1	78.50	2.9	1.7	32.0	5.5	6200
MSH-75	7.80	6.60	3.40	3.1	81.70	3.0	1.8	32.0	5.7	5900
MSH-78	7.80	6.60	3.40	3.1	84.60	3.0	1.8	32.0	6.0	5600
MSH-80	7.80	7.00	3.60	3.1	87.00	3.1	1.9	32.0	6.1	5400
MSH-82	7.80	7.10	3.70	3.1	89.00	3.2	1.9	32.0	6.3	5200
MSH-85	7.80	7.30	3.80	3.1	92.10	3.2	1.9	32.0	6.6	5000
MSH-88	8.40	7.50	3.90	3.1	95.10	3.2	1.9	47.0	6.7	4800
MSH-90	8.40	7.50	3.90	3.1	97.10	3.2	1.9	47.0	6.9	4500
MSH-95	8.40	7.90	4.10	3.1	102.70	3.4	2.1	47.0	7.2	4350
MSH-100	8.70	8.00	4.10	3.1	108.00	3.5	2.1	47.0	7.5	4150

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MSH	7-21	30N	63-69.5
	22-100	C	44-51

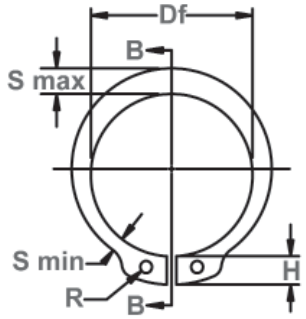
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MSH	4-6	15N	86-88
	7-12	30N	69.5-73
	13-21	30N	67.5-71
	22-26	C	49-53
	27-85	C	48-52
	88-100	C	47-51

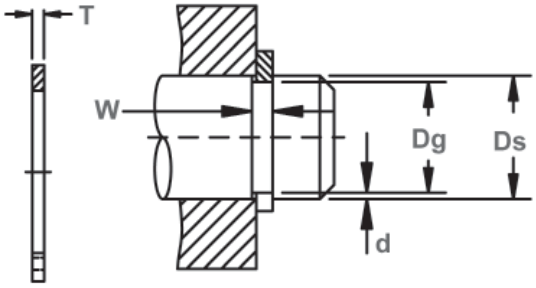
MSR Shaft Rings

Axially Assembled, External Reinforced, ANSI Metric

The MSR is an extra thick version of a regular MSH retaining ring. As such, it is stronger and can withstand greater thrust loads than its standard counterpart.

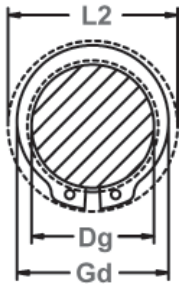


Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions

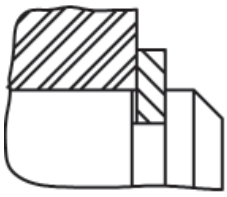
Clearance Diameter Expanded Over Shaft



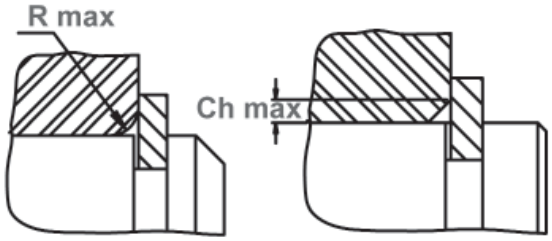
Clearance Diameter & Gaging Diameter Released In Groove

RING NO.	SHAFT DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD (kN.) Sqr. corner abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wt. Per 1000 pcs.	Ex-panded over Shaft	Re-leased in Groove	Ring (Safety Factor of 4)	Groove (Safety Factor of 2)
	Ds mm	Ds INCH	Dg	tol	F.I.M.*	W	tol	d	Df	tol	T	tol	kg	L1	L2	Pr	Pg
MSR-10	10	0.393	9.40		0.05	1.00		0.30	9.20	+0.08	0.9		0.32	15.6	14.8	9.3	2.9
MSR-11	11	0.433	10.30	-0.08	0.05	1.00		0.35	10.00	-0.20	0.9		0.39	16.6	15.8	10.8	3.8
MSR-12	12	0.472	11.30		0.05	1.20		0.35	11.05		1.1		0.63	17.6	16.8	13.7	4.0
MSR-13	13	0.512	12.20		0.05	1.40		0.40	11.80		1.3	±0.06	0.72	19.5	18.5	17.6	5.0
MSR-14	14	0.551	13.15		0.05	1.40	+0.15	0.43	12.80		1.3		0.80	20.5	19.5	18.9	5.8
MSR-15	15	0.591	14.10		0.05	1.40		0.45	13.80		1.3		1.00	22.1	21.1	20.3	6.5
MSR-16	16	0.630	15.00		0.08	1.40		0.50	14.70	+0.13	1.3		1.04	23.2	22.0	21.6	7.7
MSR-17	17	0.669	15.95	-0.10	0.08	1.40		0.53	15.65	-0.25	1.3		1.2	24.2	22.9	23.0	8.7
MSR-18	18	0.708	16.85		0.08	1.75		0.58	16.55		1.6		1.9	26.8	25.5	30.0	10.0
MSR-19	19	0.748	17.80		0.08	2.15		0.60	17.50		2.0		2.5	28.8	27.4	40.0	11.0
MSR-20	20	0.787	18.75		0.08	2.15		0.63	18.45		2.0		2.8	29.8	28.4	42.0	13.1
MSR-22	22	0.866	20.70		0.08	2.15		0.65	20.40		2.0		3.4	31.9	30.4	46.0	13.7
MSR-25	25	0.984	23.50		0.08	2.15		0.75	23.10		2.0		3.5	34.9	33.1	52.0	18.0
MSR-27	27	1.063	25.40		0.10	2.55		0.80	24.85		2.4		5.2	39.0	37.1	67.0	20.8
MSR-28	28	1.102	26.30		0.10	2.55		0.85	25.70		2.4	±0.08	5.6	40.0	38.0	69.0	22.8
MSR-30	30	1.181	28.20	-0.15	0.10	2.55	+0.20	0.90	27.60	+0.25	2.4		6.1	42.0	40.0	74.0	26.0
MSR-32	32	1.260	30.00		0.10	2.55		1.00	29.35	-0.40	2.4		6.8	44.1	41.8	79.0	30.8
MSR-35	35	1.378	32.80		0.10	2.55		1.10	32.20		2.4		8.1	47.1	44.6	87.0	38.0
MSR-38	38	1.496	35.60		0.10	2.95		1.20	35.05		2.8		12.2	53.2	50.5	111.0	44.0
MSR-40	40	1.575	37.50		0.15	2.95		1.25	36.70	+0.35	2.8		14.1	55.2	52.4	116.0	48.0
MSR-45	45	1.772	42.20	-0.20	0.15	2.95		1.40	41.10	-0.50	2.8		15.1	60.9	57.7	130.0	61.0
MSR-50	50	1.969	47.00		0.15	3.40	+0.25	1.50	45.50		3.2	±0.10	21.8	67.1	63.8	165.0	72.0

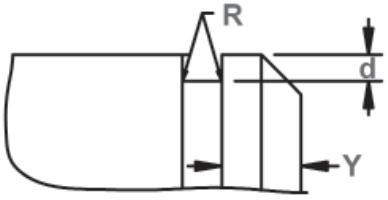
*** F.I.M.(FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS.MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**



Square Corner Abutment



Allowable Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.10 for ring sizes -10 thru -15; 0.15 for ring sizes -16 thru -20; 0.20 for ring sizes -22 thru -30
0.30 for ring sizes -32 thru -50

RING NO.	LUG HEIGHT	MAXIMUM SECTION	MINIMUM SECTION	HOLE DIAMETER	GAGING DIA.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (kN)	EDGE MARGIN	R.P.M. LIMITS Standard Material
	H nom	S max	S min	R min	Gd	R max	Ch max	P'r	Y	RPM
MSR-10	2.6	1.7	1.0	1.0	12.15	1.0	0.8	2.7	0.9	66000
MSR-11	2.6	1.9	1.1	1.0	13.40	1.0	0.8	3.0	1.0	60000
MSR-12	2.6	2.2	1.3	1.0	14.95	1.6	1.3	3.2	1.0	55000
MSR-13	3.0	2.3	1.3	1.2	15.80	1.6	1.3	4.6	1.2	52000
MSR-14	3.0	2.4	1.4	1.2	16.90	1.6	1.3	4.8	1.3	47000
MSR-15	3.3	2.6	1.4	1.2	18.20	1.6	1.3	5.2	1.3	42000
MSR-16	3.3	2.7	1.5	1.2	19.20	1.6	1.3	5.4	1.5	39000
MSR-17	3.3	2.8	1.6	1.2	20.45	1.6	1.3	5.7	1.6	36000
MSR-18	4.1	3.0	1.8	1.9	21.75	1.8	1.5	8.0	1.7	35000
MSR-19	4.6	3.2	2.0	1.9	23.05	1.8	1.5	13.2	1.8	30000
MSR-20	4.6	3.4	2.0	1.9	24.30	2.0	1.6	18.2	1.9	29000
MSR-22	4.6	3.8	2.1	1.9	26.60	2.0	1.6	14.7	2.0	27000
MSR-25	4.6	3.8	2.1	1.9	29.45	2.0	1.6	14.7	2.2	24000
MSR-27	5.6	4.1	2.3	2.3	32.00	2.0	1.6	22.9	2.4	22000
MSR-28	5.6	4.3	2.4	2.3	33.20	2.0	1.6	24.0	2.5	20000
MSR-30	5.6	4.5	2.5	2.3	35.40	2.0	1.6	25.0	2.7	19000
MSR-32	5.6	4.7	2.6	2.3	37.30	2.5	2.1	19.0	3.0	18000
MSR-35	5.6	5.1	2.8	2.3	40.80	2.5	2.1	22.0	3.3	16000
MSR-38	7.1	5.5	3.1	2.7	44.40	2.5	2.1	32.0	3.6	15000
MSR-40	7.1	5.8	3.2	2.7	46.70	2.5	2.1	34.0	3.7	13500
MSR-45	7.4	6.5	3.6	2.7	52.20	2.5	2.1	38.0	4.2	12500
MSR-50	8.0	7.1	3.9	3.1	58.40	3.5	2.9	39.0	4.5	11000

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MSR	10-16	30N	63-69.5
	17-50	C	44-51

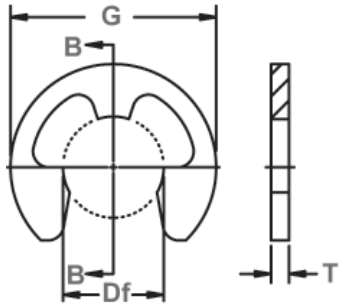
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MSR	10-16	30N	68.5-72
	17-50	C	48-52

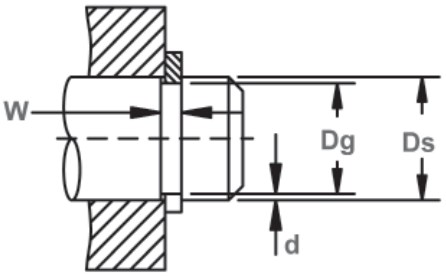
ME Shaft Rings

Radially Assembled, External 'E', ANSI Metric

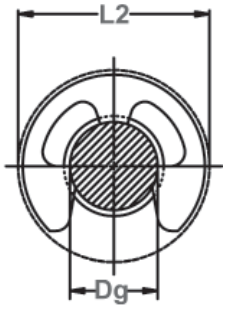
Perhaps the most popular and widely used radial retaining ring is the "E" (so named because it is shaped like the letter "E"). Three prongs make contact with the bottom of the groove and provide a shoulder for effective retention of assemblies.



Free Diameter & Ring Measurements With Section B-B



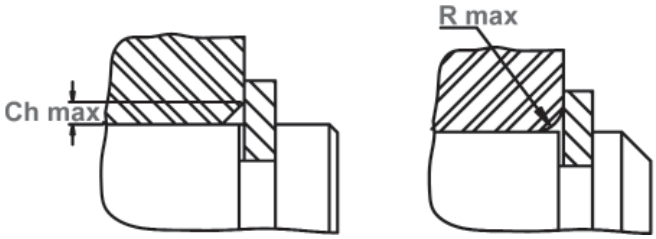
Shaft Diameter & Groove Dimensions



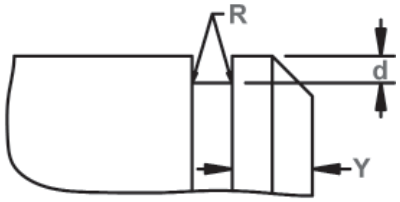
Clearance Diameter & Installed In Groove

RING NO.	SHAFT DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD (kN) Sqr. Corner Abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wt. Per 1000 Pcs.	Free Out-Side Dia. Ref.	Re-leased In Groove	Ring (Safety factor of 3)	Groove (Safety factor of 2)
	Ds mm	Ds DEC	Dg	Tol.	F.I.M.**	W	Tol.	d	Df	Tol.	T	Tol.	kg	G	L2	Pr	Pg
ME-1*	1	.039	0.72	-0.05	0.04	0.32	+0.05	0.14	0.64		0.25	±0.05	0.004	2.0	2.2	0.06	0.02
ME-2	2	.079	1.45		0.04	0.32		0.28	1.30		0.25		0.014	4.0	4.3	0.13	0.09
ME-3	3	.118	2.30		0.04	0.50	+0.10	0.35	2.10	+0.03	0.40		0.036	5.6	6.0	0.30	0.17
ME-4	4	.157	3.10	-0.08	0.05	0.70		0.45	2.90	-0.08	0.60		0.095	7.2	7.6	0.70	0.30
ME-5	5	.197	3.90		0.05	0.70		0.55	3.70		0.60		0.13	8.5	8.9	0.90	0.40
ME-6	6	.236	4.85		0.05	0.70		0.58	4.70		0.60		0.21	11.1	11.5	1.10	0.60
ME-7	7	.275	5.55		0.08	0.70		0.73	5.25		0.60		0.34	13.4	14.0	1.20	0.80
ME-8	8	.315	6.40		0.08	0.70		0.80	6.15		0.60		0.35	14.6	15.1	1.40	1.00
ME-9	9	.354	7.20	-0.10	0.08	1.00		0.90	6.80		0.90	±0.06	0.58	15.8	16.5	3.00	1.30
ME-10	10	.393	8.00		0.08	1.00	+0.15	1.00	7.60	+0.05	0.90		0.68	16.8	17.5	3.40	1.60
ME-11	11	.433	8.90		0.10	1.00		1.05	8.55	-0.10	0.90		0.68	17.4	18.0	3.70	1.90
ME-12	12	.472	9.60		0.10	1.20		1.20	9.20		1.10		1.00	18.6	19.3	4.90	2.30
ME-13	13	.512	10.30		0.10	1.20		1.35	9.95		1.10		1.13	20.3	21.0	5.40	2.90
ME-15	15	.591	11.80	-0.15	0.10	1.20		1.60	11.40		1.10		1.40	22.8	23.5	6.20	4.00
ME-16	16	.630	12.50		0.10	1.20		1.75	12.15		1.10		1.45	23.8	24.5	6.60	4.50
ME-18	18	.709	14.30		0.10	1.40		1.85	13.90	+0.10	1.30		2.3	27.2	27.9	8.70	5.40
ME-20	20	.787	16.00		0.10	1.40		2.00	15.60	-0.15	1.30		2.8	30.0	30.7	9.80	6.50
ME-22	22	.866	17.40	-0.20	0.10	1.40		2.30	17.00		1.30		3.4	33.0	33.7	10.80	8.10
ME-25	25	.984	20.00		0.10	1.40		2.50	19.50		1.30		4.2	37.1	37.9	12.20	10.10

*** AVAILABLE IN BERYLLIUM COPPER ONLY.**
**** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON GROOVES MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.05 for ring sizes -1 thru -2; 0.15 for ring sizes -3 thru -7; 0.25 for ring sizes -8 thru -13
0.40 for ring sizes -15 thru -25

RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (kN)	EDGE MARGIN	R.P.M. LIMITS Standard Material
	R max	Ch max	P'r	Y	
ME-1*	0.4	0.25	0.06	0.3	40000
ME-2	0.8	0.50	0.13	0.6	40000
ME-3	1.1	0.70	0.30	0.7	34000
ME-4	1.6	1.20	0.70	0.9	31000
ME-5	1.6	1.20	0.90	1.1	27000
ME-6	1.6	1.20	1.10	1.2	25000
ME-7	1.6	1.20	1.20	1.5	23000
ME-8	1.7	1.30	1.40	1.6	21500
ME-9	1.7	1.30	3.00	1.8	19500
ME-10	1.7	1.30	3.40	2.0	18000
ME-11	1.7	1.30	3.70	2.1	16500
ME-12	1.9	1.40	4.90	2.4	15000
ME-13	2.0	1.50	5.40	2.7	13000
ME-15	2.0	1.50	6.20	3.2	11500
ME-16	2.0	1.50	6.60	3.5	10000
ME-18	2.1	1.60	8.70	3.7	9000
ME-20	2.2	1.70	9.80	4.0	8000
ME-22	2.2	1.70	10.80	4.6	7000
ME-25	2.4	1.90	12.20	5.0	5000

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
ME	2-3	15N	82.5-86*
	4-8	30N	63-69.5
	9-25	C	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

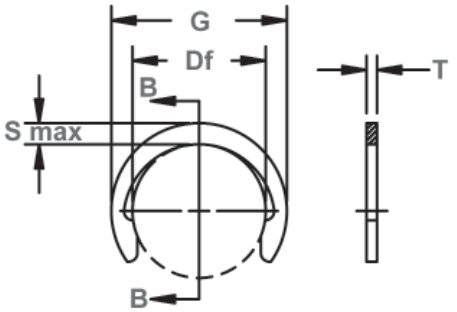
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
ME	1-3	15N	79-82*
	4-9	30N	56.5-68
	10-25	C	37-43

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

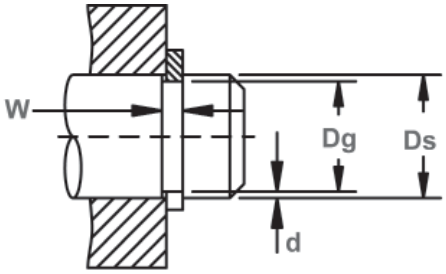
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
ME	2-3	15N	85-87*
	4-8	30N	67.5-71
	9-25	C	48-52

*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

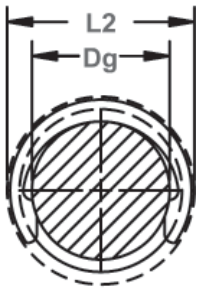
MC Shaft Rings



Free Diameter & Ring Measurements
With Section B-B



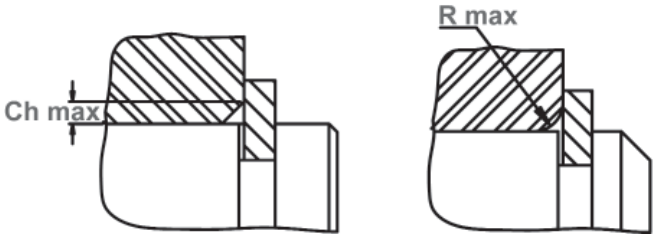
Shaft Diameter &
Groove Dimensions



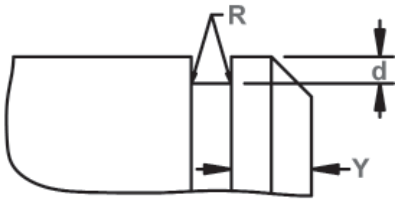
Clearance Diameter
Installed In Groove

RING NO.	SHAFT DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD (kN) Sqr. Corner Abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wt. Per 1000 Pcs.	Free Outside Dia. Ref.	Re-leased In Groove	Ring (Safety factor of 3)	Groove (Safety factor of 2)
	Ds mm	Ds DEC	Dg	Tol.	F.I.M.*	W	Tol.	d	Df	Tol.	T	Tol.	kg	G	L2	Pr	Pg
MC-3	3	0.118	2.3	-0.05	0.04	0.5	+0.10	0.35	2.18	±0.06	0.4		0.019	3.98	4.3	0.4	0.2
MC-4	4	0.157	3.2		0.04	0.5		0.40	3.00		0.4		0.025	5.00	5.4	0.5	0.4
MC-5	5	0.197	4.0	-0.07	0.06	0.7		0.50	3.80		0.6		0.055	6.20	6.6	0.9	0.6
MC-6	6	0.236	5.0		0.06	0.7		0.50	4.80	±0.08	0.6		0.072	7.40	7.8	1.1	0.7
MC-7	7	0.276	6.0		0.06	0.7		0.50	5.80		0.6		0.090	8.60	9.0	1.3	0.8
MC-8	8	0.315	7.0		0.06	0.7		0.50	6.80		0.6		0.12	10.00	10.4	1.5	1.0
MC-9	9	0.354	8.0		0.06	0.7		0.50	7.80	±0.09	0.6		0.13	11.20	11.6	2.2	1.1
MC-10	10	0.393	9.0		0.06	0.7		0.50	8.75		0.6		0.15	12.15	12.6	2.3	1.2
MC-11	11	0.433	10.0		0.10	0.7		0.50	9.65		0.6		0.17	13.20	13.8	2.6	1.3
MC-12	12	0.472	10.9	-0.10	0.10	0.7		0.55	10.55		0.6		0.20	14.35	15.0	2.8	1.6
MC-13	13	0.512	11.8		0.10	1.1	+0.15	0.60	11.40		1.0	±0.06	0.39	15.40	16.1	4.9	1.9
MC-14	14	0.551	12.7		0.10	1.1		0.65	12.30		1.0		0.42	16.30	17.0	5.5	2.1
MC-15	15	0.591	13.6		0.10	1.1		0.70	13.20	±0.18	1.0		0.50	17.40	18.1	6.0	2.5
MC-16	16	0.630	14.5		0.10	1.1		0.75	14.10		1.0		0.51	18.50	19.2	6.3	2.9
MC-17	17	0.669	15.4		0.10	1.1		0.80	14.90		1.0		0.55	19.40	20.2	6.7	3.3
MC-18	18	0.708	16.3		0.10	1.3		0.85	15.80		1.2		0.67	20.40	21.3	8.5	3.6
MC-19	19	0.748	17.2		0.15	1.3		0.90	16.70		1.2		0.85	21.50	22.4	9.0	4.2
MC-20	20	0.787	18.1		0.15	1.3		0.95	17.55		1.2		0.85	22.65	23.6	9.5	4.6
MC-22	22	0.866	19.9		0.15	1.3		1.05	19.40		1.2		1.07	25.00	25.9	10.4	5.6
MC-23	23	0.905	20.8		0.15	1.3		1.10	20.20		1.2		1.15	26.00	27.0	10.9	6.1
MC-24	24	0.945	21.7		0.15	1.3		1.15	21.10		1.2		1.2	27.10	28.1	11.3	6.7
MC-25	25	0.984	22.6	-0.20	0.15	1.3		1.20	22.00	±0.21	1.2		1.4	28.30	29.3	11.8	7.4
MC-26	26	1.023	23.5		0.15	1.3		1.25	22.90		1.2		1.5	29.40	30.4	12.2	7.8
MC-28	28	1.062	25.2		0.15	1.75		1.40	24.60		1.6		2.5	31.60	32.6	17.6	9.5
MC-30	30	1.181	27.0		0.15	1.75		1.50	26.30		1.6		2.6	33.70	34.9	19.2	10.8
MC-32	32	1.260	28.8		0.15	1.75		1.60	28.10		1.6		3.2	36.10	37.3	20.5	12.2
MC-35	35	1.378	31.5		0.15	1.75		1.75	30.80		1.6		3.5	39.40	40.6	22.4	14.7
MC-36	36	1.417	32.4		0.20	1.75		1.80	31.70	±0.25	1.6		4.1	40.50	41.7	23.1	15.7
MC-38	38	1.496	34.2		0.20	1.75		1.90	33.40		1.6		4.3	42.60	43.9	23.8	17.2
MC-40	40	1.575	36.0		0.20	1.75	+0.20	2.00	35.20		1.6	±0.08	4.7	45.00	46.3	25.6	19.6
MC-42	42	1.654	37.8	-0.25	0.20	1.75		2.10	37.00		1.6		5.0	47.20	48.5	27.5	21.0
MC-45	45	1.772	40.5		0.20	1.75		2.25	39.60		1.6		5.4	50.60	52.1	28.4	24.5
MC-48	48	1.890	43.2		0.20	1.75		2.40	42.30	±0.39	1.6		7.1	54.10	55.6	29.9	27.5
MC-50	50	1.969	45.0		0.20	2.15		2.50	44.00		2.0		8.9	56.40	58.0	40.0	30.4
MC-52	52	2.047	47.0		0.20	2.15		2.50	46.00		2.0		9.3	58.60	60.3	41.0	31.3
MC-55	55	2.165	50.0		0.20	2.15		2.50	48.50		2.0		10.4	61.50	63.7	43.0	33.3

***F.I.M.(FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
***** FOR PLATED RINGS ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.10 for ring sizes -3 thru -4; 0.20 for ring sizes -5 thru -16; 0.30 for ring sizes -17 thru -30
0.40 for ring sizes -32 thru -55

RING NO.	MAXIMUM SECTION	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (kN)	EDGE MAR-GIN	R.P.M.
	Smax/Ref.	R max	Ch max	P'r	Y	
MC-3	0.90	0.4	0.30	0.4	1.0	80000
MC-4	1.00	0.4	0.30	0.4	1.2	80000
MC-5	1.20	0.6	0.45	0.7	1.5	80000
MC-6	1.30	0.6	0.45	0.7	1.5	80000
MC-7	1.40	0.6	0.45	0.7	1.5	69000
MC-8	1.60	0.6	0.45	0.7	1.5	67000
MC-9	1.70	0.6	0.45	0.7	1.5	58000
MC-10	1.70	0.6	0.45	0.7	1.5	50000
MC-11	1.80	0.6	0.45	0.7	1.5	40000
MC-12	1.90	0.6	0.45	0.7	1.7	35000
MC-13	2.00	1.0	0.8	2.0	1.8	30000
MC-14	2.00	1.0	0.8	2.0	2.0	27000
MC-15	2.10	1.0	0.8	2.0	2.1	25000
MC-16	2.20	1.0	0.8	2.0	2.3	24000
MC-17	2.25	1.0	0.8	2.0	2.4	23000
MC-18	2.30	1.2	0.9	2.8	2.6	21000
MC-19	2.40	1.2	0.9	2.8	2.7	20500
MC-20	2.55	1.2	0.9	3.0	2.9	20000
MC-22	2.80	1.2	0.9	3.0	3.2	16500
MC-23	2.90	1.2	0.9	3.2	3.3	15200
MC-24	3.00	1.2	0.9	3.2	3.5	15100
MC-25	3.15	1.2	0.9	3.2	3.6	15000
MC-26	3.25	1.2	0.9	3.2	3.8	14500
MC-28	3.50	1.5	1.15	6.3	4.2	13200
MC-30	3.70	1.5	1.15	6.4	4.5	13000
MC-32	4.00	1.5	1.15	6.6	4.8	12900
MC-35	4.30	1.5	1.15	6.8	5.3	11000
MC-36	4.40	1.5	1.15	6.8	5.4	10200
MC-38	4.60	1.5	1.15	7.1	5.7	9600
MC-40	4.90	1.5	1.15	7.2	6.0	9200
MC-42	5.10	1.5	1.15	7.4	6.3	8600
MC-45	5.50	1.5	1.15	7.6	6.8	8300
MC-48	5.90	1.5	1.15	7.9	7.2	7500
MC-50	6.20	2.0	1.5	12.0	7.5	6800
MC-52	6.30	2.0	1.5	12.0	7.5	6600
MC-55	6.50	2.0	1.5	12.0	7.5	6500

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MC	3-4	15N	82.5-86
	5-19	30N	63-69.5
	20-55	C	44-51

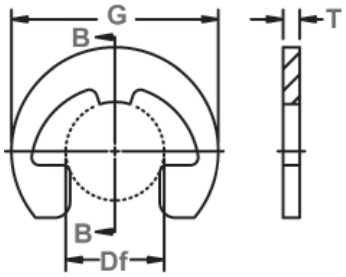
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MC	3-4	15N	84-86
	5-19	30N	66-69.5
	20-55	C	47-51

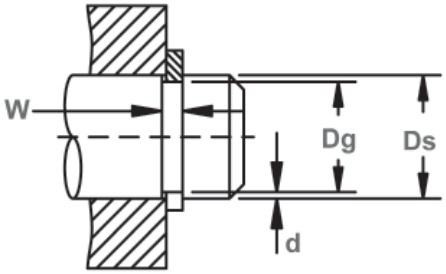
MRE Shaft Rings

Radially Assembled, External Reinforced 'E', ANSI Metric

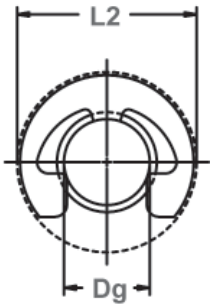
The MRE retaining ring is a reinforced version of the ME ring, which will accommodate higher thrust loadings and RPM. MRE rings function in the same size grooves as regular E rings, so that you can change from one to the other without re-engineering the application.



Free Diameter & Ring Measurements With Section B-B



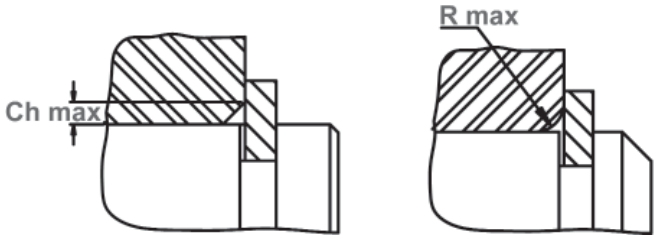
Shaft Diameter & Groove Dimensions



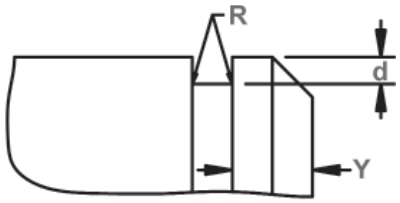
Clearance Diameter Installed in Groove

RING NO.	SHAFT DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE		I THRUST LD (kN) Sqr. Corner Abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wt. Per 1000 Pcs.	Free Out-Side Dia. Ref.	Re-leased In Groove	Ring (Safety factor of 3)	Groove (Safety factor of 2)
	Ds mm	Ds DEC	Dg	Tol.	F.I.M.*	W	Tol.	d	Df	Tol.	T	Tol.	kg	G	L2	Pr	Pg
MRE-4	4	0.157	3.00	-0.05	0.05	0.7		0.50	2.90	+0.05-0.08	0.6		0.14	8.50	8.9	0.6	0.18
MRE-5	5	0.197	3.85		0.05	0.7		0.57	3.65		0.6		0.18	9.50	9.9	0.8	0.27
MRE-6	6	0.236	4.85	-0.10	0.05	0.7		0.57	4.65	+0.08	0.6		0.24	11.35	11.8	1.0	0.34
MRE-7	7	0.276	5.40		0.08	0.7		0.80	5.20	-0.08	0.6		0.32	13.10	13.7	1.1	0.54
MRE-8	8	0.315	6.40		0.08	0.7		0.80	6.15		0.6	±0.06	0.36	14.95	15.6	1.3	0.63
MRE-9	9	0.354	7.10		0.10	1.0	+0.15	0.95	6.75		0.9		0.60	15.70	16.4	2.2	0.80
MRE-10	10	0.394	7.80		0.10	1.0		1.10	7.45		0.9		0.68	16.75	17.5	2.4	1.10
MRE-11	11	0.433	8.80	-0.15	0.10	1.0		1.10	8.45	+0.10	0.9		0.86	18.95	19.7	2.7	1.20
MRE-12	12	0.472	9.50		0.10	1.2		1.25	9.10	-0.10	1.1		1.20	19.60	20.4	3.5	1.50
MRE-13	13	0.512	10.2		0.10	1.2		1.40	9.80		1.1		1.45	20.55	21.3	3.9	1.70
MRE-14	14	0.551	11.2		0.10	1.2		1.40	10.90		1.1		1.60	22.10	22.8	4.2	1.90
MRE-15	15	0.591	11.8		0.10	1.2		1.60	11.50		1.1		1.75	23.20	23.9	4.5	2.30

***F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
***** FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.1 for ring sizes -4; 0.15 for ring sizes -5 thru -9; 0.25 for ring sizes -10 thru -15

RING NO.	CORNER RADII & CHAMFERS		LOAD w/ R max or Ch max (kN)	MAR-GIN	LIMITS Standard Material
	R max	Ch max	P'r	Y	
MRE-4	1.6	1.3	0.6	1.0	50000
MRE-5	1.6	1.3	0.8	1.1	43000
MRE-6	1.6	1.3	1.0	1.1	38000
MRE-7	1.6	1.3	1.1	1.6	33000
MRE-8	1.6	1.3	1.3	1.6	28000
MRE-9	1.8	1.4	2.2	1.9	27000
MRE-10	1.8	1.4	2.4	2.2	25000
MRE-11	1.8	1.4	2.7	2.2	21500
MRE-12	2.0	1.5	3.5	2.5	19500
MRE-13	2.0	1.5	3.9	2.8	17500
MRE-14	2.0	1.5	4.2	2.8	15500
MRE-15	2.0	1.5	4.5	3.2	14000

NOTE: CONTACT ROTOR CLIP FOR AVAILABILITY OF SIZES LISTED. LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MRE	4-8	30N	63-69.5
	9-15	C	44-51

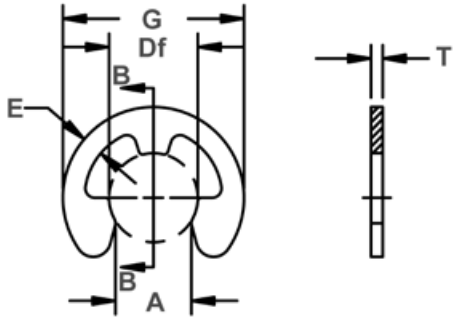
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MRE	4-8	30N	67.5-71
	9-15	C	48-52

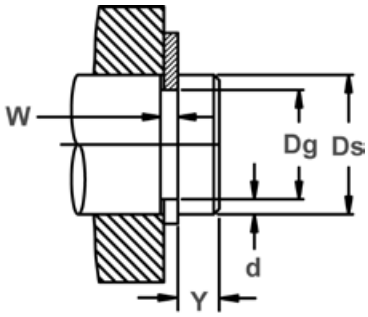
JE Shaft Rings
(JIS B 2804)

Radially Assembled, External 'E', JIS

Perhaps the most popular and widely used radial retaining ring is the "E" (so named because it is shaped like the letter "E"). Three prongs make contact with the bottom of the groove and provide a shoulder for effective retention of assemblies.



Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions

RING NO.	SHAFT Diameter Ds (mm)		GROOVE SIZE DIAMETER		WIDTH		RING SIZE EDGE MARGIN	FREE DIAMETER		THICKNESS ***		GAP		BEAM WIDTH	FREE OUTSIDE DIA.	
	From	To	Dg	Tol.	W	Tol.	Y Min.	Df	Tol.	T	Tol.	A	Tol.	E	G	Tol.
JE-0,8	1	1,4	0,82	+0,05	0.3		0,4	0,8	-0,08	0,2	±0,02	0,7		0.3	2	±0,1
JE-1,2	1,4	2,0	1,23		0.4		0,6	1,2		0,3	±0,025	1		0.4	3	
JE-1,5	2,0	2,5	1,53		0.5	+0,05	0,8	1,5		0,4		1.3	-0.25	0.6	4	
JE-2	2,5	3,2	2,05	+0,06	0.5		1,0	2	-0,09	0,4	±0,03	1.7		0.7	5	
JE-2,5	3,2	4,0	2,55		0.5		1,0	2,5		0,4		2.1		0.8	6	
JE-3	4,0	5,0	3,05		0.7		1,0	3		0,6		2,6		0.9	7	
JE-4	5,0	7,0	4,05		0.7		1,2	4		0,6		3.5		1.1	9	±0,2
JE-5	6,0	8,0	5,05	+0,075	0.7		1,2	5	-0,12	0,6		4.3	-0.30	1.2	11	
JE-6	7,0	9,0	6,05		0.9	+0,10	1,2	6		0,8	±0,04	5.2		1.4	12	
JE-7	8,0	11,0	7,1		0.9		1,5	7		0,8		6.1		1.6	14	
JE-8	9,0	12,0	8,1	+0,09	0.9		1,8	8	-0,15	0,8		6.9	-0.35	1.8	16	
JE-9	10,0	14,0	9,1		0.9		2,0	9		0,8		7.8		2.0	18	
JE-10	11,0	15,0	10,15		1.15		2,0	10		1,0	±0,05	8.7		2.2	20	
JE-12	13,0	18,0	12,15	+0,11	1.15		2,5	12	-0,18	1,0		10.4		2.4	23	
JE-15	16,0	24,0	15,15		1.65	+0,14	3,0	15		1,5	±0,06	13.0	-0.45	2.8	29	±0,3
JE-19	20,0	31,0	19,15	+0,13	1.65		3,5	19		1,5		16.5		4.0	37	
JE-24	25,0	38,0	24,15		2.2		4,0	24	-0,21	2,0	±0,07	20.8	-0,50	5.0	44	

ALL DIMENSIONS IN MILLIMETERS.

***FOR PLATED RINGS, ADD 0.05 TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF 0.005 LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.

HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
JE	0,8-2,5	15N	82.5-86*
	3-9	30N	63-69.5
	10-24	C	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
JE	0,8-2,5	15N	79-82*
	3-9	30N	56.5-62
	10-24	C	37-43

HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
JE	0,8-2,5	15N	82.5-87
	3-9	30N	63-71
	10-24	C	44-53

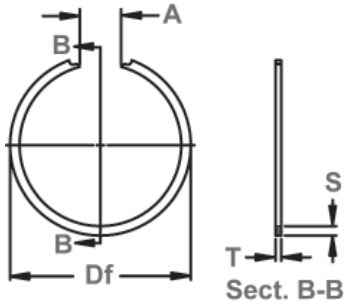
*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

Installation tools can be found at **rotorclip.com/pliers_tools_applicators_kits**

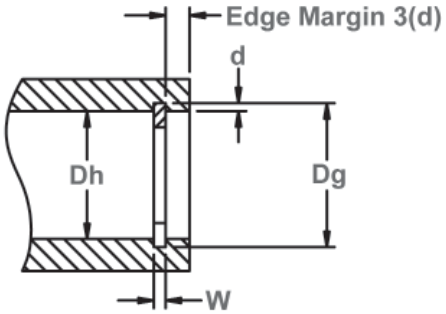
Snap Ring, Internal, Inch

Designed for needle bearings, once installed in the groove of a housing/bore, the portion of the ring protruding from the groove holds an assembly in place.

HN Constant Section Rings



Free Diameter & Ring Measurement with Section B-B



Housing Diameter & Groove Dimensions

Material SAE 1060-1075

RING SIZE	HOUSING DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION		FREE GAP		
	Dh DEC	Dh FRACT.	Dh mm	Dg	TOL.	W	d	Df	TOL.	T ±.002	S	TOL.	A Min	A Max	
HN-112	1.125	1-1/8	28.58	1.181			.028	1.196		.042	.093		.375	.562	1100
HN-125	1.250	1-1/4	31.75	1.310			.030	1.330	+.031	.042	.093	±.003	.375	.562	1360
HN-137	1.375	1- 3/8	34.93	1.435			.030	1.460	-.000	.042	.093		.375	.562	1600
HN-150	1.500	1-1/2	38.10	1.580	±.005		.040	1.600		.042	.125		.375	.562	1900
HN-162	1.625	1-5/8	41.28	1.705		.046	.040	1.725		.042	.125		.437	.750	1930
HN-175	1.750	1-3/4	44.45	1.830		+.003	.040	1.855		.042	.125		.437	.750	1960
HN-187	1.875	1-7/8	47.63	1.965		-.000	.045	1.990		.042	.156		.437	.750	2090
HN-200	2.000	2	50.80	2.090			.045	2.115	+.062	.042	.156		.437	.750	2200
HN-206	2.062	2-1/16	52.37	2.152			.045	2.177	-.000	.042	.156		.437	.750	2340
HN-218	2.187	2-3/16	55.55	2.277			.045	2.302		.042	.156		.437	.750	2700
HN-231	2.312	2-5/16	58.72	2.402			.045	2.432		.042	.156		.437	.750	2900
HN-243	2.437	2-7/16	61.90	2.527			.045	2.557		.042	.156		.437	.750	3000
HN-256	2.562	2-9/16	65.07	2.652			.045	2.682		.042	.156		.437	.750	3200
HN-300	3.000	3	76.20	3.124		.062	.062	3.154		.062	.187	±.005	.562	.938	6250
HN-325	3.250	3-1/4	82.55	3.374	±.006	.068	.062	3.404	+.078	.062	.187		.562	.938	6500
HN-350	3.500	3-1/2	88.90	3.624		+.004	.062	3.654	-.000	.062	.187		.562	.938	6700
HN-375	3.750	3-3/4	95.25	3.874		-.000	.062	3.904		.062	.187		.562	.938	6100
HN-400	4.000	4	101.60	4.125			.062	4.155		.062	.187		.562	.938	7000
HN-425	4.250	4-1/4	107.95	4.394			.072	4.429		.078	.218		.625	1.062	9100
HN-450	4.500	4-1/2	114.30	4.644		.086	.072	4.679		.078	.218		.625	1.062	9400
HN-475	4.750	4-3/4	120.65	4.894		+.005	.072	4.929	+.093	.078	.218		.625	1.062	9200
HN-500	5.000	5	127.00	5.144		-.000	.072	5.184	-.000	.078	.218		.625	1.062	9000
HN-525	5.250	5-1/4	133.35	5.394			.072	5.434		.078	.218		.625	1.062	8800
HN-575	5.750	5-3/4	146.05	5.894	±.007		.072	5.934		.078	.218		.625	1.062	8950
HN-600	6.000	6	152.40	6.160			.080	6.220	+.125	.093	.250		.875	1.437	9000
HN-650	6.500	6-1/2	165.10	6.660		.103	.080	6.730	-.000	.093	.250		.875	1.437	7500
HN-700	7.000	7	177.80	7.160		+.005	.080	7.240		.093	.250		.875	1.437	6200
HN-725	7.250	7-1/4	184.15	7.410	±.008	-.000	.080	7.500	+.187	.093	.250		1.000	1.750	6100
HN-750	7.500	7-1/2	190.50	7.660			.080	7.760	-.000	.093	.250		1.000	1.750	6000
HN-800	8.000	8	203.20	8.160			.080	8.285		.093	.250		1.000	1.750	5700

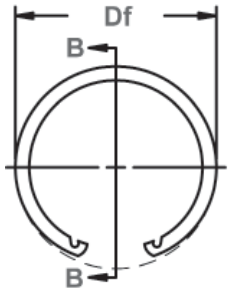
Hardness: All Ring Sizes-HRC 42-52

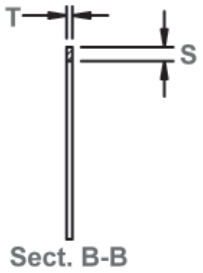
For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)

UHO Constant Section Rings

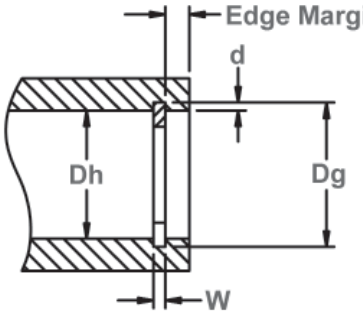
Snap Ring, Internal Notched, Inch

Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove holds an assembly in place.

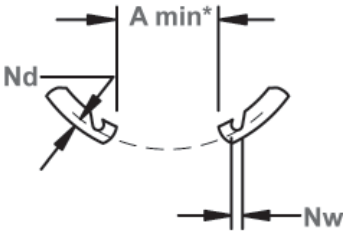




Free Diameter & Ring Measurement With Section B-B



Housing Diameter & Groove Dimensions



*Ring installed in groove

Material SAE 1060-1075

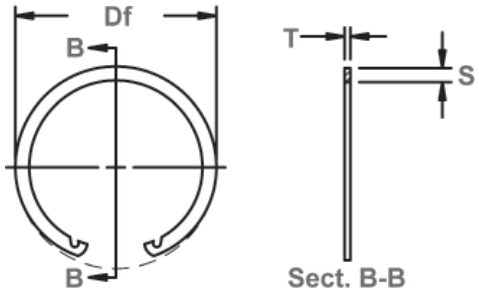
RING SIZE	HOUSING DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION	GAP	NOTCH DIMENSIONS DEPTH	NOTCH DIMENSIONS WIDTH	
	Dh DEC	Dh FRACT.	Dh mm	Dg	TOL.	W	d	Df	TOL.	T +/-.002	S +/-.005	A Min*	Nd +0/-.030	Nw REF	
UHO-175	1.750	1-3/4	44.4	1.858			.054	1.878		.062	.156	.370	.078	.093	4100
UHO-181	1.812	1-13/16	46.0	1.922			.055	1.942		.062	.156	.370	.078	.093	4280
UHO-185	1.850	-	47.0	1.962	+/-.005	.068	.056	1.982		.062	.156	.370	.078	.093	4380
UHO-187	1.875	1-7/8	47.6	1.989		+.004	.057	2.014		.062	.156	.400	.078	.093	4650
UHO-193	1.938	1-15/16	49.2	2.056		-.000	.059	2.081		.062	.156	.400	.078	.093	5000
UHO-200	2.000	2	50.8	2.122			.061	2.147	+.070 -.000	.062	.156	.420	.078	.093	5350
UHO-206	2.047	-	52.0	2.171			.062	2.201		.078	.171	.420	.085	.093	6490
UHO-206	2.062	2-1/16	52.4	2.186			.062	2.201		.078	.171	.450	.085	.093	6490
UHO-212	2.125	2-1/8	54.0	2.251			.063	2.271		.078	.171	.450	.085	.093	6810
UHO-218	2.165	-	55.0	2.295			.065	2.338		.078	.171	.430	.085	.093	7240
UHO-218	2.188	2-3/16	55.6	2.318			.065	2.338		.078	.171	.470	.085	.093	7240
UHO-225	2.250	2-1/4	57.1	2.382		.086	.066	2.402		.078	.171	.450	.085	.093	7560
UHO-231	2.312	2-5/16	58.7	2.450		+.005	.069	2.470		.078	.171	.450	.085	.093	8120
UHO-237	2.375	2-3/8	60.3	2.517		-.000	.071	2.537		.078	.188	.470	.093	.093	8580
UHO-244	2.440	2-7/16	62.0	2.584			.072	2.604		.078	.188	.470	.093	.093	8940
UHO-250	2.500	2-1/2	63.5	2.648			.074	2.673		.078	.188	.470	.093	.093	9410
UHO-253	2.531	2-17/32	64.3	2.681			.075	2.706		.078	.188	.470	.093	.093	9660
UHO-256	2.562	2-9/16	65.1	2.714			.076	2.739		.093	.188	.530	.093	.093	9910
UHO-262	2.625	2-5/8	66.7	2.781	+/-.006		.078	2.806		.093	.188	.530	.093	.093	10420
UHO-268	2.677	-	68.0	2.837			.080	2.868	+.080	.093	.188	.530	.093	.093	10900
UHO-268	2.688	2-11/16	68.3	2.848			.080	2.868	-.000	.093	.188	.560	.093	.093	10900
UHO-275	2.750	2-3/4	69.8	2.914		.103	.082	2.944		.093	.188	.590	.093	.093	11470
UHO-281	2.812	2-13/16	71.4	2.980		+.005	.084	3.025		.093	.188	.590	.093	.093	12200
UHO-281	2.835	-	72.0	3.005		-.000	.085	3.025		.093	.188	.660	.093	.093	12200
UHO-287	2.875	2-7/8	73.0	3.051			.088	3.086		.093	.203	.620	.100	.093	12870
UHO-295	2.953	-	75.0	3.135			.091	3.175		.093	.203	.620	.100	.093	13480
UHO-300	3.000	3	76.2	3.182			.091	3.222		.093	.203	.620	.100	.093	13890
UHO-306	3.062	3-1/16	77.8	3.248			.093	3.288		.109	.218	.650	.109	.125	14490
UHO-312	3.125	3-1/8	79.4	3.315			.095	3.353		.109	.218	.650	.109	.125	15110
UHO-315	3.149	-	80.0	3.341			.096	3.388		.109	.218	.650	.109	.125	15420
UHO-315	3.156	3-5/32	80.2	3.348			.096	3.388	+.100	.109	.218	.680	.109	.125	15420
UHO-325	3.250	3-1/4	82.5	3.446		.120	.098	3.488	-.000	.109	.218	.680	.109	.125	16210
UHO-334	3.346	3-11/32	85.0	3.546		+.005	.100	3.590		.109	.218	.680	.109	.125	17030
UHO-347	3.469	3-15/32	88.1	3.675		-.000	.103	3.721		.109	.234	.710	.120	.125	18190
UHO-350	3.500	3-1/2	88.9	3.710			.105	3.760		.109	.234	.710	.120	.125	18700
UHO-354	3.543	-	90.0	3.755			.106	3.805		.109	.234	.740	.120	.125	19400
UHO-354	3.562	3-9/16	90.5	3.776			.107	3.805		.109	.234	.810	.120	.125	19400

***Installed In Groove.**

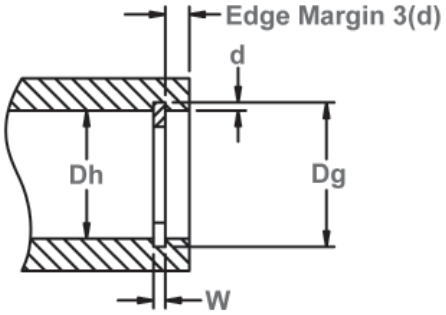
Material: SAE 1060/1075 carbon spring steel

Hardness:	Ring Size	HRc
	175-700	45-52
	725-1000	40-47

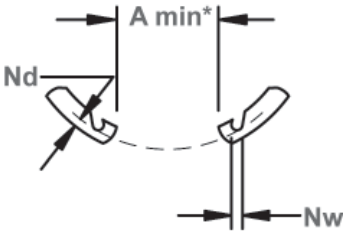
For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)



Free Diameter & Ring
Measurement With Section B-B



Housing Diameter &
Groove Dimensions



*Ring installed in groove

Material SAE 1060-1075

RING SIZE	HOUSING DIAMETER			GROOVE SIZE				RING DIMENSIONS						ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION	GAP	NOTCH DIMENSIONS	
	Dh DEC	Dh FRACT.	Dh mm	Dg	TOL.	W	d	Df	TOL.	T +/-.002	S +/-.005	A Min*	DEPTH Nd +0/-.030	WIDTH Nw REF	
UHO-362	3.625	3-5/8	92.1	3.841			.108	3.895		.109	.234	.740	.120	.125	19930
UHO-375	3.740	-	95.0	3.964			.112	4.030		.109	.250	.740	.125	.125	21380
UHO-375	3.750	3-3/4	95.2	3.974			.112	4.030		.109	.250	.780	.125	.125	21380
UHO-387	3.875	3-7/8	98.4	4.107	+/-.006		.116	4.165	+.100	.109	.250	.780	.125	.125	22880
UHO-393	3.938	3-15/16	100.0	4.174		.120	.118	4.234	-.000	.109	.250	.810	.125	.125	23650
UHO-400	4.000	4	101.6	4.240		+.005	.120	4.300		.109	.250	.810	.125	.125	24430
UHO-412	4.125	4-1/8	104.8	4.365		-.000	.120	4.430		.109	.250	.810	.125	.125	25190
UHO-425	4.250	4-1/4	108.0	4.490			.120	4.555		.109	.250	.810	.125	.125	25960
UHO-433	4.331	-	110.0	4.571			.120	4.641		.109	.250	.810	.125	.125	26450
UHO-450	4.500	4-1/2	114.3	4.740			.120	4.815		.109	.281	.840	.140	.156	27490
UHO-462	4.625	4-5/8	117.5	4.865			.120	4.940		.109	.281	.840	.140	.156	28250
UHO-475	4.724	-	120.0	4.969			.122	5.070		.109	.281	.840	.140	.156	29000
UHO-475	4.750	4-3/4	120.6	4.995			.122	5.070		.109	.281	.910	.140	.156	29000
UHO-500	5.000	5	127.0	5.260			.130	5.340		.109	.281	.930	.140	.156	33100
UHO-525	5.250	5-1/4	133.3	5.520			.135	5.600		.125	.312	1.000	.156	.156	36070
UHO-537	5.375	5-3/8	136.5	5.650		.139	.135	5.735	+.120	.125	.312	1.000	.156	.156	36930
UHO-550	5.500	5-1/2	139.7	5.770	+/-.007	+.006	.135	5.860	-.000	.125	.312	1.000	.156	.156	37790
UHO-575	5.750	5-3/4	146.0	6.020		-.000	.135	6.120		.125	.312	1.000	.156	.156	39500
UHO-600	6.000	6	152.4	6.270			.135	6.380		.125	.312	1.000	.156	.156	41220
UHO-625	6.250	6-1/4	158.7	6.530			.140	6.640		.156	.343	1.030	.171	.156	44530
UHO-650	6.500	6-1/2	165.1	6.790		.174	.145	6.905	+.150	.156	.343	1.090	.171	.156	47970
UHO-662	6.625	6-5/8	168.3	6.925		+.008	.150	7.045	-.000	.156	.343	1.120	.171	.156	50580
UHO-675	6.750	6-3/4	171.4	7.055		-.000	.152	7.180		.156	.343	1.130	.171	.156	52220
UHO-700	7.000	7	177.8	7.315			.157	7.445		.156	.343	1.140	.171	.156	55930
UHO-725	7.250	7-1/4	184.1	7.575			.162	7.705	+.180	.187	.375	1.140	.187	.187	59700
UHO-750	7.500	7-1/2	190.5	7.840	+/-.008		.170	7.975	-.000	.187	.375	1.150	.187	.187	64900
UHO-775	7.750	7-3/4	196.8	8.100			.175	8.240		.187	.375	1.160	.187	.187	68700
UHO-800	8.000	8	203.2	8.360			.180	8.505		.187	.437	1.200	.218	.187	72900
UHO-825	8.250	8-1/4	209.5	8.620		.209	.185	8.770		.187	.437	1.230	.218	.187	77600
UHO-850	8.500	8-1/2	215.9	8.880		+.008	.190	9.035	+.220	.187	.437	1.270	.218	.187	81800
UHO-875	8.750	8-3/4	222.2	9.144		-.000	.197	9.305	-.000	.187	.437	1.320	.218	.187	87300
UHO-900	9.000	9	228.6	9.404			.202	9.564		.187	.437	1.370	.218	.187	92400
UHO-925	9.250	9-1/4	235.0	9.668			.209	9.833		.187	.500	1.400	.250	.187	98000
UHO-950	9.500	9-1/2	241.3	9.930			.215	10.100		.187	.500	1.500	.250	.187	103900
UHO-975	9.750	9-3/4	247.7	10.190			.220	10.365		.187	.500	1.620	.250	.187	10900
UHO-1000	10.000	10	254.0	10.450			.225	10.630		.187	.500	1.750	.250	.187	114600

*Installed In Groove.

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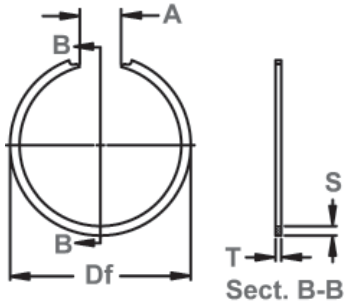
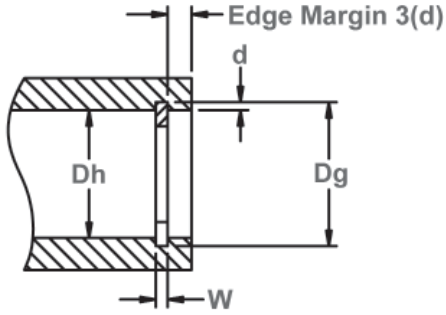
UHB Constant Section

Snap Ring, Internal, Inch

Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove holds an assembly in place.



Free Diameter & Ring Measurement with Section B-B



Housing Diameter & Groove Dimensions

Material SAE 1060-1075

RING SIZE	HOUSING DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION		FREE GAP A		
	Dh DEC	Dh FRACT.	Dh mm	Dg	TOL.	W	d	Df	TOL.	T +/-.002	S	TOL.	Min	Max	
UHB-37	.375	3/8	9.5	0.395		.028	.010	0.400	+.031	.025	.035		.125	.218	250
UHB-43	.438	7/16	11.1	0.462		+.003 -.000	.012	0.467	-.000	.025	.035		.125	.218	300
UHB-50	.500	1/2	12.7	0.524			.012	0.530		.035	.040		.187	.344	470
UHB-51	.512		13.0	0.536		.039	.012	0.542		.035	.040		.187	.344	480
UHB-56	.562	9/16	14.3	0.590		+.003	.014	0.600		.035	.048		.187	.344	510
UHB-62	.625	5/8	15.9	0.657	+/-.003	-.000	.016	0.670	+.025	.035	.048		.187	.344	620
UHB-68	.688	11/16	17.5	0.720			.016	0.733	-.000	.035	.048		.187	.344	700
UHB-75	.750	3/4	19.1	0.786			.018	0.799		.035	.048		.187	.344	750
UHB-77	.777		19.7	0.813			.018	0.827		.042	.062	+/-.003	.187	.344	1020
UHB-81	.812	13/16	20.6	0.852			.020	0.867		.042	.062		.187	.344	1090
UHB-87	.875	7/8	22.2	0.919		.046	.022	0.934		.042	.062		.281	.438	1130
UHB-90	.901		22.9	0.945		+.003	.022	0.961		.042	.078		.281	.438	1260
UHB-93	.938	15/16	23.8	0.986		-.000	.024	1.003		.042	.078		.281	.438	1360
UHB-100	1.000	1	25.4	1.052			.024	1.070		.042	.078		.281	.438	1470
UHB-102	1.023		26.0	1.075			.026	1.094		.042	.093		.281	.438	1500
UHB-106	1.062	1-1/16	27.0	1.114			.026	1.134		.050	.093		.281	.438	1780
UHB-112	1.125	1-1/8	28.6	1.181			.028	1.202	+.031	.050	.093		.375	.562	1880
UHB-118	1.188	1-3/16	30.2	1.248			.030	1.270	-.000	.050	.093		.375	.562	1990
UHB-125	1.250	1-1/4	31.8	1.314			.032	1.337		.050	.109		.375	.562	2090
UHB-131	1.312	1-5/16	33.3	1.380			.034	1.404		.050	.109		.375	.562	2200
UHB-137	1.375	1-3/8	34.9	1.447		.056	.036	1.472		.050	.109		.375	.562	2300
UHB-143	1.438	1-7/16	36.5	1.510		+.003	.036	1.535		.050	.125		.375	.562	2460
UHB-145	1.456	-	36.1	1.532	+/-.005	-.000	.038	1.557		.050	.125		.375	.562	2490
UHB-150	1.500	1-1/2	38.1	1.576			.038	1.607		.050	.125		.375	.562	2560
UHB-156	1.562	1-9/16	39.7	1.642			.040	1.668		.062	.125		.437	.687	3060
UHB-162	1.625	1-5/8	41.3	1.709			.042	1.736		.062	.141	+/-.005	.437	.687	3190
UHB-165	1.653	-	42.0	1.737			.042	1.765		.062	.141		.437	.687	3240
UHB-168	1.688	1-11/16	42.9	1.776		.068	.044	1.804	+.046	.062	.156		.437	.687	3370
UHB-175	1.750	1-3/4	44.4	1.842		+.004	.046	1.870	-.000	.062	.156		.437	.687	3510
UHB-181	1.812	1-13/16	46.0	1.904		-.000	.046	1.933		.062	.156		.437	.687	3640
UHB-185	1.850	-	47.0	1.946			.048	1.975		.062	.156		.437	.687	3710
UHB-187	1.875	1-7/8	47.6	1.971			.048	2.000		.062	.156		.437	.687	3760

Hardness: All Ring Sizes - HRC 42-52

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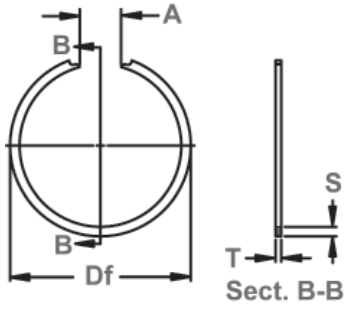
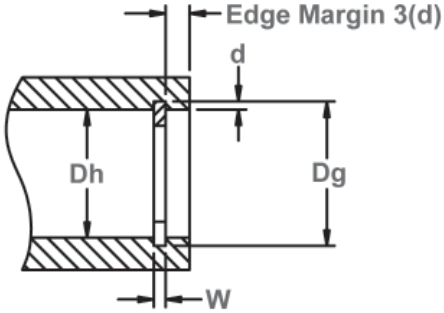


Free Diameter & Ring
Measurement with Section B-B



Housing Diameter &
Groove Dimensions

Material SAE 1060-1075

RING SIZE	HOUSING DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION		FREE GAP A		
	Dh DEC	Dh FRACT.	Dh mm	Dg	TOL.	W	d	Df	TOL.	T +/-.002	S	TOL.	Min	Max	
UHB-193	1.938	1-15/16	49.2	2.038		.068	.050	2.068		.062	.156		.500	.750	3870
UHB-196	1.968	1-31/32	50.0	2.068	+/-.005	+.004	.050	2.098		.062	.156		.500	.750	3935
UHB-200	2.000	2	50.8	2.100		-.000	.050	2.131		.062	.156		.500	.750	4000
UHB-206	2.062	2-1/16	52.4	2.166			.052	2.197		.062	.156		.500	.750	4380
UHB-212	2.125	2-1/8	54.0	2.229			.052	2.260		.078	.156		.500	.750	5140
UHB-218	2.188	2-3/16	55.6	2.296			.054	2.331		.078	.171		.500	.750	5470
UHB-225	2.250	2-1/4	57.1	2.358		.086	.054	2.393	+.046	.078	.171		.500	.750	5630
UHB-231	2.312	2-5/16	58.7	2.424		+.005	.056	2.459	-.000	.078	.171		.500	.750	5790
UHB-237	2.375	2-3/8	60.3	2.487		-.000	.056	2.523		.078	.171		.500	.750	5950
UHB-244	2.440	2-7/16	62.0	2.556	+/-.006		.058	2.592		.078	.187		.500	.750	6270
UHB-250	2.500	2-1/2	63.5	2.616			.058	2.653		.078	.187		.500	.750	6350
UHB-253	2.531	2-17/32	64.3	2.651			.060	2.688		.078	.187		.500	.750	6510
UHB-256	2.562	2-9/16	65.1	2.686			.062	2.726		.093	.187		.562	.812	8400
UHB-262	2.625	2-5/8	66.7	2.750			.062	2.790		.093	.187		.562	.812	8650
UHB-268	2.688	2-11/16	68.3	2.816			.062	2.856		.093	.187	+/-.005	.562	.812	8800
UHB-271	2.717	-	68.8	2.842		.103	.064	2.882		.093	.187		.562	.812	8875
UHB-275	2.750	2-3/4	69.8	2.878		+.005	.064	2.918		.093	.187		.562	.812	8950
UHB-281	2.812	2-13/16	71.4	2.945		-.000	.066	2.985		.093	.187		.625	.875	9100
UHB-283	2.835	-	72.0	2.966			.066	3.006		.093	.187		.625	.875	9250
UHB-287	2.875	2-7/8	73.0	3.011			.068	3.056		.093	.187		.625	.875	9400
UHB-300	3.000	3	76.2	3.136			.068	3.181	+.062	.093	.187		.625	.875	9550
UHB-306	3.062	3-1/16	77.8	3.202			.070	3.247	-.000	.109	.218		.625	.875	10470
UHB-312	3.125	3-1/8	79.4	3.265			.070	3.311		.109	.218		.625	.875	10690
UHB-315	3.156	3-5/32	80.2	3.296			.070	3.342		.109	.218		.625	.875	10800
UHB-325	3.250	3-1/4	82.5	3.394			.072	3.442		.109	.218		.718	1.062	11120
UHB-334	3.346	3-11/32	85.0	3.490	+/-.006	.120	.072	3.539		.109	.218		.718	1.062	11450
UHB-346	3.469	3-15/32	88.1	3.613		+.006	.072	3.663		.109	.218		.718	1.062	11870
UHB-350	3.500	3-1/2	88.9	3.648		-.000	.074	3.700		.109	.250		.718	1.062	11970
UHB-354	3.543	-	90.0	3.691			.074	3.745	+.078	.109	.250		.718	1.062	12120
UHB-356	3.562	3-9/16	90.5	3.710			.074	3.766	-.000	.109	.250		.718	1.062	12190
UHB-362	3.625	3-5/8	92.1	3.773			.074	3.831		.109	.250		.718	1.062	12380
UHB-375	3.750	3-3/4	95.2	3.902			.076	3.962		.109	.250		.718	1.062	12600

Hardness: All Ring Sizes - HRC 42-52

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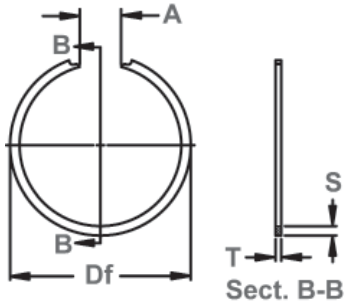
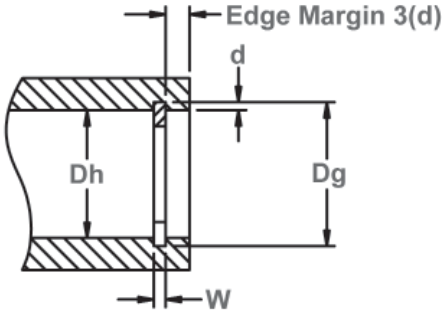
UHB Constant Section

Snap Ring, Internal, Inch

Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove holds an assembly in place.



Free Diameter & Ring Measurement with Section B-B



Housing Diameter & Groove Dimensions

Material SAE 1060-1075

RING SIZE	HOUSING DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION		FREE GAP A		
	Dh DEC	Dh FRACT.	Dh mm	Dg	TOL.	W	d	Df	TOL.	T +/-.002	S	TOL.	Min	Max	
UHB-387	3.875	3-7/8	98.4	4.027			.076	4.089	+.078	.109	.250		.718	1.062	12820
UHB-393	3.938	3-15/16	100.0	4.094			.078	4.156	-.000	.109	.250		.718	1.062	13230
UHB-400	4.000	4	101.6	4.156			.078	4.221		.109	.250		.875	1.312	13690
UHB-412	4.125	4-1/8	104.8	4.285			.080	4.355		.109	.250		.875	1.312	14110
UHB-425	4.250	4-1/4	108.0	4.410	+/-.006	.120	.080	4.485		.109	.250		.875	1.312	14540
UHB-433	4.331	-	110.0	4.490		+.006	.080	4.565	+.093	.109	.250		.875	1.312	14960
UHB-443	4.436	4-7/16	112.7	4.596		-.000	.080	4.670	-.000	.109	.250		.875	1.312	15170
UHB-450	4.500	4-1/2	114.3	4.664			.082	4.744		.109	.250		.875	1.312	15390
UHB-462	4.625	4-5/8	117.5	4.795			.085	4.875		.109	.250		.875	1.312	15830
UHB-475	4.750	4-3/4	120.6	4.926			.088	5.011		.109	.281		.875	1.312	16250
UHB-500	5.000	5	127.0	5.180			.090	5.265		.109	.281		.875	1.312	17110
UHB-525	5.250	5-1/4	133.3	5.435			.092	5.530		.125	.312		1.000	1.500	20590
UHB-537	5.375	5-3/8	136.5	5.565		.139	.095	5.660		.125	.312		1.000	1.500	21110
UHB-550	5.500	5-1/2	139.7	5.696	+/-.007	+.006	.098	5.796	+.125	.125	.312		1.000	1.500	21790
UHB-575	5.750	5-3/4	146.0	5.950		-.000	.100	6.050	-.000	.125	.312	+/-.005	1.000	1.500	22570
UHB-600	6.000	6	152.4	6.204			.102	6.309		.125	.312		1.000	1.500	23550
UHB-625	6.250	6-1/4	158.7	6.458			.104	6.568		.156	.343		1.000	1.500	29420
UHB-650	6.500	6-1/2	165.1	6.712		.174	.106	6.832		.156	.343		1.125	1.812	30610
UHB-662	6.625	6-5/8	168.3	6.845		+.006	.110	6.975	+.156	.156	.343		1.125	1.812	31400
UHB-675	6.750	6-3/4	171.4	6.970		-.000	.110	7.100	-.000	.156	.343		1.125	1.812	32640
UHB-700	7.000	7	177.8	7.220			.110	7.350		.156	.343		1.125	1.812	34850
UHB-725	7.250	7-1/4	184.1	7.500			.125	7.630		.187	.375		1.375	2.250	38060
UHB-750	7.500	7-1/2	190.5	7.750			.125	7.890		.187	.375		1.375	2.250	39450
UHB-800	8.000	8	203.2	8.250	+/-.008		.125	8.400		.187	.375		1.375	2.250	41960
UHB-825	8.250	8-1/4	209.5	8.540		.209	.145	8.665		.187	.437		1.625	2.500	43320
UHB-850	8.500	8-1/2	215.9	8.790		+.006	.145	8.915	+.187	.187	.437		1.625	2.500	44710
UHB-875	8.750	8-3/4	222.2	9.080		-.000	.165	9.205	-.000	.187	.500		1.625	2.500	48900
UHB-900	9.000	9	228.6	9.330			.165	9.455		.187	.500		1.625	2.500	49740
UHB-905	9.250	9-1/4	235.0	9.384			.165	9.509		.187	.500		1.750	2.625	50050
UHB-950	9.500	9-1/2	241.3	9.830			.165	9.955		.187	.500		1.750	2.625	52520
UHB-984	9.750	9-3/4	247.7	10.170			.165	10.295		.187	.500		1.750	2.625	53780
UHB-1000	10.000	10	254.0	10.330			.165	10.455		.187	.500		1.750	2.625	55400

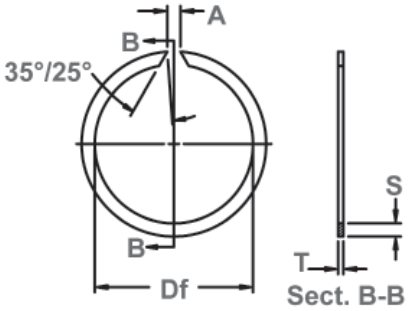
Hardness: All ring sizes - HRC 42-52

For alternate cutoff styles, contact Rotor Clip Technical Sales at 1-800-557-6867 (E-mail: tech@rotorclip.com)

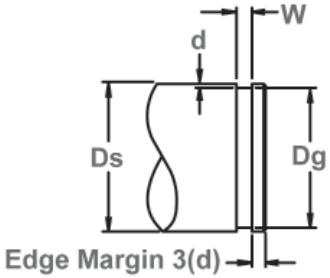
Snap Ring, External, Inch

Once installed in the groove of a shaft, the portion of the ring protruding from the groove holds an assembly in place.

USC Constant Section



Free Diameter & Ring Measure



Shaft Diameter & Groove Dimensions

Material: SAE 1060-1075

RING SIZE	SHAFT DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION		FREE GAP A		
	Ds DEC	Ds FRACT.	Ds mm	Dg	TOL.	W	d	Df	TOL.	T +/-.002	S	TOL.	Min	Max	
USC-31	.312	5/16	7.92	.290			.011	.281		.025	.040		.031	.156	180
USC-34	.344	11/32	8.74	.322			.011	.312	+.000	.025	.040		.031	.156	190
USC-35	.354	-	8.99	.330		.028	.012	.320	-.015	.025	.040		.031	.156	210
USC-37	.375	3/8	9.53	.351		+.003	.012	.341		.025	.040		.031	.156	230
USC-39	.393	-	10.31	.369		-.000	.012	.359		.025	.040		.031	.156	260
USC-40	.406	13/32	11.13	.382			.012	.372	+.000	.025	.040		.031	.156	280
USC-43	.438	7/16	11.91	.412			.013	.402	-.020	.025	.040		.031	.156	300
USC-46	.469	15/32	12.70	.443	+/-.002		.013	.433		.025	.040		.031	.156	320
USC-50	.500	1/2	14.00	.474			.013	.464		.035	.048		.062	.218	460
USC-55	.551	-	14.27	.524		.039	.013	.514		.035	.048		.062	.218	480
USC-56	.562	9/16	15.09	.534		+.003	.014	.524		.035	.048		.062	.218	490
USC-59	.594	19/32	15.88	.566		-.000	.014	.555	+.000	.035	.048		.062	.218	510
USC-62	.625	5/8	17.00	.597			.014	.586	-.025	.035	.062		.062	.218	520
USC-66	.669	-	17.00	.640			.015	.630		.035	.062	+/-.003	.062	.218	570
USC-68	.688	11/16	48.00	.656			.016	.644		.042	.062		.062	.218	700
USC-75	.750	3/4	19.05	.716			.017	.703		.042	.062		.062	.218	820
USC-78	.781	25/32	19.84	.745			.018	.733		.042	.062		.062	.218	950
USC-81	.812	13/16	20.62	.776		.046	.018	.764		.042	.062		.062	.218	1010
USC-87	.875	7/8	22.23	.835		+.003	.020	.820		.042	.078		.093	.250	1100
USC-93	.938	15/16	23.83	.896		-.000	.021	.881		.042	.078		.093	.250	1130
USC-98	.984	63/64	25.00	.940			.022	.925		.042	.078		.093	.250	1170
USC-100	1.000	1	25.40	.956	+/-.003		.022	.941		.042	.093		.156	.312	1200
USC-102	1.023	-	25.98	.977			.023	.962	+.000	.042	.093		.156	.312	1300
USC-106	1.062	1-1/16	26.97	1.016			.023	1.000	-.031	.050	.093		.156	.312	1600
USC-112	1.125	1-1/8	28.58	1.075			.025	1.060		.050	.093		.156	.312	1880
USC-118	1.188	1-3/16	30.18	1.136		.056	.026	1.121		.050	.093		.156	.312	1990
USC-125	1.250	1-1/4	31.75	1.194		+.004	.028	1.179		.050	.093		.156	.312	2090
USC-131	1.312	1-5/16	33.32	1.25		-.000	.031	1.232		.050	.093		.156	.312	2100
USC-137	1.375	1-3/8	34.93	1.309	+/-.004		.033	1.291		.050	.109		.156	.312	2300
USC-143	1.438	1-7/16	36.53	1.370			.034	1.351		.050	.109		.156	.312	2460
USC-150	1.500	1-12	38.10	1.430			.035	1.408		.050	.109		.156	.312	2500

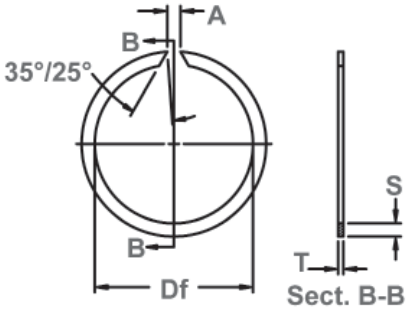
Hardness: All ring sizes - HRC 42-53

For alternate cutoff styles, contact Rotor Clip Technical Sales at 1-800-557-6867 (E-mail: tech@rotorclip.com)

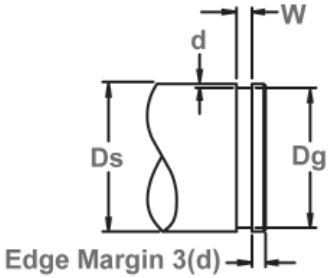
USC Constant Section

Snap Ring, External, Inch

Once installed in the groove of a shaft, the portion of the ring protruding from the groove holds an assembly in place.



Free Diameter & Ring Measure



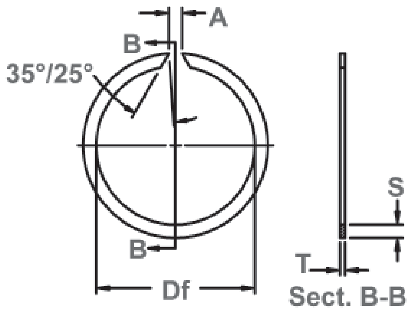
Shaft Diameter & Groove Dimensions

Material: SAE 1060-1075

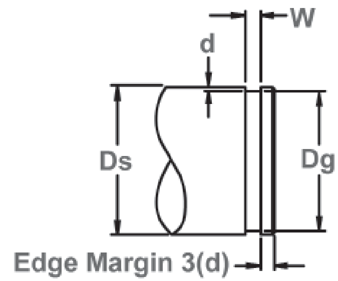
RING SIZE	SHAFT DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION		FREE GAP A		
	Ds DEC	Ds FRACT.	Ds mm	Dg	TOL.	W	d	Df	TOL.	T +/-.002	S +/-.005	TOL.	Min	Max	
USC-156	1.562	1-9/16	39.67	1.490			.036	1.467		.062	.125		.156	.375	3060
USC-162	1.625	1-5/8	41.28	1.551			.037	1.527		.062	.125		.156	.375	3190
USC-168	1.688	1-11/16	42.90	1.611			.038	1.581		.062	.125		.156	.375	3370
USC-175	1.750	1-3/4	44.40	1.670	+/-.004		.04	1.640		.062	.125		.156	.375	3510
USC-177	1.772	-	45.00	1.687		.068	.042	1.657		.062	.141		.156	.375	3550
USC-181	1.812	1-13/16	46.00	1.728		+.004	.042	1.698		.062	.141		.156	.375	3640
USC-187	1.875	1-7/8	47.60	1.789		-.000	.043	1.759		.062	.156		.156	.375	3760
USC-196	1.969	1-31/32	50.00	1.879			.045	1.849		.062	.156		.156	.375	3940
USC-200	2.000	2	50.80	1.910			.045	1.880		.062	.156		.156	.375	4010
USC-206	2.062	2-1/16	52.40	1.966			.048	1.936	+.000	.078	.156		.156	.375	5350
USC-212	2.125	2-1/8	54.00	2.027			.049	1.997	-.046	.078	.156		.156	.375	5470
USC-215	2.156	2-5/32	54.80	2.056			.050	2.026		.078	.156		.156	.375	5680
USC-225	2.250	2-1/4	57.10	2.146			.052	2.116		.078	.156		.156	.375	5790
USC-231	2.312	2-5/16	58.70	2.204		.086	.054	2.174		.078	.187		.156	.375	6300
USC-237	2.375	2-3/8	60.30	2.265		+.005	.055	2.235		.078	.187	+/-.005	.156	.375	6400
USC-243	2.438	2-7/16	61.90	2.325		-.000	.056	2.295		.078	.187		.156	.375	6500
USC-250	2.500	2-1/2	63.50	2.386			.057	2.356		.078	.187		.156	.375	6600
USC-255	2.559	-	65.00	2.443			.058	2.413		.078	.187		.156	.375	6700
USC-262	2.625	2-5/8	66.70	2.505	+/-.006		.060	2.475		.078	.187		.156	.375	6800
USC-268	2.688	2-11/16	68.30	2.565			.061	2.535		.078	.187		.156	.375	6900
USC-275	2.750	2-3/4	69.80	2.624			.063	2.594		.093	.187		.187	.437	8460
USC-287	2.875	2-7/8	73.00	2.743			.066	2.713		.093	.187		.187	.437	8840
USC-293	2.938	2-15/16	74.60	2.801			.068	2.771		.093	.187		.187	.437	9030
USC-300	3.000	3	76.20	2.860		.103	.070	2.830		.093	.218		.187	.437	9230
USC-306	3.062	3-1/16	77.80	2.920		+.005	.071	2.890	+.000	.093	.218		.187	.437	9420
USC-312	3.125	3-1/8	79.40	2.981		-.000	.072	2.951	-.062	.093	.218		.187	.437	9630
USC-315	3.156	3-5/32	80.20	3.010			.073	2.980		.093	.218		.187	.437	9800
USC-325	3.250	3-1/4	82.50	3.100			.075	3.070		.093	.250		.187	.437	10000
USC-334	3.346	3-11/32	85.00	3.190			.077	3.160		.093	.250		.187	.437	10290
USC-343	3.438	3-7/16	87.3	3.281			.078	3.251		.093	.250		.187	.437	10570

Hardness: All ring sizes - HRC 42-53

For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)



Free Diameter &
Ring Measure



Shaft Diameter &
Groove Dimensions

Material: SAE 1060-1075

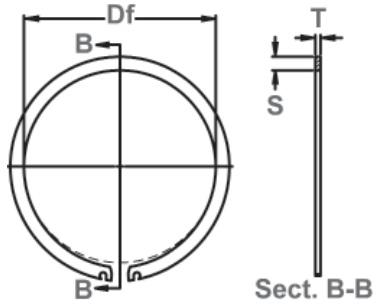
RING SIZE	SHAFT DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION		FREE GAP A		
	Ds DEC	Ds FRACT.	Ds mm	Dg	TOL.	W	d	Df	TOL.	T +/-.002	S +/-.005	TOL.	Min	Max	(Lbs.)
USC-350	3.500	3-1/2	88.9	3.340			.080	3.305		.109	.250		.250	.562	11970
USC-354	3.543	-	90.0	3.381			.081	3.346		.109	.250		.250	.562	12120
USC-362	3.625	3-5/8	92.1	3.458			.083	3.423	+.000	.109	.250		.250	.562	12300
USC-368	3.688	3-11/16	93.7	3.517			.085	3.482	-.078	.109	.250		.250	.562	12600
USC-375	3.750	3-3/4	95.2	3.576			.087	3.541		.109	.250		.250	.562	12800
USC-387	3.875	3-7/8	98.4	3.697		.120	.089	3.657		.109	.281		.250	.562	13200
USC-393	3.938	3-15/16	100.0	3.758		+.005	.090	3.713		.109	.281		.250	.562	13470
USC-400	4.000	4	101.6	3.816		-.000	.092	3.771		.109	.281		.250	.656	13650
USC-425	4.250	4-1/4	108.0	4.066	+/-.006		.092	4.016		.109	.281		.250	.656	15000
USC-437	4.375	4-3/8	111.1	4.191			.092	4.141	+.000	.109	.281		.250	.656	15500
USC-450	4.500	41/2	114.3	4.310			.095	4.255	-.093	.109	.312		.250	.656	16200
USC-475	4.750	4-3/4	120.6	4.550			.100	4.495		.109	.312		.250	.656	16480
USC-500	5.000	5	127.0	4.790			.105	4.730		.109	.312		.250	.656	17110
USC-525	5.250	5-1/4	133.3	5.030			.110	4.970		.125	.375	+/-.005	.250	.750	20590
USC-550	5.500	5-1/2	139.7	5.266		.139	.117	5.206		.125	.375		.250	.750	21790
USC-575	5.750	5-3/4	146.0	5.506		+.006	.122	5.446		.125	.375		.250	.750	23010
USC-590	5.900	-	149.9	5.656		-.000	.122	5.600	+.000	.125	.375		.250	.750	23625
USC-600	6.000	6	152.4	5.746			.127	5.687	-.125	.125	.375		.250	.750	24000
USC-625	6.250	6-1/4	158.7	5.986			.132	5.916		.156	.437		.250	.750	30310
USC-650	6.500	6-1/2	165.1	6.226		.174	.137	6.151		.156	.437		.250	.750	33760
USC-675	6.750	6-3/4	171.4	6.466		+.008	.142	6.386		.156	.437		.250	.750	36840
USC-700	7.000	7	177.8	6.706		-.000	.147	6.621		.156	.437		.250	.750	39920
USC-725	7.250	7-1/4	184.2	6.930			.160	6.840		.187	.500		.250	.875	43100
USC-750	7.500	7-1/2	190.5	7.180	+/-.008		.160	7.090		.187	.500		.250	.875	44500
USC-800	8.000	8	203.2	7.660		.209	.170	7.560		.187	.500		.250	.875	45500
USC-850	8.500	8-1/2	215.9	8.160		+.008	.170	8.050	+.000	.187	.500		.250	.875	46700
USC-900	9.000	9	228.6	8.660		-.000	.170	8.545	-.156	.187	.500		.250	.875	49900
USC-925	9.250	9-1/4	234.9	8.910			.170	8.800		.187	.500		.250	.875	51000
USC-950	9.500	9-1/2	241.3	9.160			.170	9.040		.187	.500		.250	.875	52590
USC-1000	10.000	10	254.0	9.660			.170	9.535		.187	.500		.250	.875	55600

Hardness: All ring sizes - HRC 42-53

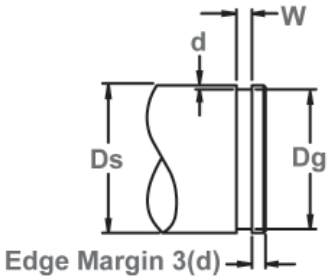
USH Constant Section

Snap Ring, External Notched, Inch

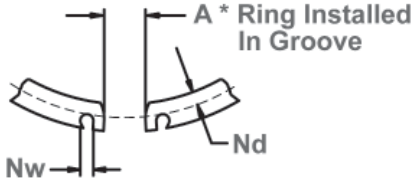
Once installed in the groove of a shaft the portion of the ring protruding from the groove holds an assembly in place.



Free Diameter & Ring Measurements



Shaft Diameter & Groove Dimensions



Material: SAE 1060-1075

RING SIZE	SHAFT DIAMETER			GROOVE SIZE			RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER	WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION	GAP	NOTCH DIMENSIONS		
	Ds DEC	Ds FRACT.	Ds mm	Dg +/-.006	W +.005/-.000	d	Df	TOL.	T +/-.002	S +/-.005	A* +/-1/16	DEPTH Nd +0/-.030	WIDTH Nw REF	
USH-206	2.062	2-1/16	52.4	1.946	.086	.058	1.926		.078	.187	.375	.093	.125	5400
USH-212	2.125	2-1/8	54.0	2.003	.086	.061	1.983		.078	.187	.375	.093	.125	5530
USH-215	2.156	2-5/32	54.8	2.032	.086	.062	2.012		.078	.187	.375	.093	.125	5680
USH-225	2.250	2-1/4	57.1	2.120	.086	.065	2.100		.078	.203	.375	.100	.125	6200
USH-231	2.312	2-5/16	58.7	2.178	.086	.067	2.158	+.000	.078	.203	.375	.100	.125	6580
USH-237	2.375	2-3/8	60.3	2.239	.086	.068	2.219	-.060	.078	.203	.375	.100	.125	6870
USH-243	2.438	2-7/16	61.9	2.299	.086	.069	2.279		.078	.203	.375	.100	.125	7130
USH-250	2.500	2-1/2	63.5	2.360	.086	.070	2.340		.078	.218	.375	.110	.125	7430
USH-255	2.559	-	65.0	2.419	.086	.070	2.399		.078	.218	.375	.110	.125	7590
USH-262	2.625	2-5/8	66.7	2.481	.086	.072	2.461		.078	.218	.375	.110	.125	8020
USH-268	2.688	2-11/16	68.3	2.541	.103	.073	2.521		.078	.218	.375	.110	.125	8320
USH-275	2.750	2-3/4	69.8	2.602	.103	.074	2.577		.093	.218	.500	.110	.125	8650
USH-287	2.875	2-7/8	73.0	2.721	.103	.077	2.696		.093	.218	.500	.110	.125	9330
USH-293	2.938	2-15/16	74.6	2.779	.103	.079	2.754		.093	.218	.500	.110	.125	9840
USH-300	3.000	3	76.2	2.838	.103	.081	2.813		.093	.218	.500	.110	.125	10310
USH-306	3.062	3-1/16	77.8	2.898	.103	.082	2.873	+.000	.093	.218	.500	.110	.125	10530
USH-312	3.125	3-1/8	79.4	2.957	.103	.084	2.932	-.080	.093	.218	.500	.110	.125	11170
USH-315	3.156	3-5/32	80.2	2.986	.103	.085	2.961		.093	.250	.500	.125	.125	11370
USH-325	3.250	3-1/4	82.5	3.076	.103	.087	3.051		.093	.250	.500	.125	.125	12000
USH-334	3.346	3-11/32	85.0	3.166	.103	.090	3.141		.093	.250	.500	.125	.125	12810
USH-343	3.438	3-7/16	87.3	3.257	.103	.090	3.232		.093	.250	.500	.125	.125	13100
USH-350	3.500	3-1/2	88.9	3.316	.120	.092	3.286		.109	.250	.500	.125	.125	13640
USH-354	3.543	-	90.0	3.357	.120	.093	3.327		.109	.250	.500	.125	.125	14000
USH-362	3.625	3-5/8	92.1	3.435	.120	.095	3.405		.109	.250	.500	.125	.125	14580
USH-368	3.688	3-11/16	93.7	3.493	.120	.097	3.463		.109	.250	.500	.125	.125	14650
USH-375	3.750	3-3/4	95.2	3.552	.120	.099	3.522		.109	.281	.562	.150	.125	15800
USH-387	3.875	3-7/8	98.4	3.673	.120	.101	3.643		.109	.281	.562	.150	.125	16600
USH-393	3.938	3-15/16	100.0	3.734	.120	.102	3.704		.109	.281	.562	.150	.125	17040
USH-400	4.000	4	101.6	3.792	.120	.104	3.762	+.000	.109	.281	.562	.150	.125	17640
USH-425	4.250	4-1/4	108.0	4.065	.120	.092	4.025	-.093	.109	.281	.625	.150	.125	16600
USH-437	4.375	4-3/8	111.1	4.190	.120	.092	4.150		.109	.281	.625	.150	.125	17100
USH-450	4.500	41/2	114.3	4.310	.120	.095	4.270		.109	.312	.625	.180	.125	18230
USH-475	4.750	4-3/4	120.6	4.550	.120	.100	4.510		.109	.312	.625	.180	.125	19160
USH-500	5.000	5	127.0	4.790	.120	.105	4.750		.109	.312	.625	.180	.125	22280

*Installed In Groove.

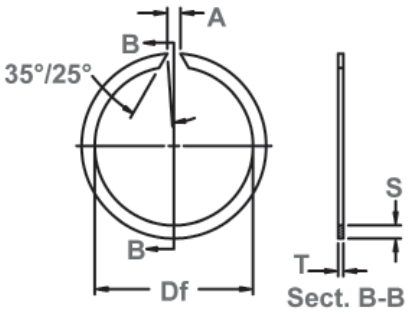
Hardness: All Ring Sizes - HRC 47-53

For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)

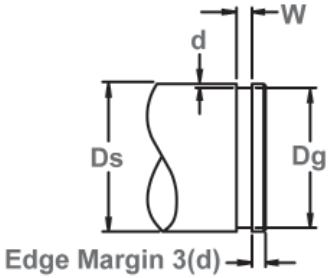
Snap Ring, External, Inch

A light-duty ring designed for needle bearings, once installed in the groove of a shaft the portion of the ring protruding from the groove holds an assembly in place.

SNL Constant Section



Free Diameter & Ring Measurements



Shaft Diameter & Groove Dimensions

Material: SAE 1060-1075

RING SIZE	SHAFT DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION		FREE GAP		
	Ds DEC	Ds FRACT.	Ds mm	Dg	TOL.	W	d	Df	TOL.	T ±.002	S	TOL.	A min	A Max	
SNL-50	.500	1/2	12.7	.474		.039	.013	.465	+.000	.035	.048		.062	.218	460
SNL-62	.625	5/8	15.88	.597	±.002	+.003 -.000	.014	.587	-.025	.035	.062		.062	.218	520
SNL-75	.750	3/4	19.05	.716			.017	.704		.042	.078	±.003	.062	.218	900
SNL-87	.875	7/8	22.23	.833			.021	.823		.042	.093		.125	.281	1100
SNL-100	1.000	1	25.40	.954	±.003		.023	.944		.042	.093		.125	.281	1200
SNL-112	1.125	1-1/8	25.58	1.077			.024	1.065		.042	.125		.125	.281	1600
SNL-118	1.187	1-3/16	30.15	1.135			.026	1.120	+.000	.042	.125		.125	.281	1700
SNL-125	1.250	1-1/4	31.75	1.194			.028	1.179	-.031	.042	.125		.125	.281	1800
SNL-131	1.312	1-5/16	33.32	1.252		.046	.030	1.232		.042	.125		.125	.281	1900
SNL-137	1.375	1-3/8	34.93	1.309		+.003	.033	1.289		.042	.125		.125	.281	2010
SNL-143	1.437	1-7/16	36.50	1.369	±.004	-.000	.034	1.349		.042	.125		.125	.281	2120
SNL-150	1.500	1-1/2	38.10	1.430			.035	1.410		.042	.125		.125	.281	2260
SNL-162	1.625	1-5/8	41.28	1.545			.040	1.520		.042	.156		.156	.437	2800
SNL-168	1.687	1 -11/16	42.85	1.607			.040	1.582		.042	.156		.156	.437	2900
SNL-175	1.750	1-3/4	44.45	1.670			.040	1.645		.042	.156		.156	.437	3000
SNL-193	1.937	1-15/16	49.20	1.857			.040	1.832	+.000	.042	.156	±.005	.156	.437	3100
SNL-200	2.000	2	50.80	1.920			.040	1.895	-.062	.042	.156		.156	.437	3200
SNL-218	2.187	2-3/16	55.55	2.107			.040	2.082		.042	.156		.156	.437	3400
SNL-225	2.250	2-1/4	57.15	2.170			.040	2.145		.042	.156		.156	.437	3500
SNL-237	2.375	2-3/8	60.33	2.295			.040	2.270		.042	.156		.156	.437	3600
SNL-250	2.500	2-1/2	63.50	2.420			.040	2.390		.042	.156		.156	.437	3650
SNL-275	2.750	2-3/4	69.85	2.626			.062	2.596		.062	.187		.156	.468	5790
SNL-293	2.937	2-15/16	74.60	2.813			.062	2.783		.062	.187		.156	.468	6150
SNL-300	3.000	3	76.20	2.876	±.006	.068	.062	2.846	+.000	.062	.187		.156	.468	6250
SNL-312	3.125	3-1/8	79.38	3.000		+.004	.062	2.965	-.078	.062	.187		.156	.468	6400
SNL-325	3.250	3-1/4	82.55	3.125		-.000	.062	3.090		.062	.187		.156	.468	6500
SNL-337	3.375	3-3/8	85.73	3.250			.062	3.215		.062	.187		.156	.468	6600
SNL-350	3.500	3-1/2	88.90	3.375			.062	3.340		.062	.187		.156	.468	6700
SNL-375	3.750	3-3/4	95.25	3.610			.070	3.570		.078	.218		.187	.562	8800
SNL-400	4.000	4	101.60	3.860		.086	.070	3.820		.078	.218		.187	.562	9000
SNL-425	4.250	4-1/4	107.95	4.110		+.005	.070	4.070	+.000	.078	.218		.187	.562	9200
SNL-450	4.500	4-1/2	114.30	4.360		-.000	.070	4.320	-.093	.078	.218		.187	.562	9400
SNL-475	4.750	4-3/4	120.65	4.610			.070	4.560		.078	.218		.187	.562	9200
SNL-500	5.000	5	127.00	4.860			.070	4.800		.078	.218		.187	.562	9000
SNL-550	5.500	5-1/2	139.70	5.340		.103	.080	5.280		.093	.250		.218	.750	13000
SNL-600	6.000	6	152.40	5.840		+.005	.080	5.775	+.000	.093	.250		.218	.750	9000
SNL-650	6.500	6-1/2	165.10	6.340		-.000	.080	6.270	-.125	.093	.250		.218	.750	7500
SNL-700	7.000	7	177.80	6.840	±.008		.080	6.765		.093	.250		.218	.750	6100
SNL-750	7.500	7-1/2	190.50	7.320		.120	.090	7.245	+.000	.109	.281		.218	.812	
SNL-800	8.000	8	203.24	7.820		+.005 -.000'	.090	7.740	-.156	.109	.281		.218	.812	

Hardness: All Ring Sizes - HRC 42-52

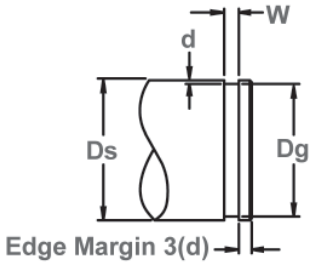
For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)

SLC/SLO SHC/SHO Constant Section

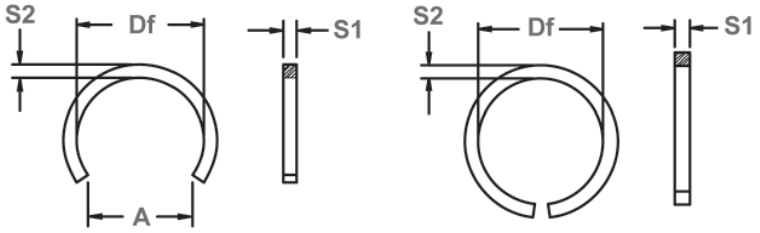
Snap Ring, External, Inch

Square Section.

Once installed in the groove of a shaft the portion of the ring protruding from the groove holds an assembly in place.



Shaft Diameter & Groove Dimensions



Free Diameter & Ring Measurements

Material: SAE 1060-1075

RING NUMBER		SHAFT DIAMETER		GROOVE DIMENSIONS				RING DIMENSIONS					
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		SECTION			FREE GAP
CLOSED*	OPEN*	Ds DEC	Ds mm	Dg	TOL.	W ±.002	d	Df	TOL.	S1	TOL.	S2±.005	A Max.
SHC-25	SH0-25	.250	6.35	.234		.036	.008	.230		.031		.031	.210
SLC-31	SL0-31	.312	7.92	.296		.036	.008	.290	+.000	.031		.031	.260
SHC-31	SH0-31	.312	7.92	.292		.045	.010	.287	-.020	.039		.039	.260
SLC-37	SL0-37	.375	9.53	.357		.041	.009	.350		.035		.035	.315
SHC-37	SH0-37	.375	9.53	.351	+.003	.052	.012	.344		.046		.046	.310
SLC-43	SL0-43	.437	11.10	.417	-.000	.045	.001	.410		.039		.039	.370
SHC-43	SH0-43	.437	11.10	.409		.062	.014	.403		.055		.055	.360
SLC-50	SL0-50	.500	12.70	.476		.052	.012	.469		.046		.046	.420
SHC-50	SH0-50	.500	12.70	.468		.069	.016	.461		.062		.062	.410
SLC-56	SL0-56	.562	14.27	.530		.069	.016	.523		.062		.062	.470
SHC-56	SH0-56	.562	14.27	.526		.078	.018	.519	+.000	.071		.071	.465
SLC-62	SL0-62	.625	15.88	.597		.062	.014	.590	-.025	.055		.055	.525
SHC-62	SH0-62	.625	15.88	.585		.085	.020	.578		.078		.078	.515
SLC-68	SL0-68	.687	17.45	.659		.062	.014	.652		.055	±.002	.055	.580
SHC-68	SH0-68	.687	17.45	.647		.085	.020	.640		.078		.078	.570
SLC-75	SL0-75	.750	19.05	.718		.069	.016	.711		.062		.062	.630
SHC-75	SH0-75	.750	19.05	.704		.100	.023	.694		.093		.093	.625
SLC-81	SL0-81	.812	20.62	.780		.069	.016	.773		.062		.062	.690
SHC-81	SH0-81	.812	20.62	.766		.100	.023	.759		.093		.093	.675
SLC-87	SL0-87	.875	22.23	.839		.078	.018	.831		.071		.071	.735
SHC-87	SH0-87	.875	22.23	.821		.117	.027	.813		.109		.109	.725
SLC-93	SL0-93	.937	23.80	.901		.078	.018	.893		.071		.071	.790
SHC-93	SH0-93	.937	23.80	.883		.117	.027	.875	+.000	.109		.109	.775
SLC-100	SLC-100	1.000	25.40	.960		.085	.020	.950	-.035	.078		.078	.850
SHC-100	SHC-100	1.000	25.40	.938	±.003	.133	.031	.928		.125		.125	.825
SLC-106	SL0-106	1.062	26.97	1.022		.085	.020	1.012		.078		.078	.895
SHC-106	SH0-106	1.062	26.97	1.000		.133	.031	.990		.125		.125	.880
SLC-112	SL0-112	1.125	28.58	1.079		.100	.023	1.068		.093		.093	.950
SHC-112	SH0-112	1.125	28.58	1.055		.148	.035	1.044		.140		.140	.930
SLC-118	SL0-118	1.187	30.15	1.141		.100	.023	1.130		.093		.093	1.000
SHC-118	SH0-118	1.187	30.15	1.117		.148	.035	1.106		.140		.140	.980
SLC-125	SL0-125	1.250	31.75	1.196		.117	.027	1.184		.109		.109	1.050
SHC-125	SH0-125	1.250	31.75	1.172		.164	.039	1.160		.156	±.003	.156	1.030
SLC-131	SL0-131	1.312	33.32	1.258		.117	.027	1.246		.109	±.002	.109	1.100
SHC-131	SH0-131	1.312	33.32	1.234		.164	.039	1.222	+.000	.156	±.003	.156	1.085
SLC-137	SL0-137	1.375	34.93	1.315		.128	.030	1.304	-.046	.120	±.002	.120	1.150
SHC-137	SH0-137	1.375	34.93	1.289		.180	.043	1.276		.172	±.003	.172	1.125
SLC-143	SL0-143	1.437	36.50	1.377		.128	.030	1.364		.120	±.002	.120	1.205
SHC-143	SH0-143	1.437	36.50	1.351		.018	.043	1.338		.172	±.003	.172	1.180
SLC-150	SL0-150	1.500	38.10	1.438		.133	.031	1.424		.125	±.002	.125	1.260
SHC-150	SH0-150	1.500	38.10	1.406		.195	.047	1.392	+.000	.187	±.003	.187	1.245
SLC-162	SL0-162	1.625	41.28	1.563		.133	.031	1.547	-.062	.125	±.002	.125	1.375
SHC-162	SH0-162	1.625	41.28	1.531		.195	.047	1.516		.187	±.003	.187	1.350
SLC-175	SL0-175	1.750	44.45	1.672		.164	.039	1.657		.156		.156	1.475

*NOTE: H=HEAVY; L=LIGHT

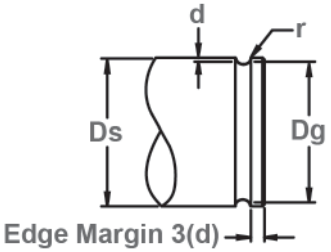
Hardness: All Ring Sizes - 46-53

Snap Ring, External, Inch

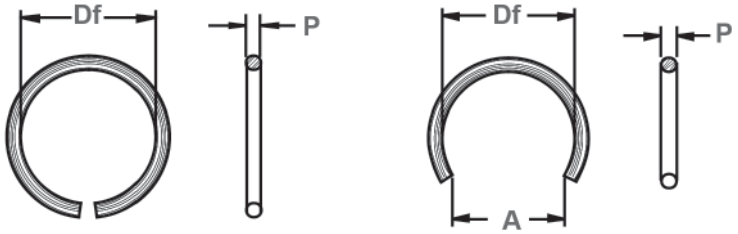
Round Section.

Once installed in the groove of a shaft the portion of the ring protruding from the groove holds an assembly in place.

RLC/RLO
RHC/RHO Constant Section



Shaft Diameter & Groove Dimensions



Free Diameter & Ring Measurement

RING NUMBER		SHAFT DIAMETER		GROOVE SIZE				RING DIMENSIONS			
				DIAMETER		RADIUS	DEPTH	FREE DIAMETER		SECTION	FREE GAP
CLOSED*	OPEN*	Ds DEC	Ds mm	Dg	TOL.	r +.002/-.000	d	Df	TOL.	P	A Max.
RHC-25	RHO-25	.250	6.35	.234		.016	.008	.228		.029	.205
RHC-31	RHO-31	.312	7.92	.290		.019	.011	.284	-.020	.035	.255
RLC-37	RLO-37	.375	9.53	.357	+.003	.016	.009	.351		.029	.325
RHC-37	RHO-37	.375	9.53	.349	-.000	.023	.013	.343		.043	.305
RLC-43	RLO-43	.437	11.10	.415		.019	.011	.409		.035	.365
RHC-43	RHO-43	.437	11.10	.405		.027	.016	.399		.051	.355
RLC-50	RLO-50	.500	12.70	.474		.023	.013	.468		.043	.415
RHC-50	RHO-50	.500	12.70	.464		.031	.018	.458	+.000	.059	.405
RLC-56	RLO-56	.562	14.27	.534		.024	.014	.528	-.025	.045	.470
RHC-56	RHO-56	.562	14.27	.524		.031	.019	.518		.059	.460
RLC-62	RLO-62	.625	15.88	.593		.027	.016	.587		.051	.520
RHC-62	RHO-62	.625	15.88	.581		.037	.022	.575		.071	.510
RLC-68	RLO-68	.687	17.45	.655		.027	.016	.649		.051	.575
RHC-68	RHO-68	.687	17.45	.643		.037	.022	.637		.071	.565
RLC-75	RLO-75	.750	19.05	.714		.031	.018	.706		.059	.625
RHC-75	RHO-75	.750	19.05	.698		.044	.026	.690		.085	.610
RLC-81	RLO-81	.812	20.62	.776		.031	.018	.768		.059	.680
RHC-81	RHO-81	.812	20.62	.760		.044	.026	.752		.085	.665
RLC-87	RLO-87	.875	22.23	.831		.037	.022	.823		.071	.730
RHC-87	RHO-87	.875	22.23	.813		.051	.031	.805	+.000	.100	.710
RLC-93	RLO-93	.937	23.80	.893		.037	.022	.885	-.035	.071	.780
RHC-93	RHO-93	.937	23.80	.875		.051	.031	.867		.100	.765
RLC-100	RLO-100	1.000	25.40	.948		.044	.026	.938		.085	.830
RHC-100	RHO-100	1.000	25.40	.926		.060	.037	.916		.118	.810
RLC-106	RLO-106	1.062	26.97	1.010		.044	.026	1.000		.085	.885
RHC-106	RHO-106	1.062	26.97	.988		.060	.037	.979		.118	.865
RLC-112	RLO-112	1.125	28.58	1.063	±.003	.051	.031	1.051		.100	.930
RHC-112	RHO-112	1.125	28.58	1.045		.066	.040	1.034		.130	.915
RLC-118	RLO-118	1.187	30.15	1.125		.051	.031	1.114		.100	.985
RHC-118	RHO-118	1.187	30.15	1.107		.066	.040	1.096		.130	.970
RLC-125	RLO-125	1.250	31.75	1.176		.060	.037	1.164		.118	1.030
RHC-125	RHO-125	1.250	31.75	1.162		.071	.044	1.150		.140	1.015
RLC-131	RLO-131	1.312	33.32	1.238		.060	.037	1.226		.118	1.085
RHC-131	RHO-131	1.312	33.32	1.224		.071	.044	1.212	+.000	.140	1.070
RLC-137	RLO-137	1.375	34.93	1.295		.066	.040	1.281	-.046	.130	1.130
RHC-137	RHO-137	1.375	34.93	1.277		.079	.049	1.263		.156	1.120
RLC-143	RLO-143	1.437	36.50	1.357		.066	.040	1.344		.130	1.185
RHC-143	RHO-143	1.437	36.50	1.339		.079	.049	1.326		.156	1.170
RLC-150	RLO-150	1.500	38.10	1.412		.071	.044	1.398		.140	1.235
RHC-150	RHO-150	1.500	38.10	1.392		.087	.054	1.378	+.000	.172	1.215
RLC-162	RLO-162	1.625	41.28	1.537		.071	.044	1.522	-.062	.140	1.345
RHC-162	RHO-162	1.625	41.28	1.517		.087	.054	1.502		.172	1.325
RLC-175	RLO-175	1.750	44.45	1.642		.087	.054	1.626		.172	1.435

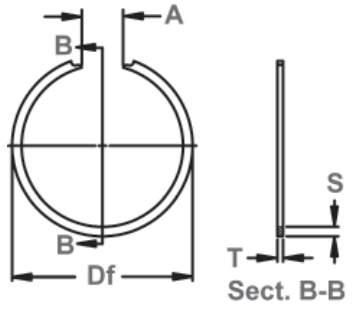
*NOTE: H=HEAVY; L=LIGHT
Hardness: All Ring Sizes - HRC 46-53

HBL/HBM/HBH
Constant Section

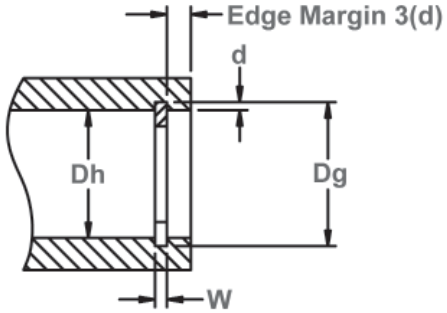
Snap Ring, Internal, Metric

Designed for SAE Standard Metric Bearings.

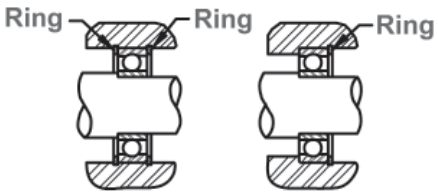
Once installed in the groove of a housing/bore the portion of the ring protruding from the groove holds an assembly in place.



Free Diameter & Ring Measurement with Section B-B



Housing Diameter & Groove Dimensions



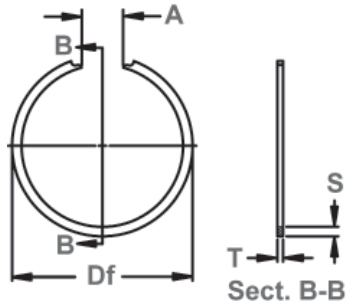
Ring Depicted retaining outer race of bearing in two directions (left) and in one direction (right).

Material: SAE 1060-1075

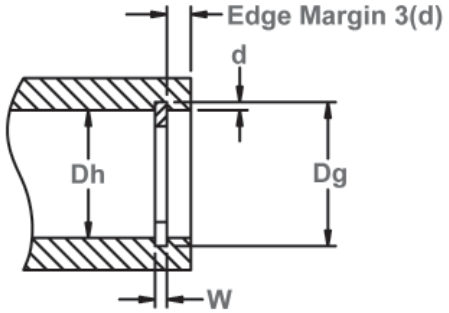
RING NUMBER	BEARING NUMBER			HOUSING DIAMETER		GROOVE SIZE					RING DIMENESIONS					
						DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS	SECTION		GAP AT MIN. FREE O.D.
	LIGHT	MED.	HEAVY	Dh DEC	Dh mm	Dg	TOL.	W	TOL.	d	Df	TOL.	T ±.002	S	TOL.	
HBL-30	200			1.1811	29.93	1.243		.035		.031	1.265		.031	.100	±.003	
HBM-30				1.1811	29.93	1.253		.046		.036	1.265		.042	.125	±.005	
HBH-30				1.1811	29.93	1.251		.068		.035	1.271		.062	.109	±.003	
HBL-32	201			1.2598	31.93	1.321		.035		.031	1.349	+.031	.031	.100		.375
HBM-32				1.2598	31.93	1.331		.046		.036	1.343	-.000	.042	.125	±.005	+.080
HBH-32				1.2598	31.93	1.329		.068		.035	1.365		.062	.109	±.003	-.000
HBL-35	202			1.3780	34.92	1.440		.035		.031	1.468		.031	.100		
HBM-35		300		1.3780	34.92	1.450		.046		.036	1.468		.042	.125	±.005	
HBH-35				1.3780	34.92	1.458		.068		.040	1.486		.062	.140		
HBL-37				1.4567	36.92	1.518	±.005	.035		.031	1.546		.031	.100	±.003	
HBM-37		301		1.4567	36.92	1.528		.046		.036	1.546		.042	.125		
HBH-37				1.4567	36.92	1.536		.068		.040	1.564		.062	.140		
HBL-40	203			1.5748	39.91	1.654		.046		.040	1.687		.042	.125		
HBM-40				1.5748	39.91	1.668		.046		.047	1.703		.042	.156		
HBH-40				1.5748	39.91	1.668		.068		.047	1.703		.062	.156		
HBL-42				1.6535	41.90	1.733		.046		.040	1.765		.042	.125		
HBM-42		302		1.6535	41.90	1.747		.046		.047	1.781	+.046	.042	.156		.437
HBH-42				1.6535	41.90	1.747		.062		.047	1.781	-.000	.062	.156		+.093
HBL-47	204			1.8504	46.89	1.930		.046		.040	1.968		.042	.125		-.000
HBM-47		303		1.8504	46.89	1.944		.046		.047	1.968		.042	.156		
HBH-47				1.8504	46.89	1.951		.068		.050	1.976		.062	.172		
HBL-52	205			2.0472	51.88	2.137		.046	+.004	.045	2.171		.042	.156		
HBM-52		304		2.0472	51.88	2.141		.046	-.000	.047	2.171		.042	.156		
HBH-52				2.0472	51.88	2.148		.068		.050	2.179		.062	.172		
HBL-62	206			2.4409	61.86	2.530		.068		.045	2.562		.062	.156	±.005	
HBM-62		305		2.4409	61.86	2.544		.068		.052	2.562		.062	.156		
HBH-62			403	2.4409	61.86	2.565		.103		.062	2.593		.093	.187		
HBL-72	207			2.8346	71.83	2.934	±.006	.068		.050	2.968		.062	.156		
HBM-72		306		2.8346	71.83	2.959		.068		.062	2.984		.062	.187		
HBH-72			404	2.8346	71.83	2.959		.103		.062	3.000		.093	.187		.562
HBL-80	208			3.1496	79.82	3.249		.068		.050	3.281	+.062	.062	.156		+.093
HBM-80		307		3.1496	79.82	3.274		.068		.062	3.296	-.000	.062	.187		-.000
HBH-80			405	3.1496	79.82	3.274		.103		.062	3.312		.093	.218		
HBL-85	209			3.3465	84.81	3.446		.068		.050	3.484		.062	.156		
HBM-85				3.3465	84.81	3.471		.068		.062	3.500		.062	.187		
HBH-85				3.3465	84.81	3.471		.103		.062	3.500		.093	.218		

Hardness: All Ring Sizes - HRC 42-52

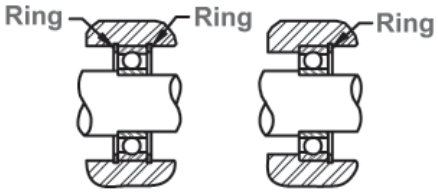
For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)



Free Diameter & Ring Measurement with Section B-B



Housing Diameter & Groove Dimensions



Ring Depicted retaining outer race of bearing in two directions (left) and in one direction (right).

Material: SAE 1060-1075

RING NUMBER	BEARING NUMBER			HOUSING DIAMETER		GROOVE SIZE					RING DIMENESIONS					
						DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS	SECTION		GAP AT MIN. FREE O.D.
	LIGHT	MED.	HEAVY	Dh DEC	Dh mm	Dg	TOL.	W	TOL.	d	Df	TOL.	T ±.002	S	TOL.	
HBL-90	210			3.5433	89.79	3.643		.103		.050	3.687		.093	.156		
HBM-90		308		3.5433	89.79	3.668		.103		.062	3.703		.093	.187		
HBH-90			406	3.5433	89.79	3.713		.139		.085	3.750		.125	.250		
HBL-100	211			3.9370	100.00	4.062		.103		.062	4.093		.093	.187		.687 +.093 -.000
HBM-100		309		3.9370	100.00	4.107		.103		.085	4.140		.093	.250		
HBH-100			407	3.9370	100.00	4.107		.139		.085	4.140		.125	.250		
HBL-110	212			4.3307	110.00	4.455	±.006	.103		.062	4.500	+.093	.093	.187		
HBM-110		310		4.3307	110.00	4.500		.103		.085	4.531	-.000	.093	.250		
HBH-110			408	4.3307	110.00	4.500		.139		.085	4.531		.125	.250		
HBL-120	213			4.7244	120.00	4.884		.120		.080	4.937		.109	.250		
HBM-120		311		4.7244	120.00	4.912		.120		.094	4.953		.109	.281		
HBH-120			409	4.7244	120.00	4.894		.139		.085	4.937		.125	.250		
HBL-125	214			4.9213	125.00	5.081		.120		.080	5.125		.109	.250		
HBM-125				4.9213	125.00	5.109		.120		.094	5.156		.109	.281		
HBH-125				4.9213	125.00	5.121		.174	+.004 -.000	.100	5.151		.156	.312	±.005	
HBL-130	215			5.1181	130.00	5.278		.120		.080	5.312		.109	.250		.875 +.125 -.000
HBM-130		312		5.1181	130.00	5.306		.120		.094	5.343		.109	.281		
HBH-130			410	5.1181	130.00	5.318		.174		.100	5.355		.156	.312		
HBL-140	216			5.5118	140.00	5.671		.120		.080	5.703		.109	.250		
HBM-140		313		5.5118	140.00	5.699		.120		.094	5.750	+.125	.109	.281		
HBH-140			411	5.5118	140.00	5.711	±.007	.174		.100	5.750	-.000	.156	.312		
HBL-150	217			5.9055	150.00	6.065		.120		.080	6.093		.109	.250		
HBM-150		314		5.9055	150.00	6.093		.120		.094	6.125		.109	.281		
HBH-150			412	5.9055	150.00	6.105		.174		.100	6.156		.156	.312		
HBL-160	218			6.2992	160.00	6.459		.120		.080	6.500		.109	.250		
HBM-160		315		6.2992	160.00	6.497		.120		.094	6.550		.109	.281		
HBH-160			413	6.2992	160.00	6.500		.174		.100	6.550		.156	.312		
HBL-170	219			6.6929	170.00	6.892		.139		.100	6.937		.125	.312		
HBM-170		316		6.6929	170.00	6.942		.139		.125	6.982		.125	.375		
HBH-170				6.6929	170.00	6.892		.174		.100	6.937		.156	.312		
HBL-180	220			7.0866	180.00	7.286		.139		.100	7.343		.125	.312		
HBM-180		317		7.0866	180.00	7.336		.139		.125	7.380	+.187	.125	.375		1.125 +.187 -.000
HBH-180			414	7.0866	180.00	7.336	±.008	.209		.125	7.381	-.000	.187	.375		
HBL-190	221			7.4803	190.00	7.680		.139		.100	7.718		.125	.312		
HBM-190		318		7.4803	190.00	7.730		.139		.125	7.781		.125	.375		
HBH-190				7.4803	190.00	7.730		.209		.125	7.782		.187	.375		
HBL-200	222			7.8740	200.00	8.074		.139		.100	8.125		.125	.312		
HBM-200		319		7.8740	200.00	8.125		.139		.125	8.187		.125	.375		
HBH-200			416	7.8740	200.00	8.125		.209		.125	8.187		.187	.375		

Hardness: All Ring Sizes - HRC 42-52

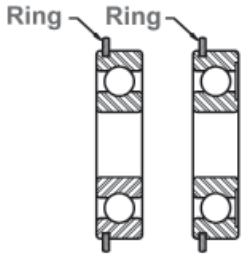
For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)

SR Constant Section

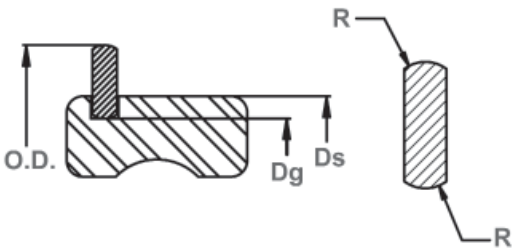
Snap Ring, External, Metric

For Grooves in Outer Tracks of Ball or Roller Bearings.

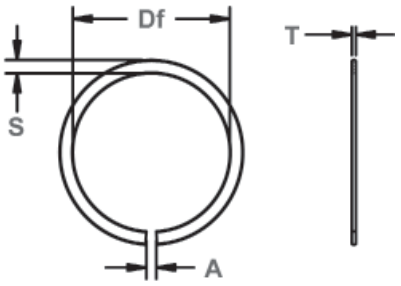
Once installed in the groove of a shaft, the portion of the ring protruding from the groove holds an assembly in place.



Open and shielded type bearings- Typical way of using retaining rings to retain bearings.



Shaft Diameter & Groove Dimensions



Free Diameter & Ring Measurement

Material: SAE 1065

RING NUMBER	SHAFT DIAMETER		BEARING NUMBER				GROOVE SIZE			RING DIMENSIONS								WEIGHT PER M (lbs.)
							DIAMETER		ASSEMBLED O.D.	FREE DIAMETER		THICKNESS		SECTION		FREE GAP	Radius Max.	
	Ds mm	Ds DEC.	EXTRA LIGHT	LIGHT	MED.	HEAVY	Dg	TOL.		Df	TOL.	T	TOL.	S	TOL.	A	R	
SR-22	22	.8661	--	37-38	--	--	.8125		1.000	.799	+.000 -.015	.042		.094		1/8 Max.	.035	2.7
SR-30	30	1.1811	--	200	--	--	1.109		1.359	1.094		.042		.125		3/32±1/32	.035	5.6
SR-32	32	1.2598	102	201	--	--	1.187		1.437	1.172		.042		.125		3/32±1/32	.035	6.0
SR-35	35	1.3780	103	202	300	--	1.306		1.547	1.291	+.000	.042		.125		3/32±1/32	.035	6.6
SR-37	37	1.4567	--	--	301	--	1.369		1.609	1.354	-.020	.042		.125		3/32±1/32	.035	7.0
SR-40	40	1.5748	--	203	--	--	1.500		1.750	1.485		.042		.125		3/32±1/32	.035	7.8
SR-42	42	1.6535	104	--	302	--	1.565		1.812	1.550		.042		.125		3/32±1/32	.035	7.8
SR-47	47	1.8504	105	204	303	--	1.756		2.062	1.741		.042		.156		1/8±1/32	.035	11.0
SR-52	52	2.0472	--	205	304	--	1.958		2.265	1.943		.042		.156		1/8±1/32	.035	12.1
SR-55	55	2.1654	106	--	--	--	2.071		2.375	2.056	+.000	.042		.156		1/8±1/32	.035	12.8
SR-62	62	2.4409	107	206	305	403	2.347		2.656	2.322	-.030	.065		.156		1/8±1/32	.050	21.9
SR-68	68	2.6772	108	--	--	--	2.552		2.922	2.527		.065		.188		1/8±1/32	.050	29.1
SR-72	72	2.8346	--	207	306	404	2.709		3.078	2.684		.065		.188		1/8±1/32	.050	30.8
SR-75	75	2.9528	109	--	--	--	2.828		3.203	2.803		.065		.188		1/8±1/32	.050	32.1
SR-80	80	3.1496	110	208	307	405	3.024		3.406	2.999		.065		.188		5/32±3/64	.050	34.2
SR-85	85	3.3465	--	209	--	--	3.221		3.594	3.196	+.000	.065		.188		5/32±3/64	.050	36.7
SR-90	90	3.5433	111	210	308	406	3.417		3.797	3.392	-.046	.095	±.002	.188	±.003	5/32±3/64	.060	56.5
SR-95	95	3.7402	112	--	--	--	3.615		3.984	3.590		.095		.188		5/32±3/64	.060	59.7
SR-100	100	3.9370	113	211	309	407	3.811		4.187	3.786		.095		.188		5/32±3/64	.060	62.1
SR-110	110	4.3307	114	212	310	408	4.205		4.578	4.180		.095		.188		3/16±1/16	.060	68.7
SR-115	115	4.5276	115	--	--	--	4.402	±.003	4.781	4.377	+.000	.095		.188		3/16±1/16	.060	72.2
SR-120	120	4.7244	--	213	311	409	4.536		5.094	4.506	-.062	.109		.281		3/16±1/16	.075	128.8
SR-125	125	4.9213	116	214	--	--	4.733		5.297	4.703		.109		.281		3/16±1/16	.075	136.0
SR-130	130	5.1181	117	215	312	410	4.930		5.500	4.900		.109		.281		3/16±1/16	.075	139.5
SR-140	140	5.5118	118	216	313	411	5.324		5.890	5.294		.109		.281		9/32±1/16	.075	150.4
SR-145	145	5.7087	119	--	--	--	5.521		6.078	5.491	+.000	.109		.281		9/32±1/16	.075	155.0
SR-150	150	5.9055	120	217	314	412	5.718		6.281	5.688	-.093	.109		.281		9/32±1/16	.075	160.9
SR-160	160	6.2992	121	218	315	413	6.111		6.672	6.081		.109		.281		9/32±1/16	.075	171.7
SR-170	170	6.6929	122	219	316	--	6.443		7.187	6.413		.120		.375		3/8±1/16	.090	267.4
SR-180	180	7.0866	124	220	317	414	6.837		7.594	6.807		.120		.375		3/8±1/16	.090	284.4
SR-190	190	7.4803	--	221	318	415	7.230		7.984	7.200	+.000	.120		.375		3/8±1/16	.090	300.1
SR-200	200	7.8740	126	222	319	416	7.624		8.375	7.594	-.125	.120		.375		3/8±1/16	.090	309.1
SR-210	210	8.2677	128	--	--	417	8.018		8.766	7.987		.120		.375		3/8±1/16	.090	319.0
SR-215	215	8.4646	--	224	320	--	8.215		8.969	8.184		.120		.375		3/8±1/16	.090	338.4
SR-225	225	8.8583	130	--	321	418	8.6083		9.328	8.578	+.000	.120		.375		15/32±3/3	.090	349.0
SR-230	230	9.0551	--	226	--	--	8.8051		9.562	8.775	-.156	.120		.375		15/32±3/3	.090	362.0
SR-240	240	9.4488	132	--	322	--	9.1988		9.953	9.168		.120		.375		15/32±3/3	.090	375.4

Hardness: All Ring Sizes - HRC 40-50

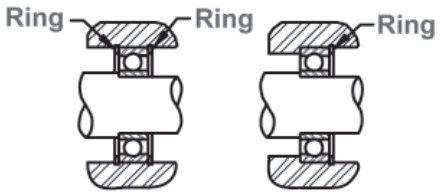
For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)

Snap Ring, External, Metric

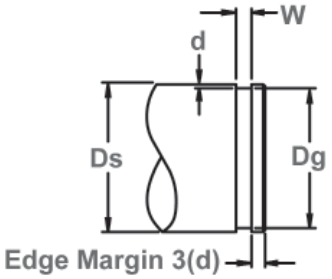
For SAE Standard Metric Bearings.

Once installed in the groove of a shaft, the portion of the ring protruding from the groove holds an assembly in place.

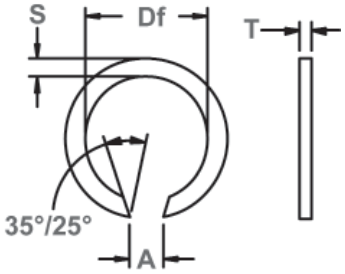
SB Constant Section



Drawing depicts using rings to retain bearings in a typical shaft application.



Shaft Diameter & Groove Dimensions



Free Diameter & Ring Measurements

RING NUMBER	SHAFT DIAMETER		BEARING NUMBER			GROOVE DIAMETER				RING DIMENSIONS					
						DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION	FREE GAP	
	Ds DEC	Ds mm				Dg	TOL.	W	d	Df	Tol.	T ±.002	S	A Min.	A Max.
SB-12	.4724	12.00	201	301	--	.436		.046 +.003 -.000	.018	.421	+.000 -.020	.042	.062 ±.003	.062	.187
SB-15	.5906	15.00	202	302	--	.550		.053	.020	.538	+.000	.047	.078	.078	.218
SB-17	.6693	17.00	203	303	403	.629	±.002	+.004 -.000	.020	.616	-.025	.047	±.003	.078	.218
SB-20	.7874	20.00	204	304	404	.731		.068	.028	.710		.062	.093 ±.003	.078	.218
SB-25	.9843	25.00	205	305	405	.924		+.004 -.000	.030	.910		.062	.109 ±.003	.156	.312
SB-30	1.1811	30.00	206	306	406	1.111		.085 +.004 -.000	.035	1.093	+.000	.075	.125 ±.005	.156	.312
SB-35	1.3780	35.00	207	307	407	1.288	±.004	.108	.045	1.265	-.031	.093	.156	.250	.406
SB-40	1.5748	40.00	208	308	408	1.465		+.005	.055	1.452		.093	±.005	.250	.406
SB-45	1.7717	45.00	209	309	409	1.648		-.000	.062	1.625		.093	.188	.250	.468
SB-50	1.9685	50.00	210	310	410	1.844			.062	1.820	+.000	.093	±.005	.250	.468
SB-55	2.1654	55.00	211	311	411	2.015		.120	.075	1.995	-.046	.109	.218	.250	.468
SB-60	2.3622	60.00	212	312	412	2.212		+.005 -.000	.075	2.187		.109	±.005	.250	.468
SB-65	2.5591	65.00	213	313	413	2.389			.085	2.359		.125		.250	.468
SB-70	2.7559	70.00	214	314	414	2.586			.085	2.556		.125	.250	.250	.500
SB-75	2.9528	75.00	215	315	415	2.783	±.006	.139	.085	2.750	+.000	.125	±.005	.250	.500
SB-80	3.1496	80.00	216	316	416	2.979		+.006	.085	2.946	-.062	.125		.250	.500
SB-85	3.3465	85.00	217	317	417	3.176		-.000	.085	3.139		.125		.250	.500
SB-90	3.5433	90.00	218	318	418	3.343			.100	3.308	+.000	.125		.312	.625
SB-95	3.7402	95.00	219	319	419	3.540			.100	3.500	-.078	.125	.312	.312	.625
SB-100	3.9370	100.00	220	320	420	3.737		.174	.100	3.697		.156	±.005	.312	.625
SB-105	4.1339	105.00	221	321	421	3.934		+.008	.100	3.888	+.000	.156		.312	.625
SB-110	4.3307	110.00	222	322	422	4.131		-.000	.100	4.080	-.093	.156		.312	.687

Hardness: All Ring Sizes - HRC 42-52

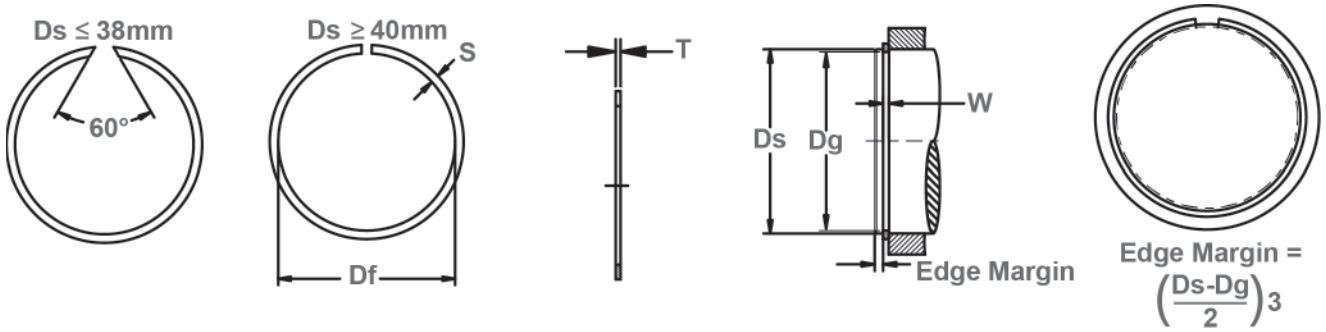
For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)

CFS Constant Section

Snap Ring, External, Metric

Flat Wire.

Once installed in the groove of a shaft, the portion of the ring protruding from the groove holds an assembly in place.

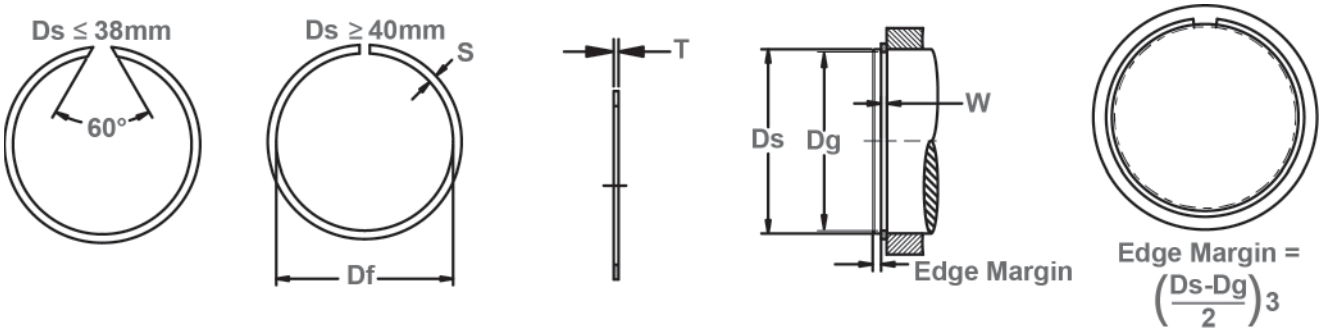


Free Diameter & Ring Dimensions

Shaft Diameter & Groove Dimensions

RING SIZE	SHAFT DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				SUPPLEMENTARY DATA		
			DIAMETER		WIDTH	FREE DIAMETER	THICKNESS	SECTION	WEIGHT			R.P.M.
	Ds DEC	Ds mm	Dg	TOL.	W min	Df max	T -0,1	S -0,1	kg/1000	Pg (kN)	Pr (kN)	X1000 (1/min)
CFS-4	0.1575	4	3,8		0,6	3,7	0,5	0,80	0,02	0,20	1,25	275,0
CFS-5	0.1969	5	4,8		0,6	4,7	0,5	1,00	0,05	0,26	1,30	192,0
CFS-6	0.2362	6	5,7		0,8	5,6	0,7	1,10	0,09	0,46	3,50	141,0
CFS-7	0.2756	7	6,7	-0,09	0,8	6,5	0,7	1,20	0,12	0,54	3,50	134,0
CFS-8	0.3150	8	7,6		1,1	7,4	1,0	1,30	0,20	0,82	6,50	108,0
CFS-9	0.3543	9	8,6		1,1	8,4	1,0	1,30	0,24	0,92	6,50	80,0
CFS-10	0.3937	10	9,6		1,1	9,4	1,0	1,30	0,25	1,03	6,50	68,0
CFS-11	0.4331	11	10,5		1,1	10,2	1,0	1,30	0,29	1,40	9,80	64,0
CFS-12	0.4724	12	11,5		1,1	11,2	1,0	1,30	0,30	1,53	9,30	53,0
CFS-13	0.5118	13	12,5		1,1	12,2	1,0	1,30	0,34	1,70	8,90	43,0
CFS-14	0.5512	14	13,5		1,3	13,1	1,2	1,50	0,50	1,80	17,00	45,0
CFS-15	0.5906	15	14,4	-0,11	1,3	14,0	1,2	1,75	0,66	2,30	18,70	44,0
CFS-16	0.6299	16	15,4		1,3	15,0	1,2	1,75	0,69	2,47	17,70	38,0
CFS-17	0.6693	17	16,4		1,3	16,0	1,2	1,75	0,72	2,63	17,00	34,0
CFS-18	0.7087	18	17,4		1,3	17,0	1,2	1,75	0,75	2,78	16,20	30,0
CFS-19	0.7480	19	18,4		1,3	17,9	1,2	1,75	0,80	2,94	15,60	29,0
CFS-20	0.7874	20	19,2		1,3	18,7	1,2	1,75	0,84	4,10	15,00	26,0
CFS-21	0.8268	21	20,2		1,3	19,7	1,2	1,75	0,87	4,30	14,60	23,0
CFS-22	0.8661	22	21,2		1,3	20,7	1,2	1,75	0,91	4,50	14,00	21,0
CFS-24	0.9449	24	23,0		1,3	22,5	1,2	1,75	0,99	6,15	13,30	18,0
CFS-25	0.9843	25	24,0	-0,13	1,3	23,5	1,2	1,75	1,00	6,40	12,80	16,0
CFS-26	1.0236	26	25,0		1,3	24,5	1,2	1,75	1,10	6,65	12,50	15,0
CFS-27	1.0630	27	26,0		1,6	25,5	1,5	2,30	2,00	6,95	30,00	16,0
CFS-28	1.1024	28	27,0		1,6	26,5	1,5	2,30	2,11	7,20	29,30	15,0
CFS-29	1.1417	29	28,0		1,6	27,5	1,5	2,30	2,20	7,45	28,20	14,0
CFS-30	1.1811	30	29,0		1,6	28,5	1,5	2,30	2,33	7,70	27,50	13,0
CFS-32	1.2598	32	30,8		1,6	30,2	1,5	2,30	2,41	9,90	26,50	13,0
CFS-35	1.3780	35	33,8		1,6	33,2	1,5	2,30	2,51	10,80	24,40	11,0
CFS-37	1.4567	37	35,8		1,6	35,2	1,5	2,30	2,72	11,30	23,50	9,0
CFS-38	1.4961	38	36,8	-0,16	1,6	36,2	1,5	2,30	2,83	11,60	22,70	9,0
CFS-40	1.5748	40	38,5		1,6	37,8	1,5	2,30	2,91	15,50	22,00	8,0
CFS-42	1.6535	42	40,5		1,6	39,8	1,5	2,30	3,10	16,20	21,40	7,0
CFS-43	1.6929	43	41,5		1,6	40,8	1,5	2,30	3,25	16,50	21,10	7,0

Hardness: Sizes 4-20, 47-52 HRC; Sizes 21 & Over, 45-50 HRC



Free Diameter & Ring Dimensions

Shaft Diameter & Groove Dimensions

RING SIZE	SHAFT DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				SUPPLEMENTARY DATA		
			DIAMETER		WIDTH	FREE DIAMETER	THICKNESS	SECTION	WEIGHT			R.P.M.
	Ds DEC	Ds mm	Dg	TOL.	W min	Df max	T -0,1	S -0,1	kg/1000	Pg (kN)	Pr (kN)	X1000 (1/min)
CFS-45	1.7717	45	43,5		1,6	42,8	1,5	2,30	3,39	17,30	20,60	6,0
CFS-47	1.8504	47	45,5	-0,16	1,6	44,8	1,5	2,30	3,48	18,20	19,20	6,0
CFS-48	1.8898	48	46,5		1,6	45,8	1,5	2,30	3,60	18,70	18,60	5,0
CFS-50	1.9685	50	48,5		1,6	47,8	1,5	2,30	3,73	19,50	18,10	5,0
CFS-52	2.0472	52	50,5		1,6	49,8	1,5	2,30	3,92	20,20	17,70	4,0
CFS-55	2.1654	55	53,5		1,6	52,6	1,5	2,30	4,11	21,00	16,50	4,0
CFS-58	2.2835	58	56,5		1,6	55,6	1,5	2,30	4,40	22,50	15,70	4,0
CFS-60	2.3622	60	58,5	-0,19	1,6	57,6	1,5	2,30	4,55	23,20	15,40	4,0
CFS-63	2.4803	63	61,5		1,6	60,6	1,5	2,30	4,58	24,40	14,70	3,0
CFS-65	2.5591	65	63,5		1,6	62,6	1,5	2,30	4,64	25,20	14,20	3,0
CFS-68	2.6772	68	66,2		2,2	65,4	2,0	2,80	8,59	31,70	39,60	3,0
CFS-70	2.7559	70	68,2		2,2	67,4	2,0	2,80	8,71	32,50	38,40	3,0
CFS-72	2.8346	72	70,2		2,2	69,4	2,0	2,80	8,80	33,70	37,60	3,0
CFS-73	2.8740	73	71,2	-0.19	2,2	70,4	2,0	2,80	8,90	34,00	37,00	3,0
CFS-75	2.9528	75	73,2		2,2	72,4	2,0	2,80	9,32	35,00	36,20	2,0
CFS-80	3.1496	80	78,2		2,2	77,4	2,0	2,80	9,67	37,40	34,20	2,0
CFS-85	3.3465	85	83,0		2,7	82,0	2,5	3,40	16,00	44,00	72,00	2,0
CFS-90	3.5433	90	88,0		2,7	87,0	2,5	3,40	16,00	46,50	66,30	2,0
CFS-95	3.7402	95	93,0		2,7	92,0	2,5	3,40	18,20	49,20	61,80	2,0
CFS-100	3.9370	100	98,0	-0,22	2,7	97,0	2,5	3,40	18,90	51,90	57,30	2,0
CFS-105	4.1339	105	102,7		2,7	101,7	2,5	3,40	20,70	65,00	54,00	2,0
CFS-110	4.3307	110	107,7		2,7	106,6	2,5	3,40	20,90	69,00	50,40	1,0
CFS-115	4.5276	115	112,7		2,7	111,6	2,5	3,40	22,10	71,00	47,20	1,0
CFS-120	4.7244	120	117,7		2,7	116,5	2,5	3,40	24,10	75,00	44,80	1,0
CFS-125	4.9213	125	122,7		2,7	121,5	2,5	3,40	25,10	78,50	41,80	1,0
CFS-130	5.1181	130	127,7		2,7	126,4	2,5	3,40	26,60	84,00	39,60	1,0
CFS-135	5.3150	135	132,4		2,7	131,1	2,5	4,00	30,20	87,00	44,00	1,0
CFS-140	5.5118	140	137,4		2,7	136,0	2,5	4,00	31,10	91,50	41,60	1,0
CFS-145	5.7087	145	142,4	-0,25	2,7	141,0	2,5	4,00	32,60	95,00	39,60	1,0
CFS-150	5.9055	150	147,4		2,7	145,9	2,5	4,00	32,80	98,00	37,50	1,0
CFS-155	6.1024	155	154,4		2,7	150,9	2,5	4,00	34,70	100,00	36,30	1,0
CFS-160	6.2992	160	157,4		2,7	155,8	2,5	4,00	36,60	103,00	35,60	1,0
CFS-165	6.4961	165	162,4		2,7	160,8	2,5	4,00	37,40	106,00	34,20	0,5

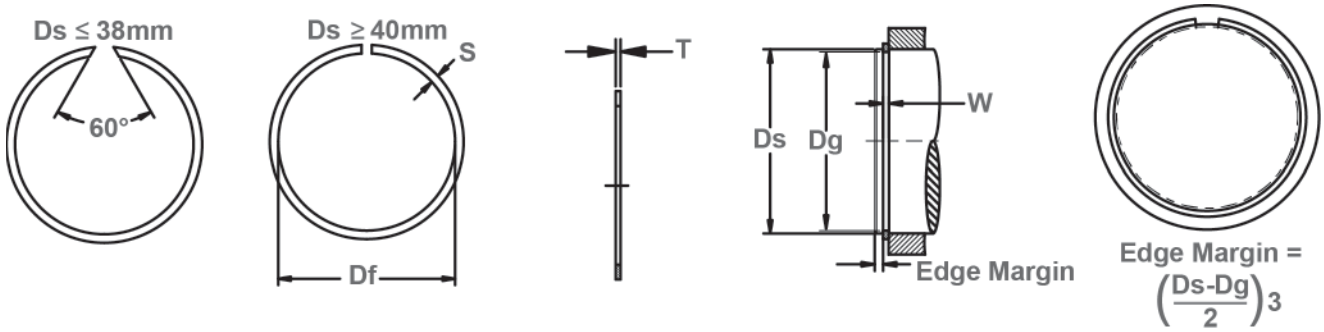
Hardness: Sizes 4-20, 47-52 HRC; Sizes 21 & Over, 45-50 HRC

CFS Constant Section

Snap Ring, External, Metric

Flat Wire.

Once installed in the groove of a shaft, the portion of the ring protruding from the groove holds an assembly in place.



Free Diameter & Ring Dimensions

Shaft Diameter & Groove Dimensions

RING SIZE	SHAFT DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				SUPPLEMENTARY DATA		
			DIAMETER		WIDTH	FREE DIAMETER	THICKNESS	SECTION	WEIGHT			R.P.M.
	Ds DEC	Ds mm	Dg	TOL.	W min	Df max	T -0,1	S -0,1	kg/1000	Pg (kN)	Pr (kN)	X1000 (1/min)
CFS-170	6.6929	170	167,4		2,7	165,7	2,5	4,00	38,50	108,00	33,50	0,5
CFS-175	6.8898	175	172,4	-0,25	2,7	170,7	2,5	4,00	39,40	117,00	32,20	0,4
CFS-180	7.0866	180	177,0		3,2	175,2	3,0	5,00	61,20	140,00	67,50	1,0
CFS-185	7.2835	185	182,0		3,2	180,2	3,0	5,00	63,90	144,00	66,20	1,0
CFS-190	7.4803	190	187,0		3,2	185,1	3,0	5,00	65,90	148,00	64,00	1,0
CFS-195	7.6772	195	192,0		3,2	190,1	3,0	5,00	67,50	152,00	62,60	1,0
CFS-200	7.8740	200	197,0	-0,29	3,2	196,0	3,0	5,00	68,40	156,00	61,40	0,5
CFS-210	8.2677	210	207,0		3,2	204,9	3,0	5,00	72,00	164,00	58,00	0,5
CFS-220	8.6614	220	217,0		3,2	214,8	3,0	5,00	76,30	171,00	55,50	0,4
CFS-230	9.0551	230	227,0		3,2	224,7	3,0	5,00	79,80	180,00	53,00	0,3
CFS-240	9.4488	240	237,0		3,2	234,6	3,0	5,00	81,70	187,00	51,00	0,3
CFS-250	9.8425	250	247,0		3,2	244,5	3,0	5,00	86,50	195,00	49,00	0,3
CFS-260	10.2362	260	255,0		4,2	252,4	4,0	7,50	179,00	338,00	168,00	0,4
CFS-265	10.4331	265	260,0		4,2	257,4	4,0	7,50	185,20	344,00	165,00	0,4
CFS-270	10.6299	270	265,0		4,2	262,3	4,0	7,50	197,70	350,00	162,00	0,4
CFS-280	11.0236	280	275,0		4,2	272,2	4,0	7,50	198,70	362,00	155,00	0,4
CFS-285	11.2205	285	280,0	-0,32	4,2	277,2	4,0	7,50	199,50	370,00	151,00	0,3
CFS-290	11.4173	290	285,0		4,2	282,1	4,0	7,50	205,30	377,00	148,00	0,3
CFS-300	11.8110	300	295,0		4,2	292,1	4,0	7,50	214,20	390,00	145,00	0,3
CFS-305	12.0079	305	300,0		4,2	297,1	4,0	7,50	219,40	396,00	142,00	0,3
CFS-310	12.2047	310	305,0		4,2	302,0	4,0	7,50	223,10	402,00	139,00	0,3
CFS-320	12.5984	320	315,0		4,2	311,9	4,0	7,50	225,30	416,00	137,00	0,3
CFS-330	12.9921	330	325,0		4,2	321,8	4,0	7,50	228,60	428,00	132,00	0,2
CFS-340	13.3858	340	335,0		4,2	331,7	4,0	7,50	239,30	442,00	129,00	0,2
CFS-350	13.7795	350	345,0		4,2	341,6	4,0	7,50	251,20	455,00	123,00	0,2
CFS-360	14.1732	360	355,0		4,2	351,5	4,0	7,50	253,10	468,00	120,00	0,2
CFS-370	14.5669	370	365,0	-0,36	4,2	361,5	4,0	7,50	259,20	482,00	117,00	0,2
CFS-380	14.9606	380	375,0		4,2	371,4	4,0	7,50	265,80	494,00	115,00	0,2
CFS-390	15.3543	390	385,0		4,2	381,3	4,0	7,50	273,90	507,00	112,00	0,2
CFS-400	15.7480	400	395,0		4,2	391,2	4,0	7,50	281,10	521,00	109,00	0,1
CFS-420	16.5354	420	415,0		4,8	410,0	4,5	12,00	531,00	547,00	133,00	0,3
CFS-460	18.1102	460	455,0		4,8	449,5	4,5	12,00	582,00	600,00	126,00	0,2

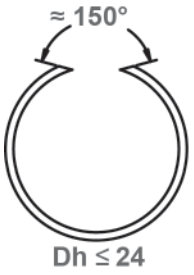
Hardness: Sizes 4-20, 47-52 HRC; Sizes 21 & Over, 45-50 HRC

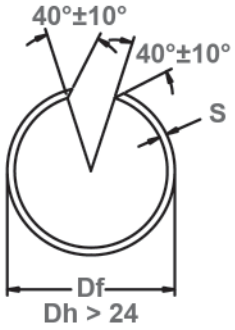
Snap Ring, Internal, Metric

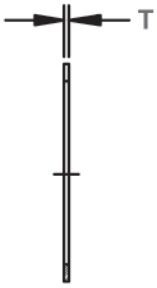
Flat Wire.

Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove holds an assembly in place.

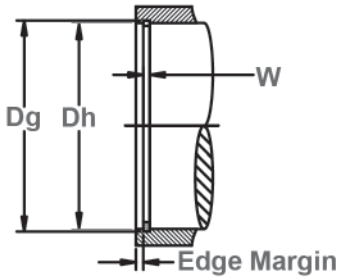
CFH Constant Section

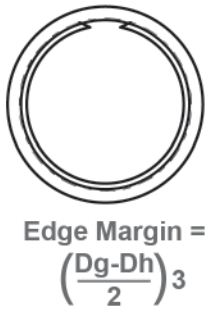






Free Diameter & Ring Dimensions





Housing Diameter & Groove Dimensions

RING SIZE	HOUSING DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				THRUST LOAD	
			DIAMETER		WIDTH	FREE DIAMETER	THICKNESS	SECTION	WEIGHT		
	Dh DEC	Dh mm	Dg	TOL.	W min	Df min	T -0,1	S -0,1	kg/1000	Pg (kN)	Pr (kN)
CFH-7	0.2756	7	7,3		0,9	7,5	0,8	1,00	0,09	0,55	3,30
CFH-8	0.3150	8	8,3	+0,09	0,9	8,5	0,8	1,00	0,10	0,65	3,25
CFH-9	0.3543	9	9,3		0,9	9,5	0,8	1,10	0,13	0,70	3,20
CFH-10	0.3937	10	10,4		0,9	10,6	0,8	1,20	0,15	1,05	3,15
CFH-11	0.4331	11	11,4		1,1	11,6	1,0	1,30	0,21	1,15	9,15
CFH-12	0.4724	12	12,4		1,1	12,7	1,0	1,30	0,25	1,30	8,90
CFH-13	0.5118	13	13,5		1,1	13,8	1,0	1,30	0,28	1,75	8,80
CFH-14	0.5512	14	14,5	+0,11	1,1	14,8	1,0	1,30	0,31	1,90	8,20
CFH-15	0.5906	15	15,5		1,1	15,8	1,0	1,30	0,34	2,00	7,70
CFH-16	0.6299	16	16,5		1,3	16,8	1,2	1,75	0,53	2,10	15,50
CFH-17	0.6693	17	17,5		1,3	17,8	1,2	1,75	0,55	2,25	15,40
CFH-18	0.7087	18	18,5		1,3	18,9	1,2	1,75	0,68	2,40	15,10
CFH-19	0.7480	19	19,6		1,3	19,9	1,2	1,75	0,72	3,00	14,80
CFH-20	0.7874	20	20,6		1,3	21,0	1,2	1,75	0,76	3,20	14,20
CFH-21	0.8268	21	21,6		1,3	22,0	1,2	1,75	0,79	3,35	13,70
CFH-22	0.8661	22	22,6		1,3	23,0	1,2	1,75	0,81	3,50	13,10
CFH-23	0.9055	23	23,6	+0,13	1,3	24,0	1,2	1,75	0,88	3,65	12,80
CFH-24	0.9449	24	24,8		1,3	25,2	1,2	1,75	0,90	5,10	12,50
CFH-25	0.9843	25	25,8		1,3	26,2	1,2	1,75	0,91	5,30	12,00
CFH-26	1.0236	26	26,8		1,3	27,2	1,2	1,75	0,98	5,50	11,50
CFH-27	1.0630	27	27,8		1,3	28,2	1,2	1,75	1,11	5,70	11,30
CFH-28	1.1024	28	28,8		1,3	29,2	1,2	1,75	1,13	5,95	11,00
CFH-29	1.1417	29	29,8		1,3	30,2	1,2	1,75	1,15	6,15	10,90
CFH-30	1.1811	30	31,0		1,6	31,4	1,5	2,30	2,00	8,00	26,00
CFH-31	1.2205	31	32,0		1,6	32,4	1,5	2,30	2,03	8,25	25,60
CFH-32	1.2598	32	33,0		1,6	33,4	1,5	2,30	2,11	8,50	25,00
CFH-33	1.2992	33	34,0		1,6	34,4	1,5	2,30	2,26	8,75	24,60
CFH-34	1.3386	34	35,0		1,6	35,4	1,5	2,30	2,34	9,00	23,80
CFH-35	1.3780	35	36,0	+0,16	1,6	36,4	1,5	2,30	2,36	9,30	23,30
CFH-37	1.4567	37	38,2		1,6	38,8	1,5	2,30	2,53	11,75	22,00
CFH-38	1.4961	38	39,2		1,6	39,8	1,5	2,30	2,61	12,15	21,60
CFH-39	1.5354	39	40,2		1,6	40,8	1,5	2,30	2,67	12,40	21,00
CFH-40	1.5748	40	41,2		1,6	41,8	1,5	2,30	2,80	12,70	20,70
CFH-42	1.6535	42	43,2		1,6	43,8	1,5	2,30	2,92	13,30	19,80
CFH-43	1.6929	43	44,2		1,6	44,8	1,5	2,30	3,03	13,70	19,60

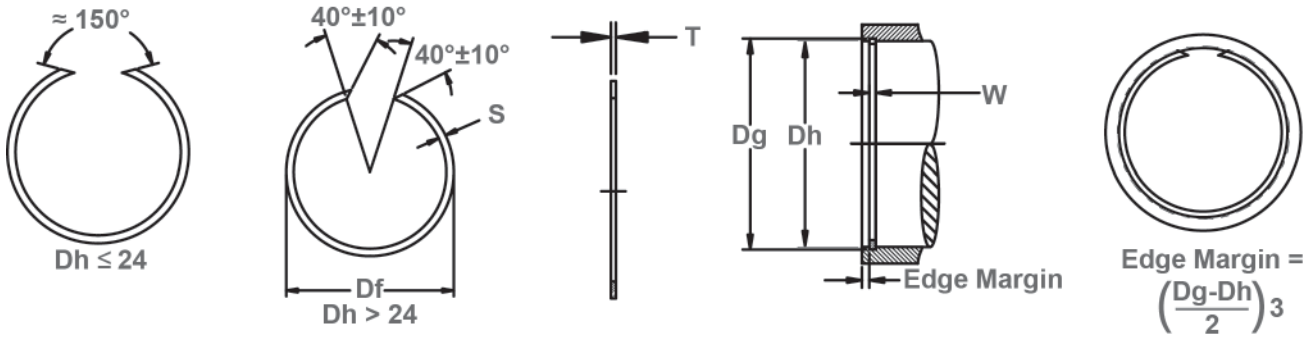
Hardness: Sizes 7-20, 47-52HRC; Sizes 21& Over, 45-50 HRC

CFH Constant Section

Snap Ring, Internal, Metric

Flat Wire.

Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove holds an assembly in place.



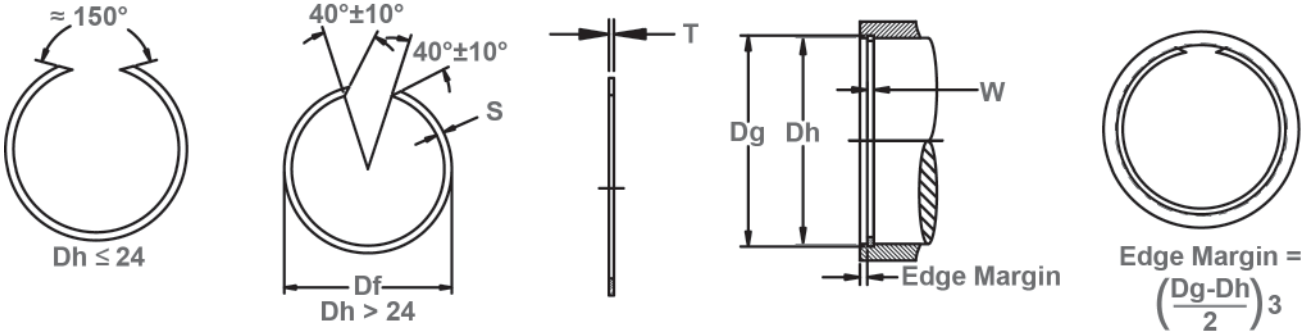
Free Diameter & Ring Dimensions

Housing Diameter & Groove Dimensions

RING SIZE	HOUSING DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				THRUST LOAD	
			DIAMETER		WIDTH	FREE DIAMETER	THICKNESS	SECTION	WEIGHT		
	Dh DEC	Dh mm	Dg	TOL.	W min	Df min	T -0,1	S -0,1	kg/1000	Pg (kN)	Pr (kN)
CFH-44	1.7323	44	45,2		1,6	45,8	1,5	2,30	3,11	14,00	19,30
CFH-45	1.7717	45	46,2		1,6	46,8	1,5	2,30	3,25	14,25	19,00
CFH-46	1.8110	46	47,2	+0,16	1,6	47,8	1,5	2,30	3,28	14,65	18,40
CFH-47	1.8504	47	48,2		1,6	48,8	1,5	2,30	3,29	14,90	18,10
CFH-48	1.8898	48	49,2		1,6	49,8	1,5	2,30	3,45	15,30	17,60
CFH-50	1.9685	50	51,2		1,6	51,8	1,5	2,30	3,57	15,80	17,20
CFH-52	2.0472	52	53,5		1,6	54,3	1,5	2,30	3,58	20,65	16,30
CFH-53	2.0866	53	54,5		1,6	55,3	1,5	2,30	3,82	21,05	16,10
CFH-55	2.1654	55	56,5		1,6	57,3	1,5	2,30	3,93	21,80	15,70
CFH-57	2.2441	57	58,5		1,6	59,3	1,5	2,30	4,12	22,60	15,30
CFH-58	2.2835	58	59,5		1,6	60,3	1,5	2,30	4,13	23,00	15,00
CFH-60	2.3622	60	61,5		1,6	62,3	1,5	2,30	4,28	23,80	14,60
CFH-62	2.4409	62	63,5	+0,19	1,6	64,3	1,5	2,30	4,42	24,60	14,20
CFH-63	2.4803	63	64,5		1,6	65,3	1,5	2,30	4,50	25,00	13,70
CFH-65	2.5591	65	66,5		1,6	67,3	1,5	2,30	4,72	25,70	13,60
CFH-68	2.6772	68	69,5		1,6	70,3	1,5	2,30	4,90	26,90	12,90
CFH-70	2.7559	70	71,5		1,6	72,3	1,5	2,30	4,93	27,70	12,80
CFH-72	2.8346	72	73,8		2,2	74,6	2,0	2,80	8,49	34,20	35,70
CFH-73	2.8740	73	74,8		2,2	75,6	2,0	2,80	8,52	34,70	35,30
CFH-74	2.9134	74	75,8		2,2	76,6	2,0	2,80	8,60	35,30	34,80
CFH-76	2.9921	76	77,8		2,2	78,6	2,0	2,80	8,89	36,20	33,80
CFH-78	3.0709	78	79,8		2,2	80,6	2,0	2,80	9,05	37,10	32,60
CFH-79	3.1102	79	80,8		2,2	81,6	2,0	2,80	9,07	37,60	32,00
CFH-80	3.1496	80	81,8		2,2	82,6	2,0	2,80	9,22	38,00	31,40
CFH-81	3.1890	81	82,8		2,2	83,6	2,0	2,80	9,31	38,60	31,30
CFH-82	3.2283	82	83,8		2,2	84,6	2,0	2,80	9,45	39,00	30,70
CFH-83	3.2677	83	84,8		2,2	85,6	2,0	2,80	9,63	39,50	30,10
CFH-85	3.3465	85	86,8	+0,22	2,2	87,6	2,0	2,80	9,81	40,40	29,60
CFH-86	3.3858	86	87,8		2,2	88,6	2,0	2,80	9,91	40,90	29,00
CFH-88	3.4646	88	90,0		2,7	91,0	2,5	3,40	15,40	46,50	65,80
CFH-90	3.5433	90	92,0		2,7	93,0	2,5	3,40	15,60	47,60	63,50
CFH-92	3.6220	92	94,0		2,7	95,0	2,5	3,40	16,60	48,60	62,00
CFH-93	3.6614	93	95,0		2,7	96,0	2,5	3,40	16,80	49,20	61,80
CFH-95	3.7402	95	97,0		2,7	98,0	2,5	3,40	16,90	50,20	59,30
CFH-97	3.8189	97	99,0		2,7	100,0	2,5	3,40	17,10	51,30	58,20

Hardness: Sizes 7-20, 47-52HRC; Sizes 21& Over, 45-50 HRC

For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)



Free Diameter & Ring Dimensions

Housing Diameter & Groove Dimensions

RING SIZE	HOUSING DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				THRUST LOAD	
			DIAMETER		WIDTH	FREE DIAMETER	THICKNESS	SECTION	WEIGHT		
	Dh DEC	Dh mm	Dg	TOL.	W min	Df min	T -0,1	S -0,1	kg/1000	Pg (kN)	Pr (kN)
CFH-98	3.8583	98	100,0		2,7	101,0	2,5	3,40	17,50	51,80	56,60
CFH-100	3.9370	100	102,0		2,7	103,0	2,5	3,40	17,90	52,80	55,50
CFH-102	4.0157	102	104,3		2,7	105,3	2,5	3,40	18,40	62,00	53,60
CFH-103	4.0551	103	105,3		2,7	106,3	2,5	3,40	18,50	62,60	53,20
CFH-105	4.1339	105	107,3		2,7	108,3	2,5	3,40	18,70	63,80	51,80
CFH-107	4.2126	107	109,3	+0,22	2,7	110,3	2,5	3,40	19,10	65,00	50,70
CFH-108	4.2520	108	110,3		2,7	111,3	2,5	3,40	19,30	65,60	50,50
CFH-110	4.3307	110	112,3		2,7	113,4	2,5	3,40	19,80	66,80	49,00
CFH-112	4.4094	112	114,3		2,7	115,4	2,5	3,40	20,30	68,00	47,00
CFH-113	4.4488	113	115,3		2,7	116,4	2,5	3,40	20,50	68,60	46,50
CFH-115	4.5276	115	117,3		2,7	118,4	2,5	3,40	20,60	69,40	45,50
CFH-117	4.6063	117	119,3		2,7	120,4	2,5	3,40	20,80	71,00	44,60
CFH-118	4.6457	118	120,3		2,7	121,4	2,5	3,40	21,10	71,70	44,20
CFH-120	4.7244	120	122,3		2,7	123,5	2,5	3,40	21,40	72,80	43,30
CFH-123	4.8425	123	125,3		2,7	126,5	2,5	3,40	22,00	74,70	41,20
CFH-125	4.9213	125	127,3		2,7	128,5	2,5	3,40	22,50	75,90	40,20
CFH-127	5.0000	127	129,3		2,7	130,5	2,5	3,40	23,00	77,00	39,80
CFH-130	5.1181	130	132,3		2,7	133,6	2,5	3,40	23,40	78,90	38,20
CFH-133	5.2362	133	135,3		2,7	136,6	2,5	3,40	24,40	80,70	36,80
CFH-135	5.3150	135	137,3		2,7	138,6	2,5	3,40	25,00	81,90	36,60
CFH-137	5.3937	137	139,3		2,7	140,6	2,5	3,40	25,30	83,00	35,60
CFH-140	5.5118	140	142,6	+0,25	2,7	144,0	2,5	4,00	29,30	96,10	40,20
CFH-143	5.6299	143	145,6		2,7	147,0	2,5	4,00	30,10	98,10	38,60
CFH-150	5.9055	150	152,6		2,7	154,1	2,5	4,00	31,90	102,00	36,20
CFH-153	6.0236	153	155,6		2,7	157,1	2,5	4,00	32,60	104,00	35,60
CFH-160	6.2992	160	162,6		2,7	164,2	2,5	4,00	34,40	108,00	34,60
CFH-163	6.4173	163	165,6		2,7	167,2	2,5	4,00	34,60	111,00	33,50
CFH-165	6.4961	165	167,6		2,7	169,2	2,5	4,00	34,90	113,00	32,80
CFH-170	6.6929	170	172,6		2,7	174,3	2,5	4,00	36,20	116,00	32,00
CFH-173	6.8110	173	175,6		2,7	177,3	2,5	4,00	37,10	118,00	32,00
CFH-175	6.8898	175	177,6		2,7	179,3	2,5	4,00	37,30	119,00	31,40
CFH-180	7.0866	180	182,6		2,7	184,5	2,5	4,00	38,30	123,00	30,80
CFH-183	7.2047	183	185,6	+0,29	2,7	187,5	2,5	4,00	41,00	125,00	30,00
CFH-190	7.4803	190	193,0		3,2	194,9	3,0	5,00	61,30	150,00	62,80
CFH-195	7.6772	195	198,0		3,2	199,9	3,0	5,00	61,60	154,00	61,50

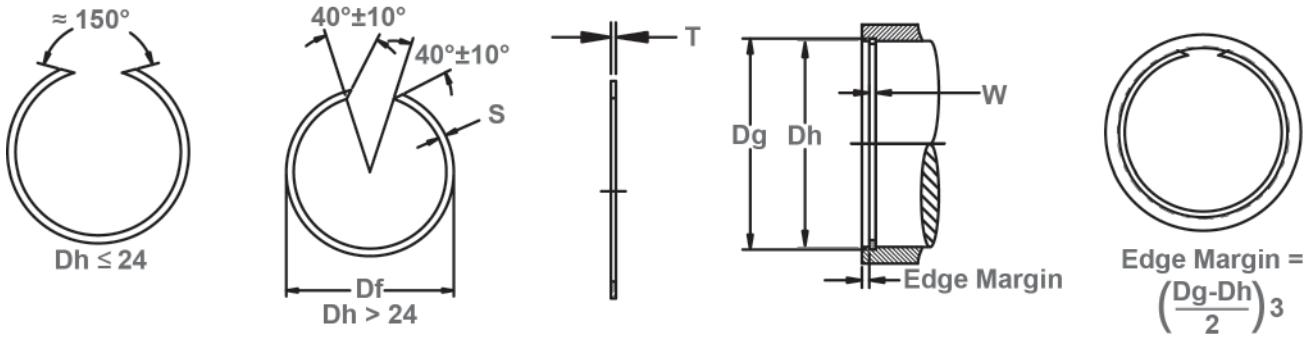
Hardness: Sizes 7-20, 47-52HRC; Sizes 21& Over, 45-50 HRC

CFH Constant Section

Snap Ring, Internal, Metric

Flat Wire.

Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove holds an assembly in place.



Free Diameter & Ring Dimensions

Housing Diameter & Groove Dimensions

RING SIZE	HOUSING DIAMETER		GROOVE DIMENSIONS DIAMETER		WIDTH	RING DIMENSIONS & WEIGHT FREE DIAMETER	THICKNESS	SECTION	WEIGHT	THRUST LOAD Pg	Pr
	Dh DEC	Dh mm	Dg	TOL.	W min	Df min	T -0,1	S -0,1	kg/1000	(kN)	(kN)
CFH-200	7.8740	200	203,0		3,2	205,0	3,0	5,00	64,50	158,00	59,00
CFH-205	8.0709	205	208,0		3,2	210,0	3,0	5,00	66,40	162,00	57,80
CFH-210	8.2677	210	213,0		3,2	215,1	3,0	5,00	68,80	166,00	56,80
CFH-215	8.4646	215	218,0	+0,29	3,2	220,1	3,0	5,00	69,50	169,00	55,50
CFH-220	8.6614	220	223,0		3,2	225,2	3,0	5,00	72,40	173,00	54,40
CFH-225	8.8583	225	228,0		3,2	230,2	3,0	5,00	72,90	177,00	53,30
CFH-230	9.0551	230	233,0		3,2	235,3	3,0	5,00	75,20	181,00	52,00
CFH-240	9.4488	240	243,0		3,2	245,4	3,0	5,00	80,90	189,00	49,60
CFH-250	9.8425	250	253,0		3,2	255,5	3,0	5,00	84,20	197,00	48,50
CFH-260	10.2362	260	265,0		4,2	267,6	4,0	7,50	165,00	343,00	162,00
CFH-270	10.6299	270	275,0		4,2	277,7	4,0	7,50	174,00	356,00	157,00
CFH-280	11.0236	280	285,0	+0,32	4,2	287,8	4,0	7,50	184,00	369,00	152,00
CFH-290	11.4173	290	295,0		4,2	297,9	4,0	7,50	190,00	382,00	144,00
CFH-300	11.8110	300	305,0		4,2	307,9	4,0	7,50	196,00	395,00	140,00
CFH-310	12.2047	310	315,0		4,2	318,0	4,0	7,50	200,00	408,00	136,00
CFH-320	12.5984	320	325,0		4,2	328,1	4,0	7,50	203,00	422,00	132,00
CFH-325	12.7953	325	330,0		4,2	333,1	4,0	7,50	206,00	428,00	129,00
CFH-330	12.9921	330	335,0		4,2	338,2	4,0	7,50	209,00	435,00	126,00
CFH-340	13.3858	340	345,0		4,2	348,3	4,0	7,50	219,00	448,00	123,00
CFH-350	13.7795	350	355,0		4,2	358,4	4,0	7,50	229,00	452,00	121,00
CFH-355	13.9764	355	360,0	+0,36	4,2	363,4	4,0	7,50	231,00	467,00	121,00
CFH-360	14.1732	360	365,0		4,2	368,5	4,0	7,50	233,00	487,00	119,00
CFH-370	14.5669	370	375,0		4,2	378,5	4,0	7,50	236,00	493,00	116,00
CFH-375	14.7638	375	380,0		4,2	383,5	4,0	7,50	240,00	500,00	112,00
CFH-380	14.9606	380	385,0		4,2	388,6	4,0	7,50	242,00	513,00	111,00
CFH-390	15.3543	390	395,0		4,2	398,7	4,0	7,50	253,00	520,00	110,00
CFH-395	15.5512	395	400,0		4,2	403,7	4,0	7,50	257,00	526,00	109,00
CFH-400	15.7480	400	405,0		4,2	408,9	4,0	7,50	260,00	529,00	106,00
CFH-410	16.1417	410	415,0		4,2	419,0	4,0	7,50	266,00	546,00	105,00
CFH-420	16.3386	415	420,0	+0,40	4,2	424,0	4,0	7,50	273,00	552,00	104,00
CFH-420	16.5354	420	425,0		4,2	429,1	4,0	7,50	277,00	553,00	101,00
CFH-430	16.9291	430	435,0		4,2	439,2	4,0	7,50	285,00	565,00	100,00
CFH-440	17.3228	440	445,0		4,2	449,3	4,0	7,50	294,00	578,00	98,00

Hardness: Sizes 7-20, 47-52HRC; Sizes 21& Over, 45-50 HRC

For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)

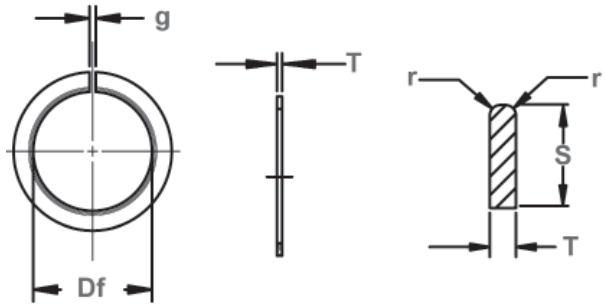
Snap Ring, External, Metric

For Bearings.

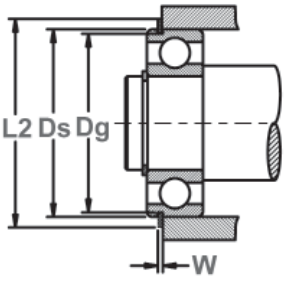
Once installed in the groove of a shaft, the portion of the ring protruding from the groove holds an assembly in place.

CBS Constant Section

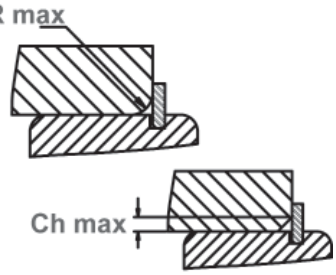
DIN 5417



Free Diameter & Ring Dimensions With Section B-B



Shaft Diameter & Groove Dimensions

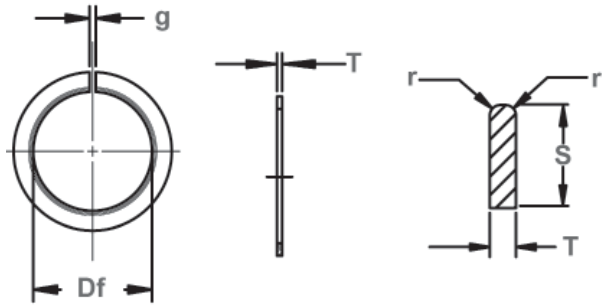


Maximum Corner Radius & Chamfer

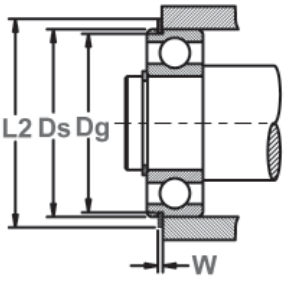
RING SIZE	SHAFT DIAMETER		GROOVE DIMENSIONS				RING DIMENSIONS & WEIGHT									SUPPLEMENTARY DATA					
			DIAMETER		WIDTH		THICKNESS		SECTION		FREE DIAMETER		GAP	RADIUS	WEIGHT						
	Ds DEC	Ds mm	Dg	TOL.	W	TOL.	T	TOL.	S	TOL.	Df	TOL.	g	r min.	kg/1000	L2	Pg	Pr	R max Ch max	P'r kN	R.P.M. X1000 (1/min)
CBS-30	1.1811	30	28,17		1,35		1,12		3,25		27,4		3	0,4	2,8	34,7	13,7	16,6	2,0	2,91	16,0
CBS-32	1.2598	32	30,15		1,35		1,12		3,25		29,4		3	0,4	3,0	36,7	14,6	14,6	2,0	2,57	13,0
CBS-35	1.3780	35	33,17		1,35		1,12		3,25		32,4	+0,4	3	0,4	3,2	39,7	16,0	13,4	2,0	2,42	11,0
CBS-37	1.4567	37	34,77		1,35		1,12		3,25		34,0		3	0,4	3,4	41,3	20,7	13,6	2,0	2,45	10,0
CBS-40	1.5748	40	38,10		1,35		1,12		3,25		37,3		3	0,4	3,6	44,6	19,3	13,5	2,0	2,50	8,0
CBS-42	1.6535	42	39,75	-0,25	1,35		1,12		3,25		38,9		3	0,4	3,8	46,3	23,5	12,9	2,0	2,39	7,0
CBS-44	1.7323	44	41,75		1,35		1,12		3,25		40,9		3	0,4	4,0	48,3	24,6	12,4	2,0	2,29	7,0
CBS-47	1.8504	47	44,60		1,35		1,12		4,04		43,7	+0,5	4	0,4	5,3	52,7	28,8	12,1	2,0	2,29	7,0
CBS-50	1.9685	50	47,60		1,35		1,12		4,04		46,7		4	0,4	5,8	55,7	30,6	13,3	2,0	2,60	6,0
CBS-52	2.0472	52	49,73		1,35		1,12		4,04		48,8		4	0,4	5,9	57,9	31,6	12,8	2,5	2,01	6,0
CBS-55	2.1654	55	52,60		1,35		1,12		4,04		51,7		4	0,4	6,2	60,7	33,8	11,8	2,5	1,90	5,0
CBS-56	2.2047	56	53,60		1,35		1,12		4,04		52,4		4	0,4	6,5	61,7	34,5	12,1	2,5	1,95	5,0
CBS-58	2.2835	58	55,60		1,35	+0,3	1,12	-0,1	4,04	-0,15	54,4		4	0,4	6,7	63,7	35,6	11,5	2,5	1,89	5,0
CBS-62	2.4409	62	59,61		1,90		1,70		4,04		58,2		4	0,6	10,5	67,7	38,1	37,6	2,5	6,18	5,0
CBS-65	2.5591	65	62,60		1,90		1,70		4,04		61,2		4	0,6	11,0	70,7	40,0	34,9	2,5	5,89	4,0
CBS-68	2.6772	68	64,82		1,90		1,70		4,85		63,4		5	0,6	12,6	74,6	55,5	40,9	2,5	7,06	4,0
CBS-72	2.8346	72	68,81		1,90		1,70		4,85		67,4	+0,8	5	0,6	14,7	78,6	59,0	38,9	2,5	6,71	4,0
CBS-75	2.9528	75	71,83		1,90		1,70		4,85		70,4		5	0,6	15,3	81,6	61,5	36,6	2,5	6,46	3,0
CBS-80	3.1496	80	76,81		1,90		1,70		4,85		75,4		5	0,6	16,3	86,6	65,7	34,8	3,0	5,25	3,0
CBS-85	3.3465	85	81,81	-0,50	1,90		1,70		4,85		80,4		5	0,6	17,5	91,6	70,0	33,5	3,0	5,16	3,0
CBS-90	3.5433	90	86,79		2,70		2,46		4,85		85,4		5	0,7	26,6	96,5	74,0	93,9	3,0	14,80	2,0
CBS-95	3.7402	95	91,82		2,70		2,46		4,85		90,4		5	0,7	28,2	101,6	76,3	86,8	3,5	12,00	2,0
CBS-100	3.9370	100	96,80		2,70		2,46		4,85		95,2		5	0,7	29,2	106,5	82,5	80,8	3,5	11,40	2,0
CBS-110	4.3307	110	106,81		2,70		2,46		4,85		105,2		5	0,7	32,8	116,6	90,7	71,2	3,5	10,40	1,0
CBS-115	4.5276	115	111,81		2,70		2,46		4,85		110,2	+1,0	5	0,7	34,4	121,6	97,7	66,6	3,5	10,00	1,0
CBS-120	4.7244	120	115,21		3,10		2,82		7,21		113,6		7	0,7	60,6	129,7	143,0	140,0	3,5	21,30	2,0
CBS-125	4.9213	125	120,22		3,10		2,82		7,21		118,6		7	0,7	63,0	134,7	155,0	132,0	4,0	17,90	2,0

CBS Constant Section
DIN 5417

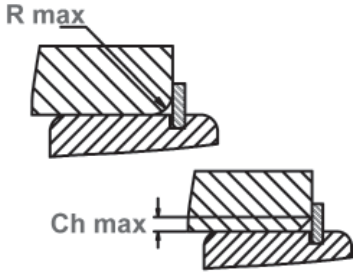
Snap Ring, External, Metric
For Bearings.
Once installed in the groove of a shaft, the portion of the ring protruding from the groove holds an assembly in place.



Free Diameter & Ring Dimensions With Section B-B



Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer

RING SIZE	SHAFT DIAMETER		GROOVE DIMENSIONS				RING DIMENSIONS & WEIGHT									SUPPLEMENTARY DATA					
			DIAMETER		WIDTH		THICKNESS		SECTION		FREE DIAMETER		GAP	RADIUS	WEIGHT						
	Ds DEC	Ds mm	Dg	TOL.	W	TOL.	T	TOL.	S	TOL.	Df	TOL.	g	r min.	kg/1000	L2	Pg	Pr	R max Ch max	P'r kN	R.P.M. X1000 (1/min)
CBS-130	5.1181	130	125,22		3,10		2,82		7,21		123,6	+1,0	7	0,7	65,6	139,7	166,0	124,7	4,0	17,30	1,0
CBS-140	5.5118	140	135,23		3,10		2,82		7,21		133,0		7	0,7	70,6	149,7	180,0	111,6	4,0	16,00	1,0
CBS-145	5.7087	145	140,23		3,10		2,82		7,21		138,0		7	0,7	73,0	154,7	186,0	106,4	4,0	15,50	1,0
CBS-150	5.9055	150	145,24		3,10		2,82		7,21		142,9	+1,6	7	0,7	77,2	159,7	193,0	101,5	4,0	15,00	1,0
CBS-160	6.2992	160	155,22		3,10	+0,3	2,82		7,21		152,9		7	0,7	81,0	169,7	206,0	92,0	4,0	14,10	1,0
CBS-170	6.6929	170	163,65		3,50		3,10		9,60		161,3		10	0,7	122,0	182,9	283,0	148,0	5,0	18,70	1,0
CBS-180	7.0866	180	173,66		3,50		3,10		9,60	-0,15	171,2		10	0,7	128,0	192,9	292,0	135,0	5,0	17,70	1,0
CBS-190	7.4803	190	183,64		3,50		3,10		9,60		181,0		10	0,7	139,0	202,9	311,0	124,0	5,0	16,70	1,0
CBS-200	7.8740	200	193,65		3,50		3,10	-0,1	9,60		191,0		10	0,7	148,0	212,9	336,0	116,0	5,0	16,00	1,0
CBS-210	8.2677	210	203,60		3,50		3,10		9,60		200,9		10	1,2	156,0	222,8	356,0	106,0	6,0	12,70	1,0
CBS-215	8.4646	215	208,60		3,50		3,10		9,60		205,9	+1,8	10	1,2	160,0	227,8	376,0	103,0	6,0	12,40	1,0
CBS-225	8.8583	225	217,00	-0,50	4,50		3,50		10,00		214,3		10	1,2	196,0	237,0	462,0	144,0	6,0	17,90	1,0
CBS-230	9.0551	230	222,00		4,50		3,50		10,00		219,2		10	1,2	200,0	242,0	473,0	139,1	6,0	17,50	1,0
CBS-240	9.4488	240	232,00		4,50		3,50		10,00		229,2		10	1,2	209,0	252,0	495,0	130,0	6,0	16,80	0,5
CBS-250	9.8425	250	242,00		4,50	+0,4	3,50		10,00		239,2		10	1,2	220,0	262,0	514,0	122,0	6,0	16,10	0,5
CBS-260	10.2362	260	252,00		4,50		3,50		10,00		247,5		10	1,2	230,0	272,0	536,0	114,0	6,0	15,50	0,5
CBS-270	10.6299	270	262,00		4,50		3,50		10,00		257,5		10	1,2	240,0	282,0	556,0	107,0	6,0	14,90	0,5
CBS-280	11.0236	280	272,00		4,50		3,50		10,00		267,5	+2,5	10	1,2	250,0	292,0	578,0	101,0	6,0	14,40	0,5
CBS-290	11.4173	290	282,00		4,50		3,50		10,00		277,5		10	1,2	260,0	302,0	598,0	95,4	6,0	13,90	0,4
CBS-300	11.8110	300	290,00		5,50		4,50		12,00		284,5		10	1,5	400,0	314,0	694,0	230,0	7,0	34,20	0,6
CBS-310	12.2047	310	300,00		5,50		4,50		12,00	-0,30	294,0		10	1,5	412,0	324,0	800,0	218,0	7,0	28,40	0,5
CBS-320	12.5984	320	310,00		5,50		4,50		12,00		304,0		10	1,5	420,0	334,0	824,0	207,0	7,0	27,60	0,5
CBS-340	13.3858	340	330,00		5,50	+0,5	4,50	-0,2	12,00		324,0		10	1,5	446,0	354,0	875,0	187,0	7,0	26,00	0,4
CBS-360	14.1732	360	350,00		5,50		4,50		12,00		343,0	+3,0	10	1,5	475,0	374,0	930,0	169,0	7,0	24,50	0,4
CBS-370	14.5669	370	360,00		5,50		4,50		12,00		353,0		10	1,5	485,0	384,0	955,0	162,0	7,0	23,80	0,4
CBS-380	14.9606	380	370,00		5,50		4,50		12,00		363,0		10	1,5	500,0	394,0	995,0	154,0	7,0	23,20	0,4
CBS-400	15.7480	400	390,00		5,50		4,50		12,00		383,0		10	1,5	525,0	414,0	1040,0	144,0	7,0	22,10	0,3

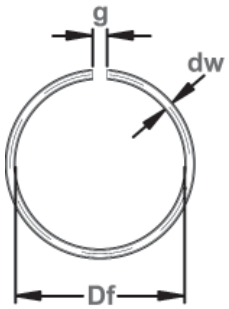
Snap Ring, External, Metric

Round Wire.

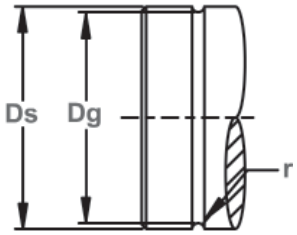
Once installed in the groove of a shaft, the portion of the ring protruding from the groove holds an assembly in place.

CRS Constant Section

DIN 7993 Type A



Free Diameter & Ring Dimensions



Shaft Diameter & Groove Dimensions

RING SIZE	SHAFT DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT					R.P.M. X1000 (1/min)
			DIAMETER		RADIUS	WIRE DIA.	FREE DIAMETER		GAP	WEIGHT	
	Ds DEC	Ds mm	Dg	TOL.	r	dw	Df	TOL.	g	kg/1000	
CRS-4	0.1575	4	3,2		0,5	0,8	3,1		1	0,044	175
CRS-5	0.1969	5	4,2		0,5	0,8	4,1	-0.2	1	0,057	112
CRS-6	0.2362	6	5,2		0,5	0,8	5,1		1	0,069	77
CRS-7	0.2756	7	6,2		0,5	0,8	6,1		2	0,077	57
CRS-8	0.3150	8	7,2	±0,05	0,5	0,8	7,1	-0,3	2	0,090	44
CRS-10	0.3937	10	9,2		0,5	0,8	9,1		2	0,115	28
CRS-12	0.4724	12	11,0		0,6	1,0	10,8		3	0,210	24
CRS-14	0.5512	14	13,0		0,6	1,0	12,8	-0,4	3	0,250	18
CRS-16	0.6299	16	14,4		0,9	1,6	14,2		3	0,740	22
CRS-18	0.7087	18	16,4		0,9	1,6	16,2		3	0,830	17
CRS-20	0.7874	20	18,0		1,1	2,0	17,7		3	1,450	18
CRS-22	0.8661	22	20,0		1,1	2,0	19,7		3	1,600	15
CRS-24	0.9449	24	22,0		1,1	2,0	21,7		3	1,780	12
CRS-25	0.9843	25	23,0		1,1	2,0	22,7	-0,5	3	1,840	11
CRS-26	1.0236	26	24,0		1,1	2,0	23,7		3	1,910	10
CRS-28	1.1024	28	26,0		1,1	2,0	25,7		3	2,070	9
CRS-30	1.1811	30	28,0		1,1	2,0	27,7		3	2,220	8
CRS-32	1.2598	32	29,5	±0,10	1,4	2,5	29,1		4	3,670	9
CRS-35	1.3780	35	32,5		1,4	2,5	32,1	-0,6	4	3,980	7
CRS-38	1.4961	38	35,5		1,4	2,5	35,1		4	4,400	6
CRS-40	1.5748	40	37,5		1,4	2,5	37,1		4	4,640	6
CRS-42	1.6535	42	39,5		1,4	2,5	39,0		4	4,870	5
CRS-45	1.7717	45	42,5		1,4	2,5	42,0		4	5,230	4
CRS-48	1.8898	48	45,5		1,4	2,5	45,0		4	5,600	4
CRS-50	1.9685	50	47,5		1,4	2,5	47,0	-0,8	4	5,830	4
CRS-55	2.1654	55	51,8		1,8	3,2	51,1		4	10,510	4
CRS-60	2.3622	60	56,8		1,8	3,2	56,1		4	11,500	3
CRS-65	2.5591	65	61,8		1,8	3,2	61,1		4	12,490	3
CRS-70	2.7559	70	66,8		1,8	3,2	66,0		5	13,400	2
CRS-75	2.9528	75	71,8		1,8	3,2	71,0		5	14,390	2
CRS-80	3.1496	80	76,8		1,8	3,2	76,0	-1,0	5	15,380	2
CRS-85	3.3465	85	81,8		1,8	3,2	81,0		5	16,380	2
CRS-90	3.5433	90	86,8	±0,15	1,8	3,2	86,0		5	17,370	1
CRS-95	3.7402	95	91,8		1,8	3,2	91,0		5	18,360	1
CRS-100	3.9370	100	96,8		1,8	3,2	95,8		5	19,310	1
CRS-105	4.1339	105	101,8		1,8	3,2	100,8		5	20,300	1
CRS-110	4.3307	110	106,8		1,8	3,2	105,8	-1,2	5	21,290	1
CRS-115	4.5276	115	111,8		1,8	3,2	110,8		5	22,290	1
CRS-120	4.7244	120	116,8		1,8	3,2	115,8		5	23,280	1
CRS-125	4.9213	125	121,8		1,8	3,2	120,8		5	24,270	1

For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)

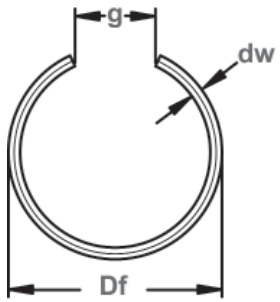
Snap Ring, Internal, Metric

Round Wire.

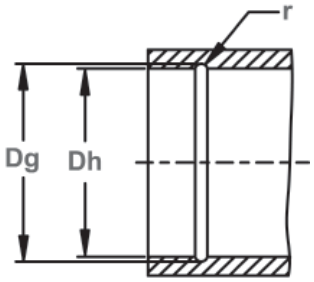
Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove holds an assembly in place.

CRH Constant Section

DIN 7993 Type B



Free Diameter & Ring Dimensions



Housing Diameter & Groove Dimensions

RING SIZE	HOUSING DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				
			DIAMETER		RADIUS	WIRE DIA.	FREE DIAMETER		GAP	WEIGHT
	Dh DEC	Dh mm	Dg	TOL.	r	dw	Df	TOL.	(g)	kg/1000
CRH-7	0.2756	7	7,80		0,5	0,8	7,9		4	0,071
CRH-8	0.3150	8	8,80		0,5	0,8	8,9	+0,3	4	0,083
CRH-10	0.3937	10	10,80		0,5	0,8	10,9		4	0,108
CRH-12	0.4724	12	13,00	±0,05	0,6	1,0	13,2		6	0,196
CRH-14	0.5512	14	15,00		0,6	1,0	15,2	+0,4	6	0,234
CRH-16	0.6299	16	17,60		0,9	1,6	17,8		8	0,706
CRH-18	0.7087	18	19,60		0,9	1,6	19,8		8	0,804
CRH-20	0.7874	20	22,00		1,1	2,0	22,3		10	1,320
CRH-22	0.8661	22	24,00		1,1	2,0	24,3		10	1,470
CRH-24	0.9449	24	26,00		1,1	2,0	26,3		10	1,630
CRH-25	0.9843	25	27,00		1,1	2,0	27,3	+0,5	10	1,700
CRH-26	1.0236	26	28,00		1,1	2,0	28,3		10	1,790
CRH-28	1.1024	28	30,00		1,1	2,0	30,3		10	1,940
CRH-30	1.1811	30	32,00	±0,10	1,1	2,0	32,3		10	2,100
CRH-32	1.2598	32	34,50		1,4	2,5	34,9		12	3,470
CRH-35	1.3780	35	37,50		1,4	2,5	37,9	+0,6	12	3,850
CRH-38	1.4961	38	40,50		1,4	2,5	40,9		12	4,200
CRH-40	1.5748	40	42,50		1,4	2,5	42,9		12	4,430
CRH-42	1.6535	42	44,50		1,4	2,5	45,0		16	4,540
CRH-45	1.7717	45	47,50		1,4	2,5	48,8		16	4,890
CRH-48	1.8898	48	50,50		1,4	2,5	51,0		16	5,240
CRH-50	1.9685	50	52,50		1,4	2,5	53,0	+0,8	16	5,510
CRH-55	2.1654	55	58,20		1,8	3,2	58,9		20	9,770
CRH-60	2.3622	60	63,20		1,8	3,2	63,9		20	10,760
CRH-65	2.5591	65	68,20		1,8	3,2	68,9		20	11,750
CRH-70	2.7559	70	73,20		1,8	3,2	74,0		25	12,440
CRH-75	2.9528	75	78,20		1,8	3,2	79,0		25	13,430
CRH-80	3.1496	80	83,20		1,8	3,2	84,0	+1,0	25	14,420
CRH-85	3.3465	85	88,20		1,8	3,2	89,0		25	15,410
CRH-90	3.5433	90	93,20	±0,15	1,8	3,2	94,0		25	16,400
CRH-95	3.7402	95	98,20		1,8	3,2	99,0		25	17,390
CRH-100	3.9370	100	103,20		1,8	3,2	104,2		32	17,980
CRH-105	4.1339	105	108,20		1,8	3,2	109,2		32	18,980
CRH-110	4.3307	110	113,20		1,8	3,2	114,2	+1,2	32	19,970
CRH-115	4.5276	115	118,20		1,8	3,2	119,2		32	20,960
CRH-120	4.7244	120	123,20		1,8	3,2	124,2		32	21,950
CRH-125	4.9213	125	128,20		1,8	3,2	129,2		32	22,940

For alternate cutoff styles, contact Rotor Clip Technical Sales at +1.732.469.7333 (E-mail: tech@rotorclip.com)

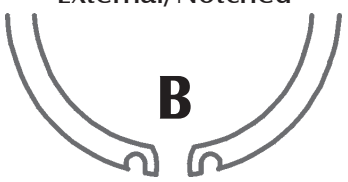
Constant Section Ring Optional **Cutoff Styles®**

The following cutoff styles represent “specials” requested by the marketplace over a period of many years.One of these configurations may suit your application requirements and may be substituted for any size ring listed in the catalog specification pages. Or, we can make any configuration your application requires. For more information, contact Rotor Clip technical sales: +1 732-469-7333, E-mail: tech@rotorclip.com.

Internal/Notched

A

External/Notched

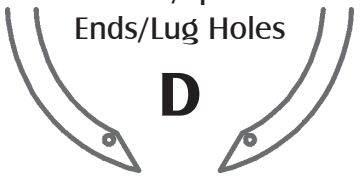


B

External/
Speared Ends

C

External/Speared
Ends/Lug Holes



D

Internal/
Butterfly Ends

E

Straight Cut/
Lug Holes

F

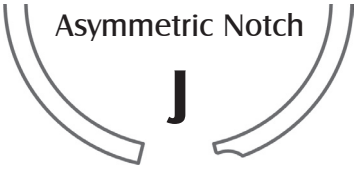
Internal/
Speared Ends

G

Straight Cut

H

Internal
Asymmetric Notch

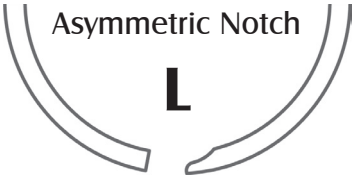


J

Straight Parallel Cut

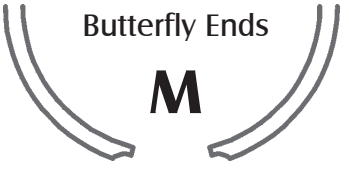
K

External
Asymmetric Notch



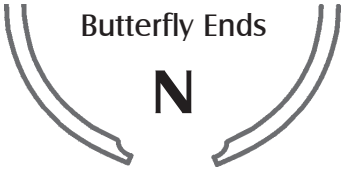
L

Internal Modified
Butterfly Ends



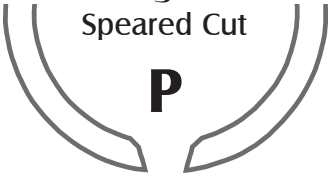
M

External Modified
Butterfly Ends



N

Angled
Speared Cut

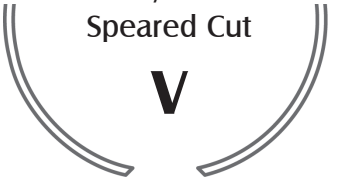


P

Internal Parallel

Q

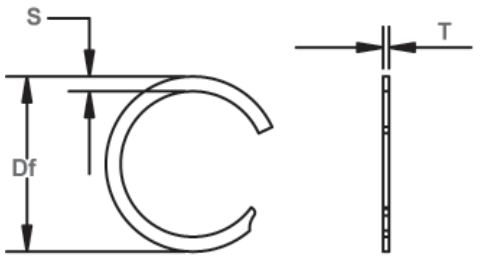
Internal/Alternate
Speared Cut



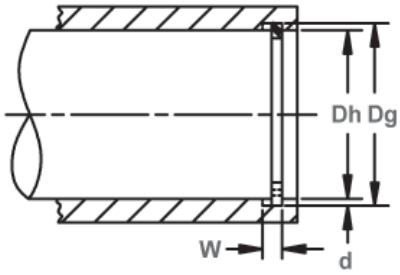
V

KL Spiral Housing Rings

Internal, Light Duty
These single-turn snap rings are ideal for light duty applications.



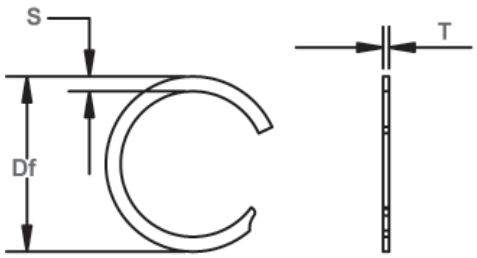
Free Diameter & Ring Measurements



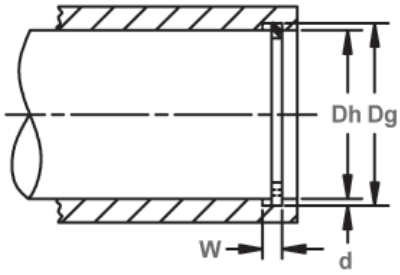
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
KL-25*	.250	.262		.015		.006	.264		.012		.020		481	106
KL-31*	.312	.326		.018		.007	.329	+.010	.015		.025		750	154
KL-37*	.375	.395		.018		.010	.398	-.000	.015		.030		901	265
KL-43	.437	.463	+.002	.018		.013	.466	+.012/-.000	.015		.030		1050	402
KL-50	.500	.528	-.002	.022		.014	.531		.018		.045		1300	500
KL-56	.562	.590		.022		.014	.593		.018		.045		1460	560
KL-62	.625	.653		.022		.014	.656		.018		.045		1630	620
KL-68	.687	.715		.022		.014	.719	+.013	.018		.045		1790	680
KL-75	.750	.779		.022		.015	.783	-.000	.018		.045		1950	800
KL-81	.812	.854		.026	+.002	.021	.862		.021	+.0015	.065		2460	1210
KL-87	.875	.917	+.003	.026	-.000	.021	.926		.021	-.0015	.065		2660	1300
KL-93	.937	.979	-.003	.026		.021	.989		.021		.065		2840	1390
KL-100	1.000	1.042		.026		.021	1.052		.021		.065		3040	1480
KL-106	1.062	1.106		.031		.022	1.117		.025		.088		3500	1650
KL-112	1.125	1.169		.031		.022	1.180		.025		.088		3710	1750
KL-118	1.187	1.231		.031		.022	1.242		.025		.088		3920	1850
KL-125	1.250	1.294	+.004	.031		.022	1.307	+.015	.025		.088		4120	1940
KL-131	1.312	1.356	-.004	.031		.022	1.369	-.000	.025		.088		4330	2040
KL-137	1.375	1.419		.031		.022	1.433		.025		.088		4540	2140
KL-143	1.437	1.481		.031		.022	1.496		.025		.088		4740	2240
KL-150	1.500	1.544		.031		.022	1.559		.025		.088		4950	2330
KL-156	1.562	1.619		.039		.029	1.637		.031		.118	+.004	6390	3200
KL-162	1.625	1.682		.039		.029	1.701		.031		.118	-.004	6650	3330
KL-168	1.687	1.744		.039		.029	1.763		.031		.118		6900	3460
KL-175	1.750	1.807	+.005	.039		.029	1.827	+.020	.031		.118		7160	3590
KL-181	1.812	1.869	-.005	.039		.029	1.890	-.000	.031		.118		7410	3710
KL-187	1.875	1.932		.039		.029	1.953		.031		.118		7670	3840
KL-193	1.937	1.994		.039		.029	2.016		.031		.118		7920	3970
KL-200	2.000	2.057		.039		.029	2.079		.031		.118		8180	4100
KL-206	2.062	2.138		.039		.038	2.162		.031		.158		8430	5540
KL-212	2.125	2.201		.039	+.003	.038	2.226		.031	+.002	.158		8690	5710
KL-218	2.187	2.263		.039	-.000	.038	2.289		.031	-.002	.158		8950	5870
KL-225	2.250	2.326		.039		.038	2.352		.031		.158		9200	6040
KL-231	2.312	2.388		.039		.038	2.415		.031		.158		9460	6210
KL-237	2.375	2.451		.039		.038	2.478		.031		.158		9720	6380
KL-243	2.437	2.513	+.006	.039		.038	2.541	+.025	.031		.158		9970	6550
KL-250	2.500	2.576	-.006	.039		.038	2.605	-.000	.031		.158		10230	6720
KL-256	2.562	2.638		.039		.038	2.667		.031		.158		10480	6880
KL-262	2.625	2.701		.039		.038	2.731		.031		.158		10740	7050
KL-268	2.687	2.763		.039		.038	2.794		.031		.158		10990	7220
KL-275	2.750	2.826		.039		.038	2.857		.031		.158		11250	7390
KL-281	2.812	2.888		.039		.038	2.920		.031		.158		11500	7550
KL-287	2.875	2.951		.039		.038	2.983		.031		.158		11760	7720
KL-293	2.937	3.013		.039		.038	3.046		.031		.158		12010	7890
KL-300	3.000	3.076		.039		.038	3.110		.031		.158		12270	8060

* No Removal Notch.



Free Diameter & Ring Measurements



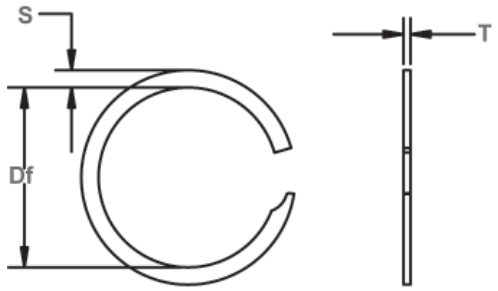
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
KL-306	3.062	3.154		.044		.046	3.188		.039		.188		15760	9960
KL-312	3.125	3.217		.044		.046	3.251		.039		.188		16080	10160
KL-318	3.187	3.279		.044		.046	3.314		.039		.188		16400	10360
KL-325	3.250	3.342		.044		.046	3.377		.039		.188		16720	10570
KL-331	3.312	3.404		.044		.046	3.440		.039		.188		17040	10770
KL-337	3.375	3.467		.044		.046	3.504		.039		.188		17370	10970
KL-343	3.437	3.529		.044		.046	3.566		.039		.188		17690	11180
KL-350	3.500	3.592		.044	+.003	.046	3.630	+.030	.039		.188		18010	11380
KL-356	3.562	3.654		.044	-.000	.046	3.692	-.000	.039		.188		18330	11580
KL-362	3.625	3.717	+.006	.044		.046	3.756		.039		.188		18650	11790
KL-368	3.687	3.779	-.006	.044		.046	3.819		.039		.188		18970	11990
KL-375	3.750	3.842		.044		.046	3.882		.039		.188		19300	12190
KL-381	3.812	3.904		.044		.046	3.945		.039		.188		19620	12400
KL-387	3.875	3.967		.044		.046	4.009		.039		.188		19940	12600
KL-393	3.937	4.029		.044		.046	4.071		.039		.188		20260	12800
KL-400	4.000	4.092		.044		.046	4.135		.039		.188	+.005	20580	13010
KL-412	4.125	4.235		.052		.055	4.279		.046		.225	-.005	23850	16040
KL-425	4.250	4.360		.052		.055	4.405		.046		.225		24570	16520
KL-437	4.375	4.485		.052		.055	4.531		.046		.225		25290	17010
KL-450	4.500	4.610		.052		.055	4.658	+.035	.046		.225		26010	17500
KL-462	4.625	4.735		.052		.055	4.784	-.000	.046		.225		26740	17980
KL-475	4.750	4.860		.052		.055	4.910		.046	+.002	.225		27460	18470
KL-487	4.875	4.985		.052		.055	5.036		.046	-.002	.225		28180	18950
KL-500	5.000	5.110		.052		.055	5.163		.046		.225		28900	19440
KL-525	5.250	5.381		.067		.066	5.435		.061		.225		40240	24490
KL-550	5.500	5.638	+.007	.067	+.004	.069	5.694		.061		.225		42160	26830
KL-575	5.750	5.894	-.007	.067	-.000	.072	5.953		.061		.225		44080	29260
KL-600	6.000	6.150		.067		.075	6.212	+.045	.061		.265		45990	31810
KL-625	6.250	6.406		.067		.078	6.470	-.000	.061		.265		47910	34460
KL-650	6.500	6.663		.067		.082	6.730		.061		.265		49830	37680
KL-675	6.750	6.919		.067		.085	6.988		.061		.265		51740	40560
KL-700	7.000	7.175		.067		.088	7.247		.061		.265		53660	43540
KL-725	7.250	7.431		.067		.091	7.505		.061		.265		55580	46640
KL-750	7.500	7.688		.067		.094	7.765		.061		.265		57490	49830
KL-775	7.750	7.944	+.008	.067		.097	8.023	+.060	.061		.300		59410	53140
KL-800	8.000	8.200	-.008	.067		.100	8.282	-.000	.061		.300		61320	56500
KL-825	8.250	8.456		.067		.103	8.541		.061		.300		63240	60000
KL-850	8.500	8.713		.067		.107	8.800		.061		.300		65160	64290
KL-875	8.750	8.969		.082		.110	9.059		.076		.345	+.004	83570	68040
KL-900	9.000	9.225		.082		.113	9.317		.076		.345	-.008	85950	71890
KL-925	9.250	9.481		.082	+.005	.116	9.576	+.070	.076		.345		88340	75850
KL-950	9.500	9.738		.082	-.000	.119	9.835	-.000	.076		.345		90730	79910
KL-975	9.750	9.994		.082		.122	10.094		.076		.345		93120	84080
KL-1000	10.000	10.250		.082		.125	10.353		.076		.345		95500	88360

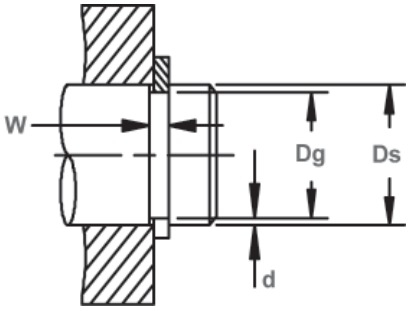
CL Spiral Shaft Rings

External, Light Duty

These single-turn snap rings are ideal for light duty applications.



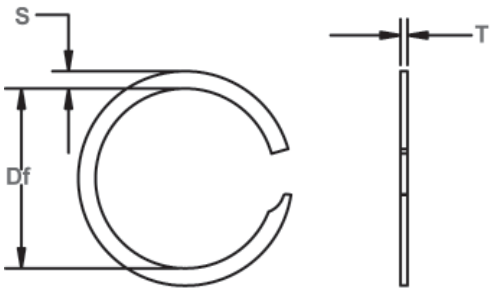
Free Diameter & Ring Measurements



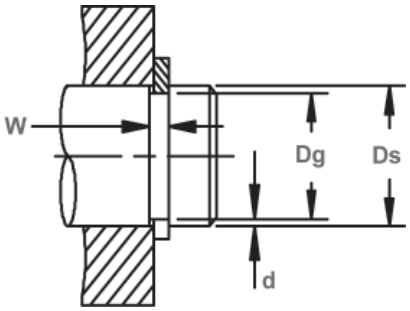
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THURST LOAD (lbs.)		R.P.M. LIMITS
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	Standard Material (Carbon Steel)
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
CL-25*	.250	.238		.015		.006	.236		.012		.020		481	106	45227
CL-31*	.312	.297		.018		.008	.294	+.000	.015		.025		750	165	39946
CL-37*	.375	.351		.018		.012	.348	-.010	.015		.025		901	318	31161
CL-43	.437	.413	+.002	.018		.012	.410	+.000/-.012	.015		.035		1050	371	24067
CL-50	.500	.472	-.002	.022		.014	.467		.018		.045		1300	500	28030
CL-56	.562	.534		.022		.014	.529		.018		.045		1460	560	21060
CL-62	.625	.597		.022		.014	.591		.018		.045		1630	620	17850
CL-68	.687	.659		.022		.014	.652	+.000	.018		.045		1790	680	15340
CL-75	.750	.722		.022		.014	.715	-.013	.018		.045		1950	740	12350
CL-81	.812	.770		.026	+.002	.021	.762		.021	+.0015	.065		2460	1210	15380
CL-87	.875	.833	+.003	.026	-.000	.021	.825		.021	-.0015	.065		2660	1300	12800
CL-93	.937	.895	-.003	.026		.021	.886		.021		.065		2840	1390	11500
CL-100	1.000	.958		.026		.021	.949		.021		.065		3040	1480	9800
CL-106	1.062	1.018		.031		.022	1.008		.025		.088		3500	1650	11490
CL-112	1.125	1.081		.031		.022	1.071		.025		.088		3710	1750	9990
CL-118	1.187	1.143		.031		.022	1.132		.025		.088		3920	1850	9220
CL-125	1.250	1.206	+.004	.031		.022	1.194	+.000	.025		.088		4120	1940	8500
CL-131	1.312	1.268	-.004	.031		.022	1.255	-.015	.025		.088		4330	2040	7880
CL-137	1.375	1.331		.031		.022	1.318		.025		.088		4540	2140	7030
CL-143	1.437	1.393		.031		.022	1.379		.025		.088		4740	2240	6560
CL-150	1.500	1.456		.031		.022	1.442		.025		.088		4950	2330	5900
CL-156	1.562	1.505		.039		.029	1.488		.031		.118	+.004	6390	3200	7720
CL-162	1.625	1.568		.039		.029	1.550		.031		.118	-.004	6650	3330	7220
CL-168	1.687	1.630		.039		.029	1.612		.031		.118		6900	3460	6590
CL-175	1.750	1.693	+.005	.039		.029	1.674	+.000	.031		.118		7160	3590	6200
CL-181	1.812	1.755	-.005	.039		.029	1.736	-.020	.031		.118		7410	3710	5700
CL-187	1.875	1.818		.039		.029	1.798		.031		.118		7670	3840	5380
CL-193	1.937	1.880		.039		.029	1.859		.031		.118		7920	3970	5100
CL-200	2.000	1.943		.039		.029	1.922		.031		.118		8180	4100	4720
CL-206	2.062	1.986		.039		.038	1.963		.031		.158		8430	5540	5970
CL-212	2.125	2.049		.039		.038	2.026		.031		.158		8690	5710	5550
CL-218	2.187	2.111		.039		.038	2.087		.031		.158		8950	5870	5290
CL-225	2.250	2.174		.039		.038	2.149		.031	+.002	.158		9200	6040	5050
CL-231	2.312	2.236		.039	+.003	.038	2.211		.031	-.002	.158		9460	6210	4720
CL-237	2.375	2.299		.039	-.000	.038	2.273		.031		.158		9720	6380	4520
CL-243	2.437	2.361		.039		.038	2.335	+.000	.031		.158		9970	6550	4240
CL-250	2.500	2.424		.039		.038	2.397	-.025	.031		.158		10230	6720	4063
CL-256	2.562	2.486	+.006	.039		.038	2.458		.031		.158		10480	6880	3900
CL-262	2.625	2.549	-.006	.039		.038	2.521		.031		.158		10740	7050	3680
CL-268	2.687	2.611		.039		.038	2.582		.031		.158		10990	7220	3540
CL-275	2.750	2.674		.039		.038	2.644		.031		.158		11250	7390	3400
CL-281	2.812	2.736		.039		.038	2.706		.031		.158		11500	7550	3220
CL-287	2.875	2.799		.039		.038	2.768		.031		.158		11760	7720	3100
CL-293	2.937	2.861		.039		.038	2.830		.031		.158		12010	7890	2940
CL-300	3.000	2.924		.039		.038	2.892		.031		.158		12270	8060	2840
CL-306	3.062	2.970		.044		.046	2.938	+.000	.039		.188	+.005	15760	9960	3670
CL-312	3.125	3.033		.044		.046	3.001	-.030	.039		.188	-.005	16080	10160	3030

* No Removal Notch.



Free Diameter & Ring Measurements



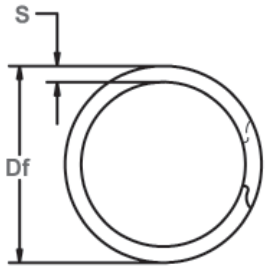
Shaft Diameter & Groove Dimensions

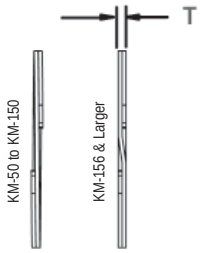
RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of	Standard Material
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.	3	2	(Carbon Steel)
CL-318	3.187	3.095		.044		.046	3.062		.039		.188		16400	10360	2930
CL-325	3.250	3.158		.044		.046	3.125		.039		.188		16720	10570	2790
CL-331	3.312	3.220		.044		.046	3.186		.039		.188		17040	10770	2700
CL-337	3.375	3.283		.044		.046	3.248		.039		.188		17370	10970	2630
CL-343	3.437	3.345		.044	+.003	.046	3.310		.039		.188		17690	11180	3500
CL-350	3.500	3.408	+.006	.044	-.000	.046	3.372	+.000	.039		.188		18010	11380	2440
CL-356	3.562	3.47	-.006	.044		.046	3.433	-.030	.039		.188		18330	11580	2370
CL-362	3.625	3.533		.044		.046	3.496		.039		.188		18650	11790	2270
CL-368	3.687	3.595		.044		.046	3.557		.039		.188		18970	11990	2210
CL-375	3.750	3.658		.044		.046	3.620		.039		.188		19300	12190	2120
CL-381	3.812	3.720		.044		.046	3.681		.039		.188		19620	12400	2060
CL-387	3.875	3.783		.044		.046	3.743		.039		.188		19940	12600	2010
CL-393	3.937	3.845		.044		.046	3.805		.039		.188		20260	12800	1930
CL-400	4.000	3.908		.044		.046	3.867		.039		.188	+.005	20580	13010	1880
CL-412	4.125	4.015		.052		.055	3.973		.046		.225	-.005	23850	16040	2090
CL-425	4.250	4.140		.052		.055	4.097		.046		.225		24570	16520	1960
CL-437	4.375	4.265		.052		.055	4.221		.046		.225		25290	17010	1850
CL-450	4.500	4.390		.052		.055	4.345	+.000	.046		.225		26010	17500	1750
CL-462	4.625	4.515		.052		.055	4.468	-.035	.046		.225		26740	17980	1670
CL-475	4.750	4.640		.052		.055	4.592		.046	+.002	.225		27460	18470	1580
CL-487	4.875	4.765	+.007	.052		.055	4.715		.046	-.002	.225		28180	18950	1520
CL-500	5.000	4.890	-.007	.052		.055	4.839		.046		.225		28900	19440	1440
CL-525	5.250	5.119		.067	+.004	.066	5.067		.061		.225		40240	24490	1310
CL-550	5.500	5.363		.067	-.000	.069	5.309		.061		.225		42160	26830	1190
CL-575	5.750	5.606		.067		.072	5.550		.061		.225		44080	29260	1090
CL-600	6.000	5.850		.067		.075	5.792	+.000	.061		.225		45990	31810	
CL-625	6.250	6.094		.067		.078	6.033	-.045	.061		.265		47910	34460	
CL-650	6.500	6.338		.067		.081	6.275		.061		.265		49830	37220	
CL-675	6.750	6.581		.067		.085	6.515		.061		.265		51740	40560	
CL-700	7.000	6.825		.067		.088	6.757		.061		.265		53660	43540	CONTACT FACTORY REGARDING MAX RPM LIMITS FOR LARGER DIAMETER RINGS
CL-725	7.250	7.069		.067		.091	6.998		.061		.300		55580	46640	
CL-750	7.500	7.313		.067		.094	7.240		.061		.300		57490	49830	
CL-775	7.750	7.556	+.008	.067		.097	7.480		.061		.300		59410	53140	
CL-800	8.000	7.800	-.008	.067		.100	7.722	+.000	.061		.300		61320	56550	
CL-825	8.250	8.044		.082		.103	7.964	-.060	.076		.345		78790	60070	
CL-850	8.500	8.288		.082		.106	8.205		.076		.345	+.004	81180	63690	
CL-875	8.750	8.531		.082		.110	8.446		.076		.345	-.008	83570	68040	
CL-900	9.000	8.775		.082	+.005	.113	8.687		.076		.345		85950	71890	
CL-925	9.250	9.019		.082	-.005	.116	8.929	+.000	.076		.345		88340	75850	
CL-950	9.500	9.263		.082		.119	9.170	-.070	.076		.345		90730	79910	
CL-975	9.750	9.506		.082		.122	9.411		.076		.345		93120	84080	
CL-1000	10.000	9.750		.082		.125	9.653		.076		.345		95500	88360	

KM Spiral Housing Rings

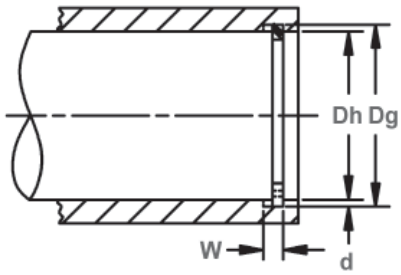
Internal, Medium Duty

These 2-turn rings provide 360° groove contact and are designed for applications with medium thrust loads.



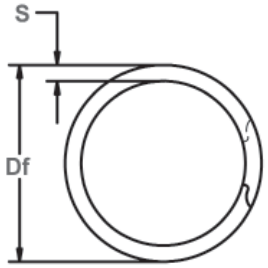


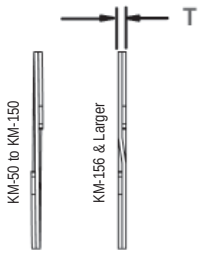
Free Diameter & Ring Measurements



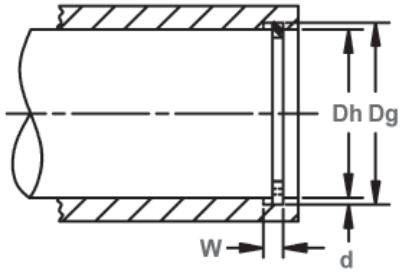
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.	3	2
KM-50	.500	.526		.030		.013	.532		.025		.045		2000	460
KM-51	.512	.538		.030		.013	.544		.025		.045		2050	470
KM-53	.531	.557		.030		.013	.564		.025		.045		2130	490
KM-56	.562	.588		.030		.013	.594		.025		.045		2250	520
KM-59	.594	.619	+.002	.030		.013	.626		.025		.045		2380	550
KM-62	.625	.651	-.002	.030		.013	.658		.025		.045		2500	570
KM-65	.656	.682		.030		.013	.689		.025		.045		2630	600
KM-68	.687	.713		.030		.013	.720		.025		.045		2750	630
KM-71	.718	.744		.030		.013	.751		.025		.045		2870	660
KM-75	.750	.782		.036		.016	.790		.031		.065		3360	850
KM-77	.777	.808		.036		.016	.817	+.013	.031		.065		3480	880
KM-78	.781	.812		.036	+.003	.016	.821	-.000	.031		.065		3500	880
KM-81	.812	.843		.036	-.000	.016	.853		.031		.065		3640	920
KM-84	.843	.880		.036		.019	.889		.031		.065		3780	1130
KM-86	.866	.903		.036		.019	.913		.031		.065		3880	1160
KM-87	.875	.912	+.003	.036		.019	.922		.031		.065		3920	1180
KM-90	.906	.943	-.003	.036		.019	.949		.031	+.002	.065	+.003	4060	1220
KM-93	.938	.975		.036		.019	.986		.031	-.002	.065	-.005	4200	1260
KM-96	.968	1.011		.042		.021	1.025		.037		.075		5180	1440
KM-98	.987	1.030		.042		.021	1.041		.037		.075		5280	1470
KM-100	1.000	1.043		.042		.021	1.054		.037		.075		5350	1480
KM-102	1.023	1.066		.042		.021	1.078		.037		.075		5470	1520
KM-103	1.031	1.074		.042		.021	1.084		.037		.075		5510	1530
KM-106	1.062	1.104		.042		.021	1.117		.037		.075		5680	1580
KM-109	1.093	1.135		.042		.021	1.147		.037		.075		5840	1620
KM-112	1.125	1.167		.042		.021	1.180		.037		.075		6020	1670
KM-115	1.156	1.198		.042		.021	1.210		.037		.075		6180	1720
KM-118	1.188	1.236		.048		.024	1.249		.043		.085		7380	2020
KM-121	1.218	1.266		.048		.024	1.278		.043		.085		7570	2070
KM-125	1.250	1.298	+.004	.048		.024	1.312		.043		.085		7770	2120
KM-128	1.281	1.329	-.004	.048		.024	1.342	+.015	.043		.085		7960	2170
KM-131	1.312	1.360		.048	+.004	.024	1.374	-.000	.043		.085		8150	2230
KM-134	1.343	1.395		.048	-.000	.026	1.408		.043		.085		8350	2470
KM-137	1.375	1.427		.048		.026	1.442		.043		.095		8540	2530
KM-140	1.406	1.458		.048		.026	1.472		.043		.095		8740	2580
KM-143	1.437	1.489		.048		.026	1.504		.043		.095		8930	2640
KM-145	1.456	1.508		.048		.026	1.523		.043		.095		9050	2680
KM-146	1.468	1.520		.048		.026	1.535		.043		.095		9120	2700
KM-150	1.500	1.552		.048		.026	1.567		.043		.095		9320	2760





Free Diameter & Ring Measurements



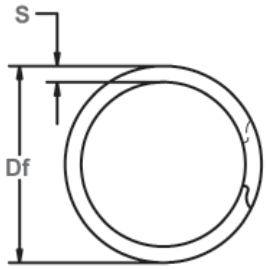
Housing Diameter & Groove Dimensions

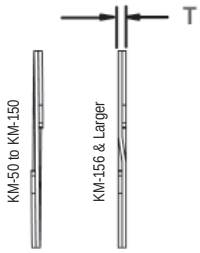
RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
KM-156	1.562	1.617		.056		.028	1.634		.049		.108		10100	3090
KM-157	1.574	1.633		.056		.030	1.649		.049		.108		10180	3340
KM-162	1.625	1.684		.056		.030	1.701		.049		.108		10510	3350
KM-165	1.653	1.712		.056		.030	1.730		.049		.108		10690	3510
KM-168	1.687	1.750	+.005	.056		.031	1.768	+.020	.049		.118		10910	3700
KM-175	1.750	1.813	-.005	.056		.031	1.834	-.000	.049		.118		11310	3840
KM-181	1.813	1.875		.056		.031	1.894		.049		.118		11720	3970
KM-185	1.850	1.917		.056		.034	1.937		.049		.118		11960	4450
KM-187	1.875	1.942		.056		.034	1.960		.049		.118		12120	4510
KM-193	1.938	2.005		.056		.034	2.025		.049		.118		12530	4660
KM-200	2.000	2.071		.056		.035	2.091		.049		.128		12930	4950
KM-204	2.047	2.118		.056		.035	2.138		.049		.128		18240	5060
KM-206	2.062	2.132		.056		.035	2.154		.049		.128	+.003	13330	5100
KM-212	2.125	2.195		.056		.035	2.217		.049		.128	-.005	13740	5260
KM-216	2.165	2.239		.056	+.004	.037	2.260		.049		.138		14000	5660
KM-218	2.188	2.262		.056	-.000	.037	2.284		.049		.138		14150	5720
KM-225	2.250	2.324		.056		.037	2.347		.049		.138		14550	5890
KM-231	2.312	2.390		.056		.039	2.413		.049		.138		14950	6370
KM-237	2.375	2.453		.056		.039	2.476		.049		.138		15360	6550
KM-243	2.437	2.519		.056		.041	2.543		.049		.148		15760	7060
KM-244	2.440	2.522		.056		.041	2.546		.049		.148		15780	7070
KM-250	2.500	2.582		.056		.041	2.606	+.025	.049	+.003	.148		16160	7250
KM-253	2.531	2.617		.056		.043	2.641	-.000	.049	-.003	.148		16360	7690
KM-256	2.562	2.648		.056		.043	2.673		.049		.148		16560	7790
KM-262	2.625	2.711		.056		.043	2.736		.049		.148		16970	7980
KM-267	2.677	2.767	+.006	.056		.045	2.789		.049		.158		17310	8520
KM-268	2.688	2.778	-.006	.056		.045	2.803		.049		.158		17380	8550
KM-275	2.750	2.841		.056		.045	2.865		.049		.158		17780	8750
KM-281	2.813	2.903		.056		.045	2.929		.049		.158		18190	8950
KM-283	2.834	2.928		.056		.047	2.954		.049		.168		18320	9520
KM-287	2.875	2.969		.056		.047	2.995		.049		.168		18590	9550
KM-293	2.937	3.031		.056		.047	3.058		.049		.168		18990	9760
KM-295	2.952	3.046		.056		.047	3.073		.049		.168		19090	9810
KM-300	3.000	3.096		.068		.048	3.122		.061		.168		24150	10180
KM-306	3.062	3.158		.068		.048	3.186		.061		.168	+.004	24650	10390
KM-312	3.125	3.223		.068		.048	3.251		.061		.178	-.006	25150	10600
KM-314	3.149	3.247		.068	+.005	.048	3.276		.061		.178		25350	10680
KM-318	3.187	3.283		.068	-.000	.048	3.311	+.030	.061		.178		25650	10810
KM-325	3.250	3.350		.068		.050	3.379	-.000	.061		.178		26160	11490
KM-331	3.312	3.416		.068		.052	3.446		.061		.188		26660	12170
KM-334	3.346	3.450		.068		.052	3.479		.061		.188		26930	12300
KM-337	3.375	3.479		.068		.052	3.509		.061		.188		27170	12410

KM Spiral Housing Rings

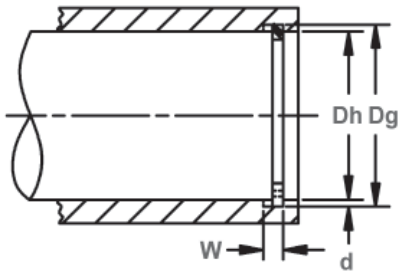
Internal, Medium Duty

These 2-turn rings provide 360° groove contact and are designed for applications with medium thrust loads.



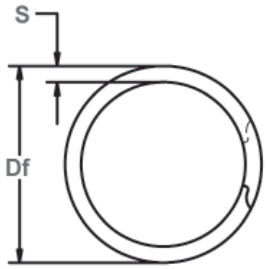


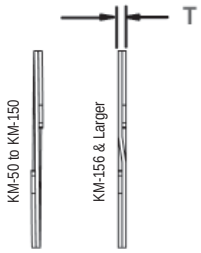
Free Diameter & Ring Measurements



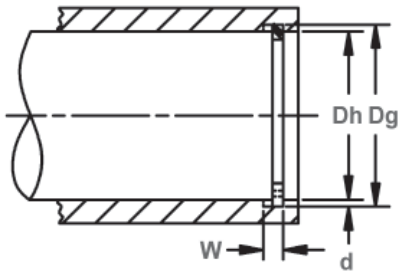
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.	3	2
KM-343	3.437	3.543		.068		.053	3.574		.061		.188		27660	12880
KM-350	3.500	3.606		.068		.053	3.636		.061		.188		28170	13110
KM-354	3.543	3.653		.068		.055	3.684		.061		.198		28520	13770
KM-356	3.562	3.672		.068		.055	3.703		.061		.198		28670	13850
KM-362	3.625	3.737		.068		.056	3.769		.061		.198		29180	14350
KM-368	3.687	3.799		.068		.056	3.832	+.030	.061		.198		29680	14600
KM-374	3.740	3.852		.068		.056	3.885	-.000	.061		.198		30100	14800
KM-375	3.750	3.862		.068		.056	3.894		.061	+.003	.198		30180	14840
KM-381	3.812	3.930		.068		.059	3.963		.061	-.003	.208		30680	15900
KM-387	3.875	3.993		.068		.059	4.025		.061		.208		31190	16160
KM-393	3.938	4.056		.068		.059	4.089		.061		.208		31700	16420
KM-400	4.000	4.124		.068		.062	4.157		.061		.218		32200	17530
KM-406	4.063	4.187		.068		.062	4.222		.061		.218		32700	17810
KM-412	4.125	4.249	+.006	.068		.062	4.284		.061		.218		33200	18080
KM-418	4.188	4.311	-.006	.068	+.005	.062	4.347		.061		.218		33710	18350
KM-425	4.250	4.380		.068	-.000	.065	4.416		.061		.228		34210	19530
KM-431	4.312	4.442		.068		.065	4.479		.061		.228		34710	19810
KM-433	4.330	4.460		.068		.065	4.497		.061		.228	+.004	34850	19900
KM-437	4.375	4.505		.068		.065	4.543		.061		.228	-.006	35210	20100
KM-443	4.437	4.573		.068		.068	4.611		.061		.238		35710	21330
KM-450	4.500	4.636		.068		.068	4.674		.061		.238		36220	21630
KM-452	4.527	4.663		.068		.068	4.701		.061		.238		36440	21760
KM-456	4.562	4.698		.068		.068	4.737	+.035	.061		.238		36720	21930
KM-462	4.625	4.765		.079		.070	4.803	-.000	.072		.250		43940	22890
KM-468	4.687	4.827		.079		.070	4.867		.072		.250		44530	23190
KM-472	4.724	4.864		.079		.070	4.903		.072		.250		44880	23370
KM-475	4.750	4.890		.079		.070	4.930		.072		.250		45130	23500
KM-481	4.812	4.952		.079		.070	4.993		.072		.250		45720	23810
KM-487	4.875	5.015		.079		.070	5.055		.072		.250		46310	24120
KM-492	4.921	5.061		.079		.070	5.102		.072		.250		46750	24350
KM-493	4.937	5.081		.079		.072	5.122		.072	+.004	.250		46900	25130
KM-500	5.000	5.144		.079		.072	5.185		.072	-.004	.250		47500	25450
KM-511	5.118	5.262		.079		.072	5.304		.072		.250		48620	26050
KM-512	5.125	5.269		.079		.072	5.311		.072		.250		48690	26100
KM-525	5.250	5.393		.079		.072	5.436		.072		.250		49880	26720
KM-537	5.375	5.522		.079		.074	5.566		.072		.250		51060	28120
KM-550	5.500	5.647	+.007	.079		.074	5.693	+.045	.072		.250		52250	28770
KM-551	5.511	5.658	-.007	.079		.074	5.703	-.000	.072		.250		52360	28830
KM-562	5.625	5.772		.079		.074	5.818		.072		.250		53440	29400
KM-570	5.708	5.861		.079		.077	5.909		.072		.250		54230	31070
KM-575	5.750	5.903		.079		.077	5.950		.072		.250		54630	31300





Free Diameter & Ring Measurements



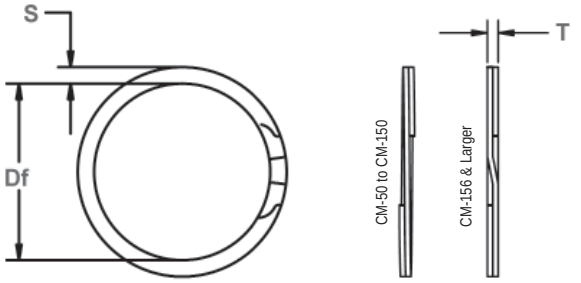
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
KM-587	5.875	6.028	+.007	.079	+.005	.077	6.077		.072		.250	+.004	55810	31980
KM-590	5.905	6.058	-.007	.079	-.000	.077	6.106	+.045	.072		.250	-.006	56100	32140
KM-600	6.000	6.153		.079		.077	6.202	-.000	.072		.250		57000	32660
KM-612	6.125	6.297		.094		.086	6.349		.086		.312		69500	37200
KM-625	6.250	6.422		.094		.086	6.474		.086		.312		70920	37990
KM-629	6.299	6.471		.094		.086	6.524		.086		.312		71480	38290
KM-637	6.375	6.547		.094		.086	6.601		.086		.312		72340	38750
KM-650	6.500	6.672		.094		.086	6.726		.086		.312		73760	39510
KM-662	6.625	6.807		.094		.091	6.863	+.055	.086		.312		75180	42620
KM-669	6.692	6.874		.094		.091	6.931	-.000	.086		.312		75940	43050
KM-675	6.750	6.932		.094		.091	6.987		.086		.312		76600	43420
KM-687	6.875	7.057		.094		.091	7.114		.086		.312		78010	44220
KM-700	7.000	7.182		.094		.091	7.239		.086		.312		79430	45030
KM-708	7.086	7.278		.094		.096	7.337		.086		.312		80410	48080
KM-712	7.125	7.317		.094		.096	7.376		.086		.312		80850	48350
KM-725	7.250	7.442		.094		.096	7.501		.086		.312		82270	49200
KM-737	7.375	7.567		.094		.096	7.628		.086		.312		83690	50050
KM-748	7.480	7.672		.094		.096	7.734		.086		.312	+.004	84880	50760
KM-750	7.500	7.692	+.008	.094	+.006	.096	7.754		.086		.312	-.008	85110	50890
KM-762	7.625	7.827	-.008	.094	-.000	.101	7.890		.086		.312		86520	54440
KM-775	7.750	7.952		.094		.101	8.014		.086	+.004	.312		87940	55330
KM-787	7.875	8.077		.094		.101	8.131		.086	-.004	.312		89360	63360
KM-800	8.000	8.202		.094		.101	8.266		.086		.312		90780	57110
KM-825	8.250	8.462		.094		.106	8.528		.086		.375		93620	61820
KM-826	8.267	8.479		.094		.106	8.546		.086		.375		93810	61940
KM-846	8.464	8.676		.094		.106	8.744	+.065	.086		.375		96050	63420
KM-850	8.500	8.712		.094		.106	8.780	-.000	.086		.375		96450	63690
KM-875	8.750	8.972		.094		.111	9.041		.086		.375		99290	68650
KM-885	8.858	9.080		.094		.111	9.151		.086		.375		100520	69500
KM-900	9.000	9.222		.094		.111	9.293		.086		.375		102130	70620
KM-905	9.055	9.287		.094		.116	9.359		.086		.375		102750	74250
KM-925	9.250	9.482		.094		.116	9.555		.086		.375		104960	75850
KM-944	9.448	9.680		.094		.116	9.755		.086		.375		107210	77470
KM-950	9.500	9.732		.094		.116	9.806		.086		.375		107800	77900
KM-975	9.750	9.992		.094		.121	10.068		.086		.375		110640	83390
KM-1000	10.000	10.242		.094		.121	10.320		.086		.375		113470	85530
KM-1025	10.250	10.502		.094		.126	10.582		.086		.375		116310	91290
KM-1050	10.500	10.752		.094		.126	10.834		.086		.375		119150	93520
KM-1075	10.750	11.012		.094		.131	11.095		.086		.375		121990	99540
KM-1100	11.000	11.262		.094		.131	11.347		.086		.375		124820	101860

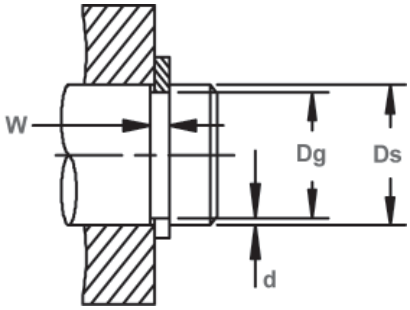
CM Spiral Shaft Rings

External, Medium Duty

These 2-turn rings provide 360° groove contact and are designed for applications with medium thrust loads.

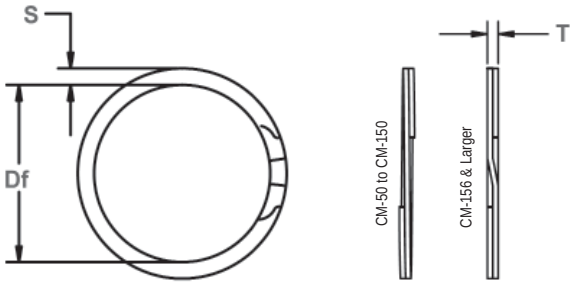


Free Diameter & Ring Measurements

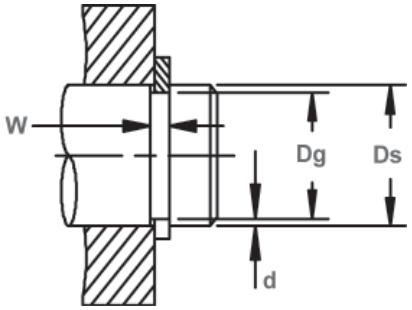


Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	Standard Material (Carbon Steel)
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
CM-50	.500	.474		.030		.013	.467		.025		.045		2000	460	24650
CM-53	.531	.505	+.002	.030		.013	.498		.025		.045		2130	490	21280
CM-55	.551	.525	-.002	.030		.013	.518		.025		.045		2210	510	19440
CM-56	.562	.536		.030		.013	.529		.025		.045		2250	520	18520
CM-59	.594	.569		.030		.013	.561		.025		.045		2380	550	17290
CM-62	.625	.594		.030		.016	.585		.025		.055		2500	710	19500
CM-65	.656	.625		.030		.016	.617		.025		.055		2630	740	16270
CM-66	.669	.638		.030		.016	.629		.025		.055		2680	760	16510
CM-68	.687	.656		.030		.016	.647		.025		.055		2750	780	15470
CM-71	.718	.687		.030		.016	.679	+.000	.025		.055		2880	810	13050
CM-75	.750	.719		.036		.016	.710	-.013	.031		.065		3360	850	14290
CM-78	.781	.750	+.003	.036	+.003	.016	.741		.031		.065		3500	880	12960
CM-81	.812	.781	-.003	.036	-.000	.016	.771		.031		.065		3640	920	12470
CM-84	.843	.812		.036		.016	.803		.031		.065		3780	950	10770
CM-87	.875	.838		.036		.019	.828		.031		.065		3920	1180	10570
CM-90	.906	.869		.036		.019	.860		.031		.065		4060	1220	9180
CM-93	.937	.900		.036		.019	.889		.031	+.002	.065	+.003	4200	1260	9400
CM-96	.968	.925		.042		.021	.916		.037	-.002	.075	-.005	5180	1440	8920
CM-98	.984	.941		.042		.021	.930		.037		.075		5260	1460	9530
CM-100	1.000	.957		.042		.021	.946		.037		.075		5350	1480	9160
CM-102	1.023	.980		.042		.021	.968		.037		.075		5470	1520	9070
CM-103	1.031	.988		.042		.021	.978		.037		.075		5510	1530	8080
CM-106	1.062	1.020		.042		.021	1.007		.037		.075		5680	1580	8610
CM-109	1.093	1.051		.042		.021	1.040		.037		.075		5840	1620	7350
CM-112	1.125	1.083		.042		.021	1.070		.037		.075		6020	1670	7470
CM-115	1.156	1.114		.042		.021	1.102		.037		.075		6180	1720	6700
CM-118	1.188	1.140		.048		.024	1.127		.043		.085		7380	2020	7350
CM-121	1.218	1.170		.048		.024	1.159		.043		.085		7570	2070	6340
CM-125	1.250	1.202	+.004	.048		.024	1.188	+.000	.043		.085		7770	2120	6750
CM-128	1.281	1.233	-.004	.048		.024	1.221	-.015	.043		.085		7960	2170	5860
CM-131	1.312	1.264		.048	+.004	.024	1.251		.043		.095		8150	2230	6310
CM-134	1.343	1.295		.048	-.000	.024	1.282		.043		.095		8350	2280	5960
CM-137	1.375	1.323		.048		.026	1.308		.043		.095		8540	2530	6110
CM-140	1.406	1.354		.048		.026	1.340		.043		.095		8740	2580	5580
CM-143	1.437	1.385		.048		.026	1.370		.043		.095		8930	2640	5490
CM-146	1.468	1.416		.048		.026	1.402		.043		.095		9120	2700	5020
CM-150	1.500	1.448		.048		.026	1.433		.043		.095		9320	2760	4940



Free Diameter & Ring Measurements



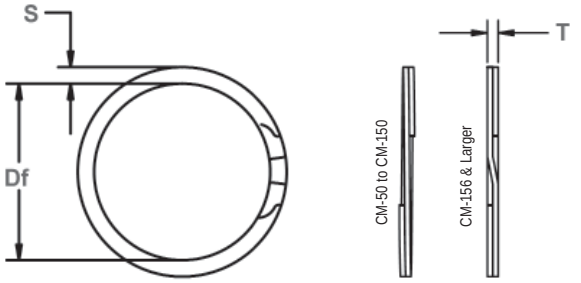
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS Standard Material (Carbon Steel)
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
CM-156	1.562	1.507		.056		.028	1.490		.049		.108		10100	3090	5343
CM-157	1.575	1.520		.056		.028	1.503		.049		.108		10190	3120	5240
CM-162	1.625	1.566		.056		.030	1.549		.049		.108		10510	3450	4880
CM-168	1.687	1.628		.056		.030	1.610		.049		.118		10910	3580	4930
CM-175	1.750	1.691	+.005	.056		.030	1.673		.049		.118		11310	3710	4510
CM-177	1.771	1.708	-.005	.056		.032	1.690		.049		.118		11450	4010	4410
CM-181	1.813	1.749		.056		.032	1.730	+.000	.049		.118		11720	4100	4290
CM-187	1.875	1.808		.056		.034	1.789	-.020	.049		.128		12120	4510	4240
CM-193	1.938	1.871		.056		.034	1.844		.049		.128		12530	4660	4020
CM-196	1.969	1.902		.056		.034	1.882		.049		.128	+.003	12730	4730	3860
CM-200	2.000	1.929		.056		.035	1.909		.049		.128	-.005	12930	4950	3740
CM-206	2.062	1.992		.056		.035	1.971		.049		.128		13330	5100	3550
CM-212	2.125	2.051		.056	+.004	.037	2.029		.049		.128		13740	5560	3400
CM-215	2.156	2.082		.056	-.000	.037	2.060		.049		.138		13940	5640	3490
CM-216	2.165	2.091		.056		.037	2.070		.049	+.003	.138		14000	5660	3370
CM-218	2.188	2.113		.056		.037	2.092		.049	-.003	.138		14150	5720	3290
CM-225	2.250	2.176		.056		.037	2.153		.049		.138		14550	5890	3220
CM-231	2.312	2.234		.056		.039	2.211		.049		.138		14950	6370	3020
CM-236	2.362	2.284		.056		.039	2.261	+.000	.049		.138		15270	6510	2870
CM-237	2.375	2.297		.056		.039	2.273	-.025	.049		.138		15360	6550	2890
CM-243	2.437	2.355		.056		.041	2.331		.049		.148		15760	7060	2920
CM-250	2.500	2.418	+.006	.056		.041	2.394		.049		.148		16160	7250	2750
CM-255	2.559	2.473	-.006	.056		.043	2.449		.049		.148		16550	7780	2600
CM-256	2.562	2.476		.056		.043	2.452		.049		.148		16560	7790	2600
CM-262	2.625	2.539		.056		.043	2.514		.049		.148		16970	7980	2500
CM-268	2.688	2.597		.056		.045	2.572		.049		.158		17380	8550	2470
CM-275	2.750	2.660		.056		.045	2.635		.049		.158		17780	8750	2340
CM-281	2.813	2.722		.056		.045	2.696		.049		.168		18190	8950	2380
CM-287	2.875	2.781		.056		.047	2.755		.049		.168		18590	9550	2260
CM-293	2.937	2.843		.056		.047	2.817		.049		.168		18990	9760	2140
CM-295	2.952	2.858		.056		.047	2.831	+.000	.049		.168		19090	9810	2160
CM-300	3.000	2.904		.068		.048	2.877	-.030	.061		.168	+.004	24150	10180	2080
CM-306	3.062	2.966		.068		.048	2.938		.061		.168	-.006	24650	10390	2020
CM-312	3.125	3.027		.068	+.005	.049	3.000		.061		.178		25150	10820	1980
CM-314	3.149	3.051		.068	-.000	.049	3.023		.061		.178		25350	10910	1980
CM-318	3.187	3.089		.068		.049	3.061		.061		.178		25650	11040	1930
CM-325	3.250	3.150		.068		.050	3.121		.061		.178		26160	11490	1870

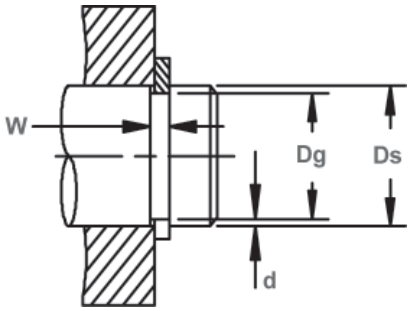
CM Spiral Shaft Rings

External, Medium Duty

These 2-turn rings provide 360° groove contact and are designed for applications with medium thrust loads.

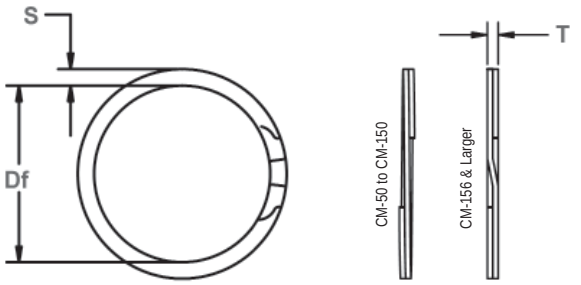


Free Diameter & Ring Measurements

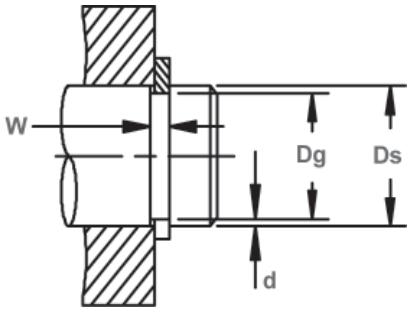


Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	Standard Material (Carbon Steel)
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
CM-331	3.312	3.208		.068		.052	3.180		.061		.188		26660	12170	1840
CM-334	3.343	3.239		.068		.052	3.210	+.000	.061		.188		26910	12290	1840
CM-337	3.375	3.271		.068		.052	3.242	-.030	.061		.188		27170	12410	1790
CM-343	3.437	3.331		.068		.053	3.301		.061		.188		27660	12880	1750
CM-350	3.500	3.394		.068		.053	3.363		.061		.188		28170	13110	1700
CM-354	3.543	3.433		.068		.055	3.402		.061		.198		28520	13770	1730
CM-356	3.562	3.452		.068		.055	3.422		.061		.198		28670	13850	1680
CM-362	3.625	3.515		.068		.055	3.483		.061		.198		29180	14090	1660
CM-368	3.687	3.575		.068		.056	3.543		.061		.198		29680	14600	1600
CM-374	3.740	3.628		.068		.056	3.597		.061		.198		30100	14800	1520
CM-375	3.750	3.638		.068		.056	3.606		.061		.198		30180	14840	1530
CM-381	3.812	3.700		.068		.056	3.668		.061	+.003	.198		30680	15090	1470
CM-387	3.875	3.757		.068		.059	3.724		.061	-.003	.208		31190	16160	1500
CM-393	3.938	3.820		.068		.059	3.784		.061		.208		31700	16420	1510
CM-400	4.000	3.876	+.006	.068	+.005	.062	3.842		.061		.218	+.004	32200	17530	1470
CM-406	4.063	3.939	-.006	.068	-.000	.062	3.906		.061		.218	-.006	32700	17810	1400
CM-412	4.125	4.000		.068		.062	3.967		.061		.218		33200	18080	1350
CM-413	4.134	4.010		.068		.062	3.975		.061		.218		33270	18120	1380
CM-418	4.188	4.058		.068		.065	4.030	+.000	.061		.218		33710	19240	1360
CM-425	4.250	4.120		.068		.065	4.084	-.040	.061		.228		34210	19530	1360
CM-431	4.312	4.182		.068		.065	4.147		.061		.228		34710	19810	1300
CM-433	4.331	4.200		.068		.065	4.164		.061		.228		34860	19900	1300
CM-437	4.375	4.245		.068		.065	4.208		.061		.228		35210	20100	1290
CM-443	4.437	4.307		.068		.065	4.271		.061		.228		35710	20390	1230
CM-450	4.500	4.364		.068		.068	4.326		.061		.238		36220	21630	1270
CM-456	4.562	4.422		.079		.070	4.384		.072		.250		43340	22570	1280
CM-462	4.625	4.485		.079		.070	4.447		.072		.250		43940	22890	1240
CM-468	4.687	4.547		.079		.070	4.508		.072		.250		44530	23190	1220
CM-472	4.724	4.584		.079		.070	4.546		.072		.250		44880	23370	1180
CM-475	4.750	4.610		.079		.070	4.571		.072	+.004	.250		45130	23500	1180
CM-481	4.812	4.672		.079		.070	4.633		.072	-.004	.250		45720	23810	1140
CM-487	4.875	4.735		.079		.070	4.695		.072		.250		46310	24120	1120
CM-493	4.937	4.797		.079		.070	4.757		.072		.250		46900	24430	1090
CM-500	5.000	4.856		.079		.072	4.820		.072		.250		47500	25450	1050
CM-511	5.118	4.974		.079		.072	4.934		.072		.250		48620	26050	1000
CM-512	5.125	4.981		.079		.072	4.939		.072		.250		48690	26080	1020



Free Diameter & Ring Measurements



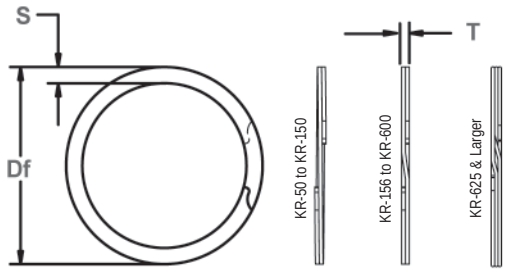
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS Standard Material (Carbon Steel)
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
CM-525	5.250	5.107		.079		.072	5.064		.072		.250		49880	26720	970
CM-537	5.375	5.228		.079		.074	5.187		.072		.250		51060	28120	900
CM-550	5.500	5.353		.079		.074	5.308		.072		.250		52250	28770	890
CM-551	5.511	5.364	+.007	.079	+.005	.074	5.320		.072		.250	+.004	52360	28830	870
CM-562	5.625	5.478	-.007	.079	-.000	.074	5.433	+.000	.072		.250	-.006	53440	29420	840
CM-575	5.750	5.597		.079		.077	5.550	-.050	.072		.250		54630	31300	820
CM-587	5.875	5.722		.079		.077	5.674		.072		.250		55810	31980	
CM-590	5.905	5.752		.079		.077	5.705		.072		.250		56100	32140	
CM-600	6.000	5.847		.079		.077	5.798		.072		.250		57000	32660	
CM-612	6.125	5.953		.094		.086	5.903		.086		.312		69500	37230	
CM-625	6.250	6.078		.094		.086	6.026		.086		.312		70920	37990	
CM-629	6.299	6.127		.094		.086	6.076		.086		.312		71480	38290	
CM-637	6.375	6.203		.094		.086	6.152		.086		.312		72340	38750	
CM-650	6.500	6.328		.094		.086	6.274		.086		.312		73760	39510	
CM-662	6.625	6.443		.094		.091	6.390	+.000	.086		.312		75180	42620	
CM-675	6.750	6.568		.094		.091	6.513	-.060	.086		.312		76600	43420	
CM-687	6.875	6.693		.094		.091	6.638		.086		.312		78010	44220	
CM-700	7.000	6.818		.094		.091	6.761		.086		.312		79430	45030	CONTACT FACTORY REGARDING MAX RPM LIMITS FOR LARGER DIAMETER RINGS.
CM-712	7.125	6.933		.094		.096	6.877		.086	+.004	.312		80850	48350	
CM-725	7.250	7.058		.094		.096	6.999		.086	-.004	.312		82270	49200	
CM-737	7.375	7.183		.094		.096	7.125		.086		.312		83690	50050	
CM-750	7.500	7.308	+.008	.094	+.006	.096	7.250		.086		.312	+.004	85110	50890	
CM-762	7.625	7.423	-.008	.094	-.000	.101	7.363		.086		.312	-.008	86520	54440	
CM-775	7.750	7.548		.094		.101	7.486		.086		.312		87940	55330	
CM-787	7.875	7.673		.094		.101	7.611		.086		.312		89360	56220	
CM-800	8.000	7.798		.094		.101	7.734		.086		.312		90780	57110	
CM-825	8.250	8.038		.094		.106	7.972		.086		.375		93620	61820	
CM-850	8.500	8.288		.094		.106	8.220	+.000	.086		.375		96450	63690	
CM-875	8.750	8.528		.094		.111	8.459	-.070	.086		.375		99290	68650	
CM-900	9.000	8.778		.094		.111	8.707		.086		.375		102130	70620	
CM-925	9.250	9.018		.094		.116	8.945		.086		.375		104960	75850	
CM-950	9.500	9.268		.094		.116	9.194		.086		.375		107800	77900	
CM-975	9.750	9.508		.094		.121	9.432		.086		.375		110640	83390	
CM-1000	10.000	9.758		.094		.121	9.680		.086		.375		113470	85530	
CM-1025	10.250	9.998		.094		.126	9.918		.086		.375		116310	91290	
CM-1050	10.500	10.248		.094		.126	10.166		.086		.375		119150	93520	
CM-1075	10.750	10.488		.094		.131	10.405		.086		.375		121990	99540	
CM-1100	11.000	10.738		.094		.131	10.653		.086		.375		124820	101860	

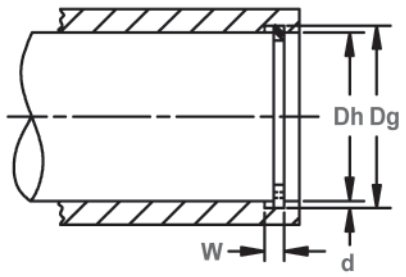
KR Spiral Housing Rings

Internal, Medium-Heavy Duty

These 2-turn and multi-turn rings provide 360° groove contact and are designed for applications with medium-high thrust loads.

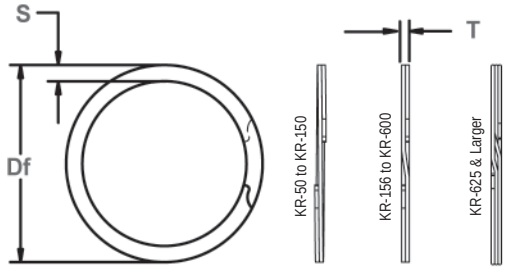


Free Diameter & Ring Measurements

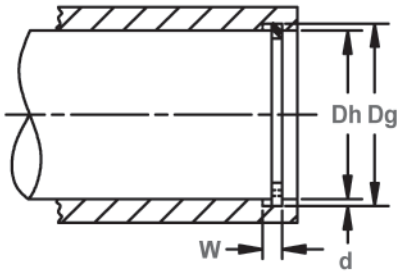


Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.	3	2
KR-50	.500	.524	+.002/-.002	.039		.012	.529		.035		.045		2530	420
KR-51	.512	.536		.039		.012	.541		.035		.045		2590	430
KR-56	.562	.592		.039		.015	.597		.035		.045		2840	600
KR-62	.625	.659		.039		.017	.665		.035		.045		3160	750
KR-68	.688	.724		.039		.018	.730		.035		.055		3480	880
KR-75	.750	.790	+.003	.039		.020	.796		.035		.055		3790	1060
KR-77	.777	.819	-.003	.046	+.003	.021	.825	+.013	.042		.065		4720	1150
KR-81	.812	.857		.046	-.000	.023	.864	-.000	.042		.065		4930	1320
KR-86	.866	.912		.046		.023	.919		.042		.065		5260	1410
KR-87	.875	.922		.046		.024	.929		.042	+.002	.065		5310	1480
KR-90	.901	.950		.046		.025	.957		.042	-.002	.065		5470	1590
KR-93	.938	.989		.046		.026	.997		.042		.075		5690	1720
KR-100	1.000	1.055		.046		.028	1.063		.042		.075		6070	1980
KR-102	1.023	1.079		.046		.028	1.087		.042		.075		6210	2030
KR-106	1.062	1.120		.056		.029	1.129		.050		.078		7010	2180
KR-112	1.125	1.185		.056		.030	1.195		.050		.078	+.004	7420	2390
KR-118	1.188	1.250		.056		.031	1.260		.050		.088	-.004	7840	2600
KR-125	1.250	1.320	+.004	.056		.035	1.330	+.015	.050		.093		8250	3090
KR-131	1.312	1.385	-.004	.056		.037	1.395	-.000	.050		.093		8660	3430
KR-137	1.375	1.450		.056		.038	1.461		.050		.098		9070	3690
KR-143	1.438	1.515		.056		.039	1.526		.050		.103		9490	3960
KR-145	1.456	1.535		.056		.040	1.546		.050		.108		9610	4120
KR-150	1.500	1.580		.056	+.004	.040	1.591		.050		.108		9900	4240
KR-156	1.562	1.647		.068	-.000	.043	1.659		.062		.113		12780	4750
KR-162	1.625	1.715		.068		.045	1.727		.062		.113		13290	5170
KR-165	1.653	1.745		.068		.046	1.757		.062		.118		13520	5380
KR-168	1.688	1.780		.068		.046	1.793		.062		.118		13810	5490
KR-175	1.750	1.845	+.005	.068		.048	1.858	+.020	.062		.118		14320	5940
KR-181	1.812	1.910	-.005	.068		.049	1.923	-.000	.062		.123		14820	6280
KR-185	1.850	1.949		.068		.050	1.963		.062		.123		15130	6540
KR-187	1.875	1.975		.068		.050	1.989		.062		.128		15340	6630
KR-193	1.938	2.040		.068		.051	2.054		.062		.128		15850	6990
KR-200	2.000	2.110		.068		.055	2.125		.062		.138		16360	7780
KR-206	2.062	2.175		.086		.057	2.190		.078		.141		21220	8310
KR-212	2.125	2.240		.086		.058	2.255		.078	+.003	.141		21870	8710
KR-218	2.188	2.305		.086		.059	2.321		.078	-.003	.141		22520	9130
KR-225	2.250	2.370		.086		.060	2.386		.078		.141		23160	9540
KR-231	2.312	2.440		.086		.064	2.457		.078		.188		23800	10460
KR-237	2.375	2.505		.086		.065	2.522		.078		.188		24440	10910
KR-244	2.440	2.570		.086		.065	2.588		.078		.188		25110	11210
KR-250	2.500	2.635	+.006	.086	+.005	.068	2.653	+.025	.078		.188		25730	12020
KR-253	2.531	2.668	-.006	.086	-.000	.069	2.687	-.000	.078		.188	+.005	26050	12350
KR-256	2.562	2.700		.103		.069	2.720		.093		.188	-.005	29940	12500
KR-262	2.625	2.765		.103		.070	2.785		.093		.188		30680	12990
KR-268	2.688	2.834		.103		.073	2.855		.093		.188		31410	13870
KR-275	2.750	2.900		.103		.075	2.921		.093		.188		32140	14580
KR-281	2.813	2.965		.103		.076	2.987		.093		.188		32880	15110
KR-283	2.834	2.987		.103		.077	3.009		.093		.188		33120	15430



Free Diameter & Ring Measurements



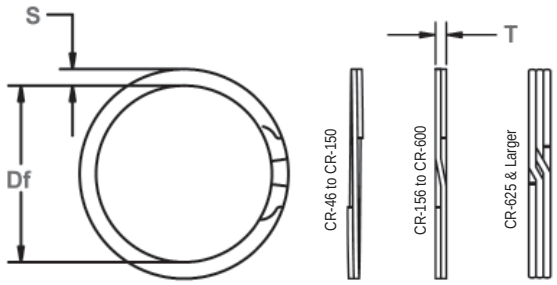
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
KR-287	2.875	3.030		.103		.078	3.053	+.025	.093		.188		33600	15850
KR-300	3.000	3.165		.103		.083	3.188	-.000	.093		.188		35060	17600
KR-306	3.062	3.230		.120		.084	3.253		.111		.250		42710	18180
KR-312	3.125	3.295		.120		.085	3.318		.111		.250		43590	18780
KR-315	3.156	3.328		.120		.086	3.354		.111		.250		44040	19190
KR-325	3.250	3.426		.120		.088	3.450		.111		.250		45330	20220
KR-334	3.346	3.525		.120		.090	3.550		.111		.250	+.005	46670	21290
KR-346	3.464	3.650		.120		.093	3.675		.111		.250	-.005	48320	22770
KR-350	3.500	3.690		.120		.095	3.716	+.030	.111		.250		48820	23500
KR-354	3.543	3.735	+.006	.120	+.005	.096	3.761	-.000	.111	+.003	.250		49420	24040
KR-356	3.562	3.756	-.006	.120	-.000	.097	3.783		.111	-.003	.250		49690	24420
KR-362	3.625	3.822		.120		.099	3.849		.111		.250		50560	25370
KR-375	3.750	3.955		.120		.103	3.982		.111		.250		52310	27300
KR-387	3.875	4.087		.120		.106	4.115		.111		.250		54050	29030
KR-393	3.938	4.150		.120		.106	4.178		.111		.250		54930	29510
KR-400	4.000	4.220		.120		.110	4.248		.111		.250		55800	31100
KR-412	4.125	4.345		.120		.110	4.373		.111		.312		57540	32070
KR-425	4.250	4.470		.120		.110	4.500		.111		.312		59280	33050
KR-433	4.330	4.556		.120		.113	4.586	+.035	.111		.312		60400	34590
KR-450	4.500	4.735		.120		.118	4.768	-.000	.111		.312		62770	37530
KR-462	4.625	4.865		.120		.120	4.897		.111		.312		64510	39230
KR-475	4.750	4.995		.120		.123	5.028		.111		.312		66260	41300
KR-500	5.000	5.260		.120		.130	5.295		.111		.312		69740	45950
KR-525	5.250	5.520		.139		.135	5.559		.127		.375		83790	50100
KR-537	5.375	5.645	+.007	.139	+.006	.135	5.685	+.045	.127	+.004	.375		85780	51290
KR-550	5.500	5.770	-.007	.139	-.000	.135	5.810	-.000	.127	-.004	.375		87780	52480
KR-575	5.750	6.020		.139		.135	6.062		.127		.375		91770	54870
KR-600	6.000	6.270		.139		.135	6.314		.127		.375		95760	57260
KR-625	6.250	6.530		.174		.140	6.576		.165		.312	+.006	129590	61850
KR-650	6.500	6.790		.174		.145	6.837	+.055	.165		.312	-.006	134780	66620
KR-662	6.625	6.925		.174		.150	6.973	-.000	.165		.312		137370	70240
KR-675	6.750	7.055		.174		.153	7.104		.165		.312		139960	73000
KR-700	7.000	7.315		.174		.158	7.366		.165		.312		145140	78180
KR-725	7.250	7.575		.209		.163	7.628		.189		.375		172190	83530
KR-750	7.500	7.840		.209		.170	7.895		.189		.375		178130	90120
KR-775	7.750	8.100	+.008	.209	+.008	.175	8.156		.189	+.005	.375		184070	95870
KR-800	8.000	8.360	-.008	.209	-.000	.180	8.418		.189	-.005	.375		190000	101790
KR-825	8.250	8.620		.209		.185	8.680		.189		.375		195940	107880
KR-850	8.500	8.880		.209		.190	8.942	+.070	.189		.375		201880	114160
KR-875	8.750	9.145		.209		.198	9.209	-.000	.189		.375		207820	122460
KR-900	9.000	9.405		.209		.203	9.471		.189		.375		213750	129140
KR-925	9.250	9.669		.209		.210	9.736		.189		.375		219690	137310
KR-950	9.500	9.930		.209		.215	9.999		.189		.375		225630	144380
KR-975	9.750	10.189		.209		.220	10.260		.189		.375		231570	151620
KR-1000	10.000	10.450		.209		.225	10.552		.189		.375		237500	159040
KR-1050	10.500	10.970		.209		.235	11.072		.189		.375		249380	174420

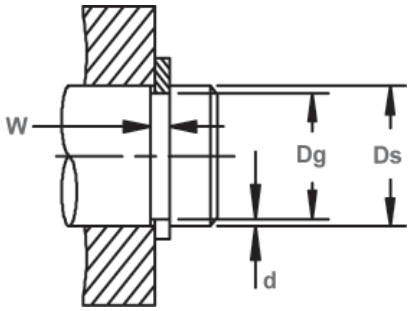
CR Spiral Shaft Rings

External, Medium-Heavy Duty

These 2-turn and multi-turn rings provide 360° groove contact and are designed for applications with medium-high thrust loads.

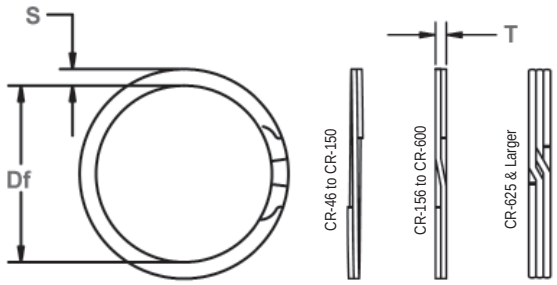


Free Diameter & Ring Measurements

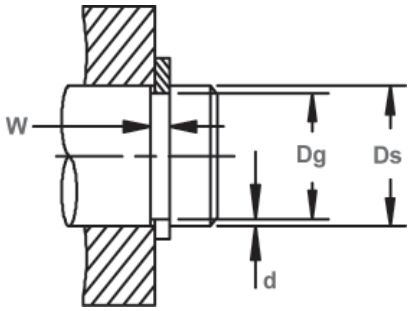


Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	Standard Material (Carbon Steel)
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
CR-46	.469	.443	+.002	.029		.013	.436		.025		.045		1800	430	28820
CR-50	.500	.474	-.002	.039		.013	.469		.035		.045		2530	460	20780
CR-55	.551	.524		.039		.014	.518		.035		.045		2790	550	18130
CR-56	.562	.535		.039		.014	.529		.035		.045		2840	560	17270
CR-59	.594	.565		.039		.015	.559		.035		.045		3000	630	15200
CR-62	.625	.596		.039		.015	.590		.035		.055		3160	660	15700
CR-66	.669	.638		.039		.016	.630		.035		.055		3380	760	15600
CR-68	.688	.655	+.003	.046	+.003	.017	.648	+.000	.042		.065		4180	830	15600
CR-75	.750	.715	-.003	.046	-.000	.018	.708	-.013	.042		.065		4550	950	12750
CR-78	.781	.745		.046		.018	.738		.042		.065		4740	990	11590
CR-81	.812	.776		.046		.018	.768		.042	+.002	.065		4930	1030	11300
CR-87	.875	.835		.046		.020	.827		.042	-.002	.075		5310	1240	10660
CR-93	.938	.894		.046		.022	.886		.042		.075		5690	1460	9100
CR-98	.984	.940		.046		.022	.934		.042		.075		5970	1530	6980
CR-100	1.000	.955		.046		.023	.947		.042		.075		6070	1630	7800
CR-102	1.023	.977		.046		.023	.969		.042		.075		6210	1660	7400
CR-106	1.062	1.015		.056		.024	1.005		.050		.088	+.004	7010	1800	8660
CR-112	1.125	1.075		.056		.025	1.064		.050		.088	-.004	7420	1990	7960
CR-118	1.188	1.135	+.004	.056		.027	1.126		.050		.088		7370	2270	6320
CR-125	1.250	1.195	-.004	.056		.028	1.184	+.000	.050		.093		8250	2470	6500
CR-131	1.312	1.250		.056		.031	1.240	-.015	.050		.098		8660	2880	5800
CR-137	1.375	1.310		.056		.033	1.298		.050		.103		9070	3210	6000
CR-143	1.438	1.370		.056		.034	1.359		.050		.103		9490	3460	5160
CR-150	1.500	1.430		.056	+.004	.035	1.419		.050		.103		9900	3710	4670
CR-156	1.562	1.490		.068	-.000	.036	1.476		.062		.108		12780	3980	5160
CR-162	1.625	1.550		.068		.038	1.537		.062		.118		13290	4370	4690
CR-168	1.687	1.610		.068		.039	1.598		.062		.118		13800	4650	4110
CR-175	1.750	1.670	+.005	.068		.040	1.657	+.000	.062		.118		14320	4950	3930
CR-177	1.771	1.689	-.005	.068		.041	1.676	-.020	.062		.123		14490	5130	3960
CR-181	1.812	1.730		.068		.041	1.714		.062		.123		14820	5250	4170
CR-187	1.875	1.790		.068		.043	1.774		.062		.123		15340	5700	3850
CR-196	1.969	1.879		.068		.045	1.864		.062		.123		16110	6260	3320
CR-200	2.000	1.910		.068		.045	1.894		.062	+.003	.128		16360	6360	3410
CR-206	2.062	1.970		.086		.046	1.955		.078	-.003	.141		21220	6710	3340
CR-212	2.125	2.027		.086		.049	2.012		.078		.141		21870	7360	3120
CR-215	2.156	2.057		.086		.050	2.041		.078		.141		22190	7620	3120
CR-225	2.250	2.145		.086		.053	2.129		.078		.141		23160	8430	2820
CR-231	2.312	2.205	+.006	.086	+.005	.054	2.188	+.000	.078		.141		23800	8830	2730
CR-237	2.375	2.265	-.006	.086	-.000	.055	2.248	-.025	.078		.141		24440	9230	2560
CR-243	2.437	2.325		.086		.056	2.307		.078		.141		25080	9650	2480
CR-250	2.500	2.385		.086		.058	2.366		.078		.188		25730	10250	3040
CR-255	2.559	2.443		.086		.058	2.424		.078		.188	+.005	26340	10490	3430
CR-262	2.625	2.505		.086		.060	2.485		.078		.188	-.005	27020	11130	2780
CR-268	2.687	2.565		.086		.061	2.545		.078		.188		27660	11590	2630



Free Diameter & Ring Measurements

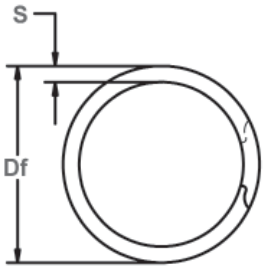


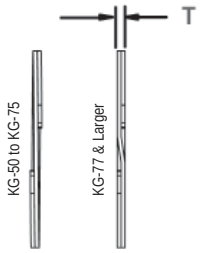
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	Standard Material (Carbon Steel)
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
CR-275	2.750	2.625		.103		.063	2.604		.093		.188		32140	12250	2560
CR-287	2.875	2.742		.103		.067	2.722		.093		.188		33600	13620	2260
CR-293	2.937	2.801		.103		.068	2.780		.093		.188		34320	14120	2200
CR-300	3.000	2.860		.103		.070	2.838		.093		.188		35060	14840	2150
CR-306	3.062	2.920		.103		.071	2.897	+.000	.093		.188		35790	15370	2090
CR-312	3.125	2.980		.103		.073	2.957	-.030	.093		.188		36520	16130	1990
CR-315	3.156	3.010		.103		.073	2.986		.093		.188		36880	16290	1990
CR-325	3.250	3.100		.103		.075	3.075		.093		.188		37980	17230	1900
CR-334	3.344	3.190		.103		.077	3.164		.093		.188		39080	18200	1810
CR-343	3.437	3.280	+.006	.103	+.005	.079	3.254		.093	+.003	.188	+.005	40170	19190	1690
CR-350	3.500	3.340	-.006	.120	-.000	.080	3.315		.111	-.003	.250	-.005	48820	19790	2020
CR-354	3.543	3.381		.120		.081	3.356		.111		.250		49420	20290	1960
CR-362	3.625	3.458		.120		.084	3.433		.111		.250		50560	21520	1860
CR-368	3.687	3.517		.120		.085	3.490		.111		.250		51430	22150	1860
CR-375	3.750	3.577		.120		.087	3.550		.111		.250		52310	23060	1790
CR-387	3.875	3.696		.120		.090	3.670	+.000	.111		.250		54050	24650	1620
CR-393	3.938	3.756		.120		.091	3.730	-.040	.111		.250		54930	25330	1560
CR-400	4.000	3.815		.120		.093	3.787		.111		.250		55800	26300	1560
CR-425	4.250	4.065		.120		.093	4.032		.111		.250		59280	27940	1350
CR-437	4.375	4.190		.120		.093	4.162		.111		.250		61030	28760	1250
CR-450	4.500	4.310		.120		.095	4.280		.111		.250		62770	30220	1210
CR-475	4.750	4.550		.120		.100	4.515		.111		.250		66260	33580	1160
CR-500	5.000	4.790		.120		.105	4.755		.111		.250		69740	37110	1020
CR-525	5.250	5.030		.139		.110	4.995		.127		.375		83790	40820	1280
CR-550	5.500	5.265	+.007	.139	+.006	.118	5.229	+.000	.127	+.004	.375		87780	45880	1170
CR-575	5.750	5.505	-.007	.139	-.000	.123	5.466	-.050	.127	-.004	.375		91770	49990	1100
CR-600	6.000	5.745		.139		.128	5.705		.127		.375		95760	54290	
CR-625	6.250	5.985		.174		.133	5.942		.165		.312		129590	58760	
CR-650	6.500	6.225		.174		.138	6.182	+.000	.165		.312		134780	63410	
CR-675	6.750	6.465		.174		.143	6.420	-.060	.165		.312		139960	68230	
CR-700	7.000	6.705		.174		.148	6.658		.165		.312		145140	73230	CONTACT FACTORY REGARDING MAX RPM LIMITS FOR LARGER DIAMETER RINGS
CR-725	7.250	6.942		.174		.154	6.894		.165		.312	+.006	172190	78290	
CR-750	7.500	7.180		.209		.160	7.130		.189		.375	-.006	178130	84820	
CR-775	7.750	7.420	+.008	.209	+.008	.165	7.368		.189	+.005	.375		184070	90390	
CR-800	8.000	7.660	-.008	.209	-.000	.170	7.607		.189	-.005	.375		190000	96130	
CR-825	8.250	7.900		.209		.175	7.845	+.000	.189		.375		195940	102050	
CR-850	8.500	8.140		.209		.180	8.083	-.070	.189		.375		201880	108150	
CR-875	8.750	8.383		.209		.184	8.321		.189		.375		207820	113800	
CR-900	9.000	8.620		.209		.190	8.560		.189		.375		213750	120870	
CR-925	9.250	8.860		.209		.195	8.798		.189		.375		219690	127500	
CR-950	9.500	9.100		.209		.200	9.036		.189		.375		225630	134300	
CR-975	9.750	9.338		.209		.206	9.273		.189		.375		231570	141970	
CR-1000	10.000	9.575		.209		.213	9.508		.189		.375		237500	150560	

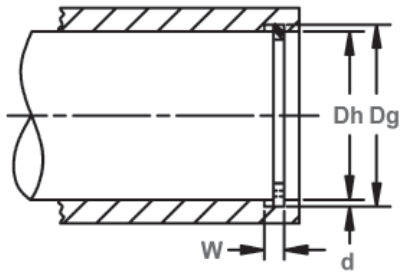
KG Spiral Housing Rings

Internal, Heavy Duty
These 2-turn rings provide 360° groove contact and are ideal for applications with high thrust loads.





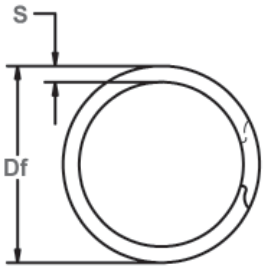
Free Diameter & Ring Measurements

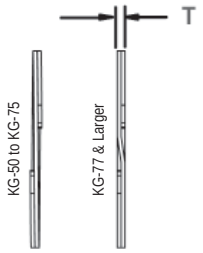


Housing Diameter & Groove Dimensions

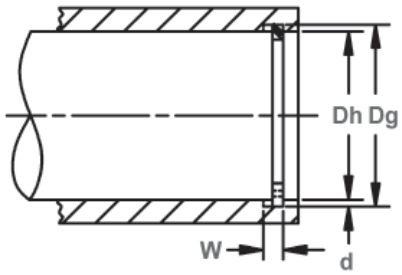
RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
KG-25*	.250	.268		.020		.009	.270		.015		.020		561	159
KG-31*	.312	.330		.020		.009	.333	+.010	.015		.025		700	198
KG-37*	.375	.397		.029		.011	.400	-.000	.025		.030		1442	292
KG-43	.437	.461		.029		.012	.464	+.012/-.000	.025		.035		1680	371
KG-50	.500	.530	+.002	.039		.015	.538		.035		.045		2530	530
KG-51	.512	.542	-.002	.039		.015	.550		.035		.045		2590	540
KG-56	.562	.596		.039		.017	.605		.035		.055		2840	680
KG-62	.625	.665		.039	+.003	.020	.675		.035		.055		3160	880
KG-68	.688	.732		.039	-.000	.022	.743		.035		.065		3480	1070
KG-75	.750	.796		.039		.023	.807		.035		.065		3790	1220
KG-77	.777	.825		.046		.024	.836		.042		.075		4720	1320
KG-81	.812	.862		.046		.025	.873		.042		.075		4930	1440
KG-86	.866	.920		.046		.027	.931		.042	+.002	.075		5260	1650
KG-87	.875	.931	+.003	.046		.028	.943	+.013	.042	-.002	.085		5310	1730
KG-90	.901	.959	-.003	.046		.029	.972	-.000	.042		.085		5470	1850
KG-93	.938	1.000		.046		.031	1.013		.042		.085	+.003	5690	2060
KG-100	1.000	1.066		.046		.033	1.080		.042		.085	-.005	6070	2330
KG-102	1.023	1.091		.046		.034	1.105		.042		.085		6210	2460
KG-106	1.062	1.130		.056		.034	1.138		.050		.103		7010	2550
KG-112	1.125	1.197		.056		.036	1.205		.050		.103		7420	2860
KG-118	1.188	1.262		.056		.037	1.271		.050		.103		7840	3110
KG-125	1.250	1.330	+.004	.056		.040	1.339		.050		.103		8250	3530
KG-131	1.312	1.396	-.004	.056		.042	1.406		.050		.118		8660	3900
KG-137	1.375	1.461		.056	+.004	.043	1.471		.050		.118		9070	4180
KG-143	1.439	1.528		.056	-.000	.045	1.539		.050		.118		9490	4580
KG-145	1.456	1.548		.056		.046	1.559		.050		.118		9610	4730
KG-150	1.500	1.594		.056		.047	1.605		.050		.118		9900	4980
KG-156	1.562	1.658		.068		.048	1.675		.062		.128		12780	5300
KG-162	1.625	1.725	+.005	.068		.050	1.742	+.020	.062	+.003	.128		13290	5740
KG-165	1.653	1.755	-.005	.068		.051	1.772	-.000	.062	-.003	.128		13520	5960
KG-168	1.688	1.792		.068		.052	1.810		.062		.128		13810	6210
KG-175	1.750	1.858		.068		.054	1.876		.062		.128		14320	6680

* No Removal Notch.





Free Diameter & Ring Measurements



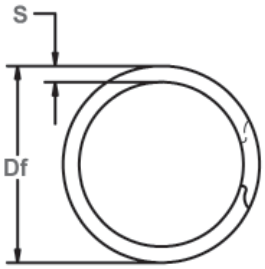
Housing Diameter & Groove Dimensions

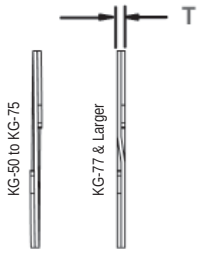
RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.	3	2
KG-181	1.812	1.922		.068		.055	1.940		.062		.128		14820	7050
KG-185	1.850	1.962	+.005	.068	+.004	.056	1.981	+.020	.062		.158	+.003	15130	7320
KG-187	1.875	1.989	-.005	.068	-.000	.057	2.008	-.000	.062		.158	-.005	15340	7560
KG-193	1.938	2.056		.068		.059	2.075		.062		.158		15850	8080
KG-200	2.000	2.122		.068		.061	2.142		.062		.158		16360	8620
KG-206	2.062	2.186		.086		.062	2.201		.078		.168		21220	9040
KG-212	2.125	2.251		.086		.063	2.267		.078		.168		21870	9460
KG-218	2.188	2.318		.086		.065	2.334		.078		.168		22520	10050
KG-225	2.250	2.382		.086		.066	2.399		.078		.168		23160	10500
KG-231	2.312	2.450		.086		.069	2.467	+.025	.078		.200		23800	11280
KG-237	2.375	2.517		.086		.071	2.535	-.000	.078		.200		24440	11920
KG-244	2.440	2.584		.086		.072	2.602		.078	+.003	.200		25110	12420
KG-250	2.500	2.648		.086		.074	2.667		.078	-.003	.200		25730	13080
KG-253	2.531	2.681		.086		.075	2.700		.078		.200		26050	13420
KG-256	2.562	2.714	+.006	.103	+.005	.076	2.733		.093		.225		29940	13760
KG-262	2.625	2.781	-.006	.103	-.000	.078	2.801		.093		.225		30680	14470
KG-268	2.688	2.848		.103		.080	2.868		.093		.225	+.004	31410	15200
KG-275	2.750	2.914		.103		.082	2.934	+.030	.093		.225	-.006	32140	15940
KG-281	2.813	2.980		.103		.084	3.001	-.000	.093		.225		32880	16700
KG-283	2.834	3.006		.103		.086	3.027		.093		.225		33120	17230
KG-287	2.875	3.051		.103		.088	3.072		.093		.225		33600	17880
KG-300	3.000	3.182		.103		.091	3.204		.093		.225		35060	18300
KG-306	3.062	3.248		.120		.093	3.271		.111		.281		42710	20130
KG-312	3.125	3.315		.120		.095	3.338		.111		.281		43590	20990
KG-315	3.157	3.348		.120		.096	3.371	+.035	.111		.281		44040	21420
KG-325	3.250	3.446		.120		.098	3.470	-.000	.111		.281		45330	22510
KG-334	3.346	3.546		.120		.100	3.571		.111		.281		46670	23650
KG-347	3.464	3.675		.120		.105	3.701		.111		.281		48320	25710

KG Spiral Housing Rings

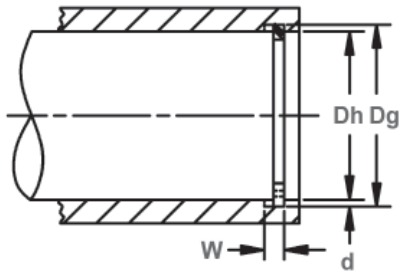
Internal, Heavy Duty

These 2-turn rings provide 360° groove contact and are ideal for applications with high thrust loads.



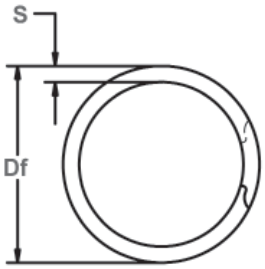


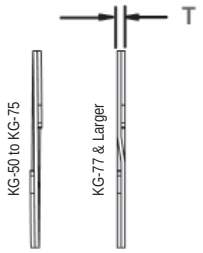
Free Diameter & Ring Measurements



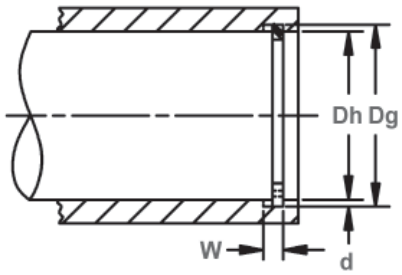
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THURST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
KG-350	3.500	3.710		.120		.105	3.736		.111		.281		48820	25980
KG-354	3.543	3.755		.120		.106	3.781		.111		.281	+.004	49420	26550
KG-356	3.562	3.776		.120		.107	3.802		.111		.281	-.006	49690	26940
KG-362	3.625	3.841		.120		.108	3.868		.111		.281		50560	27670
KG-375	3.750	3.974		.120		.112	4.002		.111		.312		52310	29690
KG-387	3.875	4.107	+.006	.120	+.005	.116	4.136	+.035	.111	+.003	.312		54050	31770
KG-393	3.938	4.174	-.006	.120	-.000	.118	4.203	-.000	.111	-.003	.312		54930	32850
KG-400	4.000	4.240		.120		.120	4.270		.111		.312		55800	33930
KG-412	4.125	4.365		.120		.120	4.369		.111		.312		57540	34990
KG-425	4.250	4.490		.120		.120	4.501		.111		.312		59280	36050
KG-433	4.330	4.570		.120		.120	4.588		.111		.312		60400	36730
KG-450	4.500	4.740		.120		.120	4.770		.111		.312		62770	38170
KG-462	4.625	4.865		.120		.120	4.899		.111		.312		64510	39230
KG-475	4.750	4.995		.120		.123	5.030		.111		.312		66260	41300
KG-500	5.000	5.260		.120		.130	5.297		.111		.312		69740	45950
KG-525	5.250	5.520		.139		.135	5.559		.127		.350	+.004	83790	50100
KG-537	5.375	5.645	+.007	.139	+.006	.135	5.690	+.050	.127	+.004	.350	-.008	85780	51290
KG-550	5.500	5.770	-.007	.139	-.000	.135	5.810	-.000	.127	-.004	.350		87780	52480
KG-575	5.750	6.020		.139		.135	6.062		.127		.350		91770	54870
KG-600	6.000	6.270		.139		.135	6.314		.127		.350		95760	57260
KG-625	6.250	6.530		.174		.140	6.576		.156		.380		122520	61850
KG-650	6.500	6.790		.174		.145	6.838	+.055	.156		.380		127420	66620
KG-662	6.625	6.925		.174		.150	6.974	-.000	.156		.380		129870	70240
KG-675	6.750	7.055	+.008	.174	+.008	.153	7.105		.156	+.005	.380		132320	73000
KG-700	7.000	7.315	-.008	.174	-.000	.158	7.366		.156	-.005	.380		137230	78180
KG-725	7.250	7.575		.209		.163	7.628	+.070	.187		.418		170370	83530
KG-750	7.500	7.840		.209		.170	7.895	-.000	.187		.418		176240	90120
KG-775	7.750	8.100		.209		.175	8.157		.187		.418		182120	95870





Free Diameter & Ring Measurements



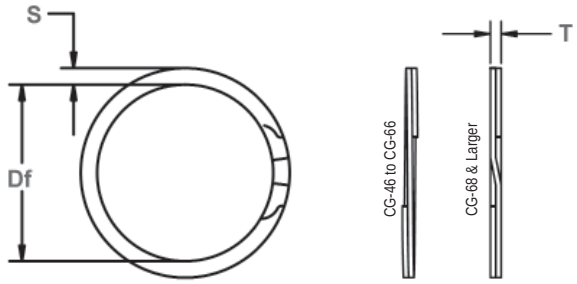
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
KG-800	8.000	8.360		.209		.180	8.419		.187		.418		187990	101790
KG-825	8.250	8.620		.209		.185	8.680		.187		.437		193870	107880
KG-850	8.500	8.880		.209		.190	8.942		.187		.437	+.004	199740	114160
KG-875	8.750	9.145	+.008	.209		.198	9.209	+.070	.187		.437	-.008	205620	122460
KG-900	9.000	9.405	-.008	.209		.203	9.471	-.000	.187		.437		211490	129140
KG-925	9.250	9.669		.209		.210	9.737		.187		.437		217370	137310
KG-950	9.500	9.930		.209		.215	10.000		.187		.500		223240	144380
KG-975	9.750	10.189		.209		.220	10.260		.187		.500		229120	150620
KG-1000	10.000	10.450		.209		.225	10.523		.187		.500		234990	159040
KG-1025	10.250	10.711		.209		.235	10.786		.187		.500		246740	174420
KG-1050	10.500	10.970		.209		.231	11.047		.187		.500		240870	167370
KG-1075	10.750	11.234		.209	+.008	.242	11.313		.187	+.005	.500		252620	183890
KG-1100	11.000	11.495		.209	-.000	.248	11.575		.187	-.005	.500		258490	192830
KG-1125	11.250	11.756	+.010	.209		.253	11.838		.187		.500		264370	201190
KG-1150	11.500	12.018	-.010	.209		.259	12.102	+.120	.187		.562		270240	210540
KG-1175	11.750	12.279		.209		.265	12.365	-.000	.187		.562		276120	220100
KG-1200	12.000	12.540		.209		.270	12.628		.187		.562	+.005	281990	229020
KG-1225	12.250	12.801		.209		.276	12.891		.187		.562	-.015	287860	238990
KG-1250	12.500	13.063		.209		.282	13.154		.187		.562		293740	249170
KG-1275	12.750	13.324		.209		.287	13.417		.187		.562		299610	258660
KG-1300	13.000	13.585		.209		.293	13.680		.187		.662		305490	269240
KG-1325	13.250	13.846		.209		.298	13.943		.187		.662		311360	279100
KG-1350	13.500	14.108		.209		.304	14.207		.187		.662		317240	290100
KG-1375	13.750	14.369	+.012	.209		.310	14.470	+.140	.187		.662		323110	301300
KG-1400	14.000	14.630	-.012	.209		.315	14.732	-.000	.187		.662		328990	311730
KG-1425	14.250	14.891		.209		.321	14.995		.187		.662		334860	323340
KG-1450	14.500	15.153		.209		.327	15.259		.187		.750		340740	335160
KG-1475	14.750	15.414		.209		.332	15.522		.187		.750		346610	346150
KG-1500	15.000	15.675		.209		.338	15.785		.187		.750		352490	358380

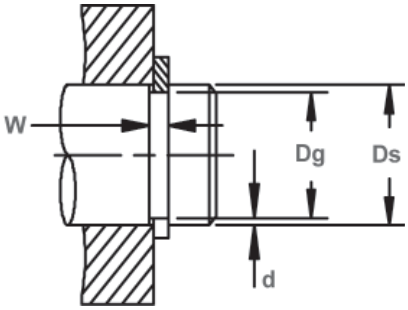
CG Spiral Shaft Rings

External, Heavy Duty

These 2-turn rings provide 360° groove contact and are ideal for applications with high thrust loads.



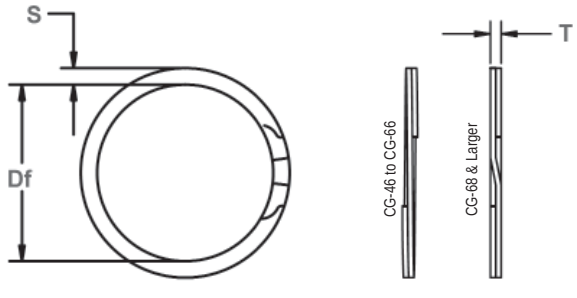
Free Diameter & Ring Measurements



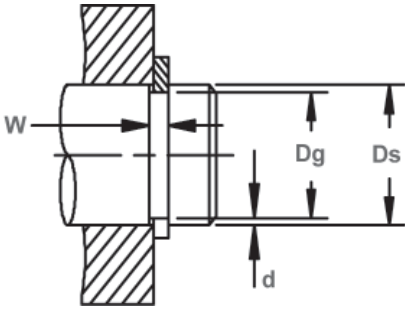
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of	Standard Material
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.	3	2	(Carbon Steel)
CG-25*	.250	.230		.029		.010	.228		.021		.020		961	177	36651
CG-31*	.312	.290		.029		.011	.287	+.000	.025		.025		1200	243	31364
CG-37*	.375	.352		.029		.012	.349	-.010	.025		.030		1442	305	23025
CG-43	.437	.412	+.002	.029		.013	.409	+.000/-.012	.025		.035		1680	386	18019
CG-46	.469	.443	-.002	.029		.013	.439		.025		.045		1880	430	21450
CG-50	.500	.468		.039		.016	.464		.035		.050		2530	570	20600
CG-55	.551	.519		.039		.016	.514		.035		.050		2790	620	18260
CG-56	.562	.530		.039		.016	.525		.035		.050		2840	640	17400
CG-59	.594	.559		.039	+.003	.018	.554		.035		.050		3000	760	15390
CG-62	.625	.588		.039	-.000	.019	.583		.035		.055		3160	840	14730
CG-66	.669	.629		.039		.020	.623		.035		.055		3380	950	13860
CG-68	.688	.646		.046		.021	.641		.042		.065		4180	1020	13510
CG-75	.750	.704	+.003	.046		.023	.698		.042		.065		4550	1220	12190
CG-78	.781	.733	-.003	.046		.024	.727		.042	+.002	.065		4740	1330	11110
CG-81	.812	.762		.046		.025	.756	+.000	.042	-.002	.065	+.003	4930	1440	10150
CG-87	.875	.821		.046		.027	.814	-.013	.042		.075	-.005	5310	1670	10340
CG-93	.938	.882		.046		.028	.875		.042		.075		5690	1860	8760
CG-98	.984	.926		.046		.029	.919		.042		.085		5970	2020	8640
CG-100	1.000	.940		.046		.030	.932		.042		.085		6070	2120	8940
CG-102	1.023	.961		.046		.031	.953		.042		.085		6210	2240	8500
CG-106	1.062	.998		.056		.032	.986		.050		.103		7010	2400	11260
CG-112	1.125	1.059		.056		.033	1.047		.050		.103		7420	2620	9820
CG-118	1.188	1.118		.056		.035	1.105		.050		.103		7840	2940	9040
CG-125	1.250	1.176	+.004	.056		.037	1.163		.050		.103		8250	3270	8042
CG-131	1.312	1.232	-.004	.056	+.004	.040	1.218		.050		.118		8660	3710	8280
CG-137	1.375	1.291		.056	-.000	.042	1.277		.050		.118		9070	4080	7430
CG-143	1.438	1.350		.056		.044	1.336		.050		.118		9490	4470	6700
CG-150	1.500	1.406		.056		.047	1.385		.050		.118		9900	4980	6540
CG-156	1.562	1.468	+.005	.068		.047	1.453	+.000	.062	+.003	.128		12780	5190	6110
CG-162	1.625	1.529	-.005	.068		.048	1.513	-.020	.062	-.003	.128		13290	5510	5750

* No Removal Notch.



Free Diameter & Ring Measurements

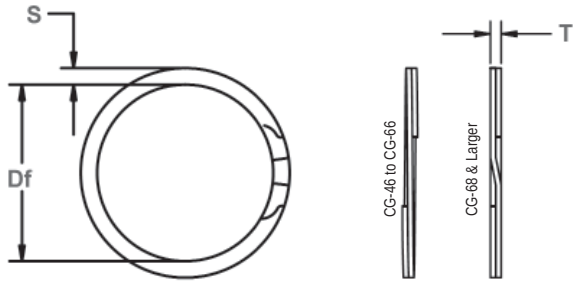


Shaft Diameter & Groove Dimensions

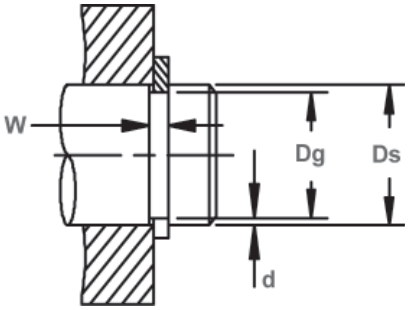
RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS Standard Material (Carbon Steel)
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
CG-168	1.687	1.589		.068		.049	1.573		.062		.128		13800	5840	5260
CG-175	1.750	1.650		.068		.050	1.633		.062		.128		14320	6190	4970
CG-177	1.771	1.669	+.005	.068	+.004	.051	1.651	+.000	.062		.128	+.003	14490	6380	4990
CG-181	1.812	1.708	-.005	.068	-.000	.052	1.690	-.020	.062		.128	-.005	14820	6660	4720
CG-187	1.875	1.769		.068		.053	1.751		.062		.158		15340	7020	4540
CG-196	1.969	1.857		.068		.056	1.838		.062		.158		16110	7790	4730
CG-200	2.000	1.886		.068		.057	1.867		.062		.158		16360	8060	4560
CG-206	2.062	1.946		.086		.058	1.932		.078		.168		21220	8450	3810
CG-212	2.125	2.003		.086		.061	1.989		.078		.168		21870	9160	3560
CG-215	2.156	2.032		.086		.062	2.018		.078		.168		22190	9450	3450
CG-225	2.250	2.120		.086		.065	2.105		.078		.168		23160	10340	3240
CG-231	2.312	2.178		.086		.067	2.163	+.000	.078	+.003	.168		23800	10950	3040
CG-237	2.375	2.239		.086		.068	2.223	-.025	.078	-.003	.200		24440	11420	3380
CG-243	2.437	2.299		.086		.069	2.283		.078		.200		25080	11890	3180
CG-250	2.500	2.360		.086		.070	2.343		.078		.200		25730	12370	3090
CG-255	2.559	2.419		.086		.070	2.402		.078		.200		26340	12660	2920
CG-262	2.625	2.481	+.006	.086	+.005	.072	2.464		.078		.200	+.004	27020	13360	2750
CG-268	2.687	2.541	-.006	.086	-.000	.073	2.523		.078		.200	-.006	27660	13870	2680
CG-275	2.750	2.602		.103		.074	2.584		.093		.225		32140	14390	2790
CG-287	2.875	2.721		.103		.077	2.702		.093		.225		33600	15650	2590
CG-293	2.937	2.779		.103		.079	2.760		.093		.225		34320	16400	2460
CG-300	3.000	2.838		.103		.081	2.818		.093		.225		35060	17180	2410
CG-306	3.062	2.898		.103		.082	2.878	+.000	.093		.225		35790	17750	2290
CG-312	3.125	2.957		.103		.084	2.936	-.030	.093		.225		36520	18560	2240
CG-315	3.156	2.986		.103		.085	2.965		.093		.225		36880	18960	2190
CG-325	3.250	3.076		.103		.087	3.054		.093		.225		37980	19990	2100
CG-334	3.344	3.166		.103		.089	3.144		.093		.225		39080	21040	1960
CG-343	3.437	3.257		.103		.090	3.234		.093		.225		40170	21870	1880

CG Spiral Shaft Rings

External, Heavy Duty
These 2-turn rings provide 360° groove contact and are ideal for applications with high thrust loads.

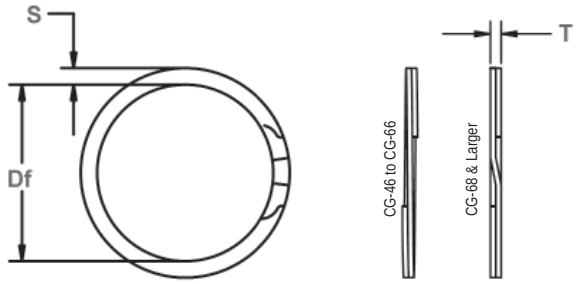


Free Diameter & Ring Measurements

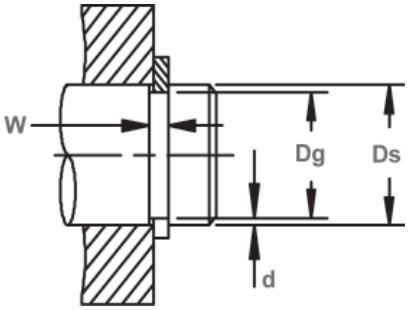


Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS Standard Material (Carbon Steel)
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
CG-350	3.500	3.316		.120		.092	3.293		.111		.270		48820	22760	2090
CG-354	3.543	3.357		.120		.093	3.333		.111		.270		49420	23290	2080
CG-362	3.625	3.435		.120		.095	3.411		.111		.270		50560	24340	1970
CG-368	3.687	3.493		.120		.097	3.469		.111		.270		51430	25280	1890
CG-375	3.750	3.552	+.006	.120	+.005	.099	3.527	+.000	.111	+.003	.270	+.004	52310	26240	1860
CG-387	3.875	3.673	-.006	.120	-.000	.101	3.647	-.035	.111	-.003	.270	-.006	54050	27670	1750
CG-393	3.938	3.734		.120		.102	3.708		.111		.270		54930	28390	1690
CG-400	4.000	3.792		.120		.104	3.765		.111		.270		55800	29410	1660
CG-425	4.250	4.065		.120		.093	4.037		.111		.270		59280	27940	1440
CG-437	4.375	4.190		.120		.093	4.161		.111		.270		61030	28760	1360
CG-450	4.500	4.310		.120		.095	4.280		.111		.270		62770	30220	1300
CG-475	4.750	4.550		.120		.100	4.518		.111		.270		66260	36930	1180
CG-500	5.000	4.790		.120		.105	4.756		.111		.270		69740	37110	1080
CG-525	5.250	5.030		.139		.110	4.995		.127		.350		83790	40820	1210
CG-550	5.500	5.265	+.007	.139	+.006	.118	5.228	+.000	.127	+.004	.350		87780	45880	1120
CG-575	5.750	5.505	-.007	.139	-.000	.123	5.466	-.050	.127	-.004	.350		91770	49990	1030
CG-600	6.000	5.745		.139		.128	5.705		.127		.350		95760	54290	
CG-625	6.250	5.985		.174		.133	5.938		.156		.418		122520	58760	CONTACT FACTORY REGARDING MAX RPM LIMITS FOR LARGER DIAMETER RINGS
CG-650	6.500	6.225		.174		.138	6.181	+.000	.156		.418		127420	63410	
CG-675	6.750	6.465		.174		.143	6.410	-.060	.156		.418	+.004	132330	68230	
CG-700	7.000	6.705		.174		.148	6.648		.156		.418	-.008	137230	73230	
CG-725	7.250	6.942	+.008	.174	+.008	.154	6.891		.156	+.005	.418		142130	78920	
CG-750	7.500	7.180	-.008	.209	-.000	.160	7.130		.187	-.005	.437		176240	84820	
CG-775	7.750	7.420		.209		.165	7.368	+.000	.187		.437		182120	90390	
CG-800	8.000	7.660		.209		.170	7.606	-.070	.187		.437		187990	96130	
CG-825	8.250	7.900		.209		.175	7.845		.187		.437		193870	102050	
CG-850	8.500	8.140		.209		.180	8.083		.187		.437		199740	108150	



Free Diameter & Ring Measurements



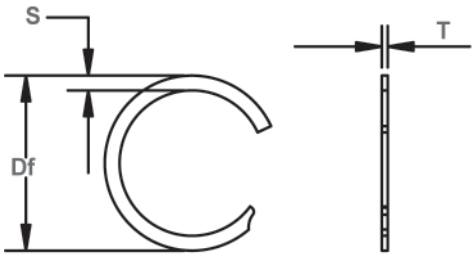
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE					RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS Standard Material (Carbon Steel)
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
CG-875	8.750	8.383		.209		.184	8.324		.187		.437	+.004 -.006	205620	113800	
CG-900	9.000	8.620		.209		.190	8.560		.187		.500		211490	120870	
CG-925	9.250	8.860	+.008	.209		.195	8.798	+.000	.187		.500		217370	127500	
CG-950	9.500	9.100	-.008	.209		.200	9.036	-.070	.187		.500		223240	134300	
CG-975	9.750	9.338		.209		.206	9.275		.187		.500		229120	141970	
CG-1000	10.000	9.575		.209		.213	9.508		.187		.500		234990	150560	
CG-1025	10.250	9.814		.209		.218	9.745		.187		.500		240870	157950	
CG-1050	10.500	10.054		.209		.223	9.984		.187		.500		246740	165510	
CG-1075	10.750	10.293		.209		.229	10.221		.187		.500		252620	174010	CONTACT FACTORY REGARDING MAX RPM LIMITS FOR LARGER DIAMETER RINGS
CG-1100	11.000	10.533		.209		.234	10.459		.187		.500		258490	181950	
CG-1125	11.250	10.772	+.010	.209	+.008	.239	10.692	+.000	.187	+.005	.500		264360	190060	
CG-1150	11.500	11.011	-.010	.209	-.000	.245	10.934	-.090	.187	-.005	.562		270240	199160	
CG-1175	11.750	11.250		.209		.250	11.171		.187		.562	+.005	276120	207640	
CG-1200	12.000	11.490		.209		.255	11.410		.187		.562	-.010	281990	216300	
CG-1225	12.250	11.729		.209		.261	11.647		.187		.562		287860	226000	
CG-1250	12.500	11.969		.209		.266	11.885		.187		.562		293740	235030	
CG-1275	12.750	12.208		.209		.271	12.124		.187		.562		299610	244240	
CG-1300	13.000	12.448		.209		.276	12.361		.187		.662		305490	253620	
CG-1325	13.250	12.687		.209		.282	12.598		.187		.662		311360	264120	
CG-1350	13.500	12.927		.209		.287	12.837		.187		.662		317240	273870	
CG-1375	13.750	13.166	+.012	.209		.292	13.074	+.000	.187		.662		323110	283800	
CG-1400	14.000	13.405	-.012	.209		.298	13.311	-.110	.187		.662		328990	294900	
CG-1425	14.250	13.644		.209		.303	13.548		.187		.662		334860	305200	
CG-1450	14.500	13.884		.209		.308	13.787		.187		.750		340740	315680	
CG-1475	14.750	14.123		.209		.314	14.024		.187		.750		346610	327380	
CG-1500	15.000	14.363		.209		.319	14.262		.187		.750		352490	338230	

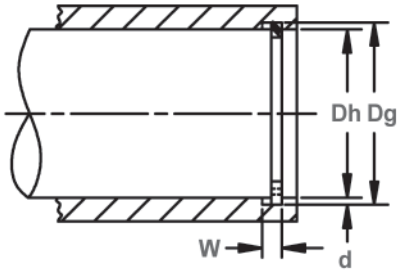
KLR Spiral Housing Rings

Internal, Heavy-Duty Snap Ring

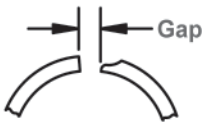
These single-turn snap rings are ideal for applications involving high thrust loads.



Free Diameter & Ring Measurements

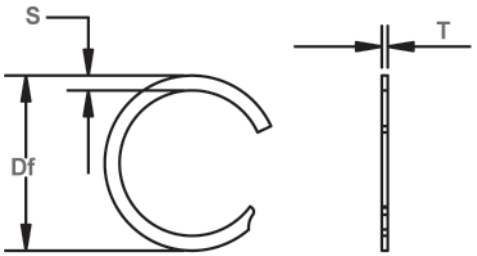


Housing Diameter & Groove Dimensions

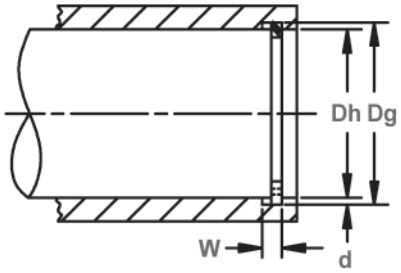


End Design

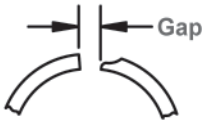
RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE				RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
KLR-50	.500	.524		.043		.529		.037		.055		2325	424
KLR-56	.562	.586	+.004	.043		.591		.037		.055		2613	477
KLR-62	.625	.657	-.000	.043		.665	+.013	.037		.065		2906	707
KLR-68	.687	.719		.043		.726	-.000	.037		.065		3194	777
KLR-75	.750	.790	+.005	.043		.797		.037		.075		3487	1060
KLR-81	.812	.852	-.000	.043		.860		.037		.075		3775	1148
KLR-87	.875	.915		.043		.924		.037		.075		4068	1237
KLR-93	.937	.985		.051		1.000		.045		.085		5334	1590
KLR-100	1.000	1.048	+.008	.051		1.058		.045		.085		5693	1696
KLR-106	1.062	1.110	-.000	.051		1.121		.045		.094		6045	1802
KLR-112	1.125	1.181		.051		1.192		.045	±.002	.094	±.004	6404	2227
KLR-118	1.187	1.243		.051		1.252	+.015	.045		.094		6757	2349
KLR-125	1.250	1.316		.051		1.336	-.000	.045		.094		7116	2916
KLR-131	1.312	1.378		.051		1.391		.045		.094		7469	3060
KLR-137	1.375	1.453		.063		1.470		.057		.128		9307	3791
KLR-143	1.437	1.515	+.010	.063		1.529		.057		.128		9727	3961
KLR-150	1.500	1.578	-.000	.063		1.592		.057		.128		10153	4135
KLR-156	1.562	1.666		.073		1.687		.067		.158		12400	5741
KLR-162	1.625	1.729		.073	+.006	1.746		.067		.158		12901	5973
KLR-168	1.687	1.791		.073	-.000	1.808	+.020	.067		.158		13393	6201
KLR-175	1.750	1.862		.073		1.885	-.000	.067		.158		13893	6927
KLR-181	1.812	1.924		.073		1.942		.067		.158		14385	7173
KLR-187	1.875	1.987		.073		2.007		.067		.158		14885	7422
KLR-193	1.937	2.055		.085		2.074		.076		.200		16649	8078
KLR-200	2.000	2.118		.085		2.143		.076		.200		17191	8341
KLR-206	2.062	2.180		.085		2.200		.076		.200		17724	8599
KLR-212	2.125	2.243		.085		2.264		.076		.200		18265	8862
KLR-218	2.187	2.305		.085		2.327	+.025	.076		.200		18798	9121
KLR-225	2.250	2.368		.085		2.389	-.000	.076		.200		19340	9384
KLR-231	2.312	2.430	+.012	.085		2.453		.076		.200		19873	9642
KLR-237	2.375	2.493	-.000	.085		2.517		.076		.200		20414	9905
KLR-243	2.437	2.555		.085		2.582		.076		.200		20947	10163
KLR-250	2.500	2.618		.085		2.643		.076		.200		21488	10426
KLR-256	2.562	2.680		.104		2.705		.095		.200		26225	10685
KLR-262	2.625	2.743		.104		2.777		.095	±.003	.200	±.005	26870	10947
KLR-268	2.687	2.805		.104		2.828		.095		.200		27504	11206
KLR-275	2.750	2.868		.104		2.899		.095		.200		28149	11469
KLR-281	2.812	2.930		.104		2.958	+.030	.095		.200		28784	11727
KLR-287	2.875	2.993		.104		3.022	-.000	.095		.200		29429	11990
KLR-293	2.937	3.055		.104		3.084		.095		.200		30063	12249
KLR-300	3.000	3.118		.104		3.145		.095		.200		30708	12511
KLR-306	3.062	3.184		.104		3.218		.095		.200		31343	13203
KLR-312	3.125	3.263	+.013	.104		3.294		.095		.237		31988	15242
KLR-318	3.187	3.325	-.000	.104		3.357		.095		.237		32622	15544
KLR-325	3.250	3.388		.104		3.420		.095		.237		33267	15851



Free Diameter & Ring Measurements



Housing Diameter & Groove Dimensions



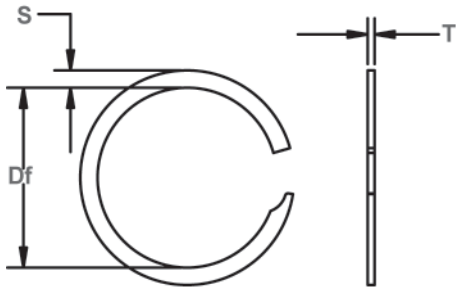
End Design

RING NO.	HOUSING DIAMETER (In.)	GROOVE SIZE				RING SIZE						THRUST LOAD (lbs.)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
KLR-331	3.312	3.450		.124		3.483		.115		.248		38952	16154
KLR-337	3.375	3.513		.124		3.547		.115		.248		39693	16461
KLR-343	3.437	3.575		.124		3.609		.115		.248		40422	16763
KLR-350	3.500	3.638		.124		3.673		.115		.248		41163	17071
KLR-356	3.562	3.700	+.013	.124		3.728	+.035	.115	±.003	.248		41892	17373
KLR-362	3.625	3.763	-.000	.124		3.799	-.000	.115		.248		42633	17680
KLR-368	3.687	3.825		.124		3.862		.115		.248		43362	17983
KLR-375	3.750	3.888		.124		3.922		.115		.248		44103	18290
KLR-381	3.812	3.950		.124		3.988		.115		.248		44832	18592
KLR-387	3.875	4.013		.124		4.044		.115		.248		45573	18900
KLR-393	3.937	4.075		.124		4.114		.115		.248		46302	19202
KLR-400	4.000	4.158		.163		4.223		.153		.265	±.005	60283	22337
KLR-412	4.125	4.283	+.021	.163		4.329		.153		.265		62166	23035
KLR-425	4.250	4.408	-.000	.163		4.452		.153		.265		64050	23733
KLR-437	4.375	4.533		.163		4.576		.153		.265		65934	24431
KLR-450	4.500	4.658		.163		4.703	+.050	.153		.265		67818	25129
KLR-462	4.625	4.783		.163		4.829	-.000	.153		.265		69702	25827
KLR-475	4.750	4.908		.163		4.945		.153		.265		71585	26525
KLR-487	4.875	5.033		.163		5.082		.153		.265		73469	27223
KLR-500	5.000	5.158		.163		5.207		.153		.265		75353	27921
KLR-525	5.250	5.408	+.024	.163	+.007	5.460		.153	±.004	.265		79121	29317
KLR-550	5.500	5.658	-.000	.163	-.000	5.719		.153		.265		82888	30713
KLR-575	5.750	5.908		.163		5.965		.153		.265		86656	32109
KLR-600	6.000	6.196		.163		6.256		.153		.316		90424	41563
KLR-625	6.250	6.446		.163		6.508	+.055	.153		.316		94191	43295
KLR-650	6.500	6.696		.163		6.760	-.000	.153		.316		97959	45027
KLR-675	6.750	6.946		.163		7.013		.153		.316		101727	46759
KLR-700	7.000	7.196		.163		7.266		.153		.316		105494	48490
KLR-725	7.250	7.446		.163		7.541		.153		.316		109262	50222
KLR-750	7.500	7.696		.163		7.762		.153		.316		113030	51954
KLR-775	7.750	7.946		.163		8.023		.153		.316	±.006	116797	53686
KLR-800	8.000	8.196	+.028	.163		8.276		.153		.316		120565	55418
KLR-825	8.250	8.486	-.000	.203		8.580		.192		.373		147399	68813
KLR-850	8.500	8.736		.203		8.821		.192		.373		151866	70898
KLR-875	8.750	8.986		.203		9.073	+.070	.192		.373		156332	72983
KLR-900	9.000	9.236		.203		9.326	-.000	.192		.373		160799	75068
KLR-925	9.250	9.486		.203		9.580		.192		.373		165265	77154
KLR-950	9.500	9.736		.203		9.831		.192	±.005	.373		169732	79239
KLR-975	9.750	9.986		.203		10.083		.192		.373		174199	81324
KLR-1000	10.000	10.314		.203		10.414		.192		.435		178665	110977
KLR-1025	10.250	10.564	+.031	.203		10.660		.192		.435		183132	113751
KLR-1050	10.500	10.814	-.000	.203		10.919		.192		.435	±.007	187599	116526
KLR-1075	10.750	11.064		.203		11.171		.192		.435		192065	119300
KLR-1100	11.000	11.314		.203		11.440	+.120-.000	.192		.435		196532	122074

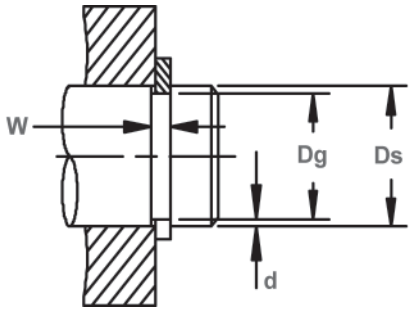
CLR Spiral Shaft Rings

External, Heavy-Duty Snap Ring

These single-turn snap rings are ideal for applications involving high thrust loads.

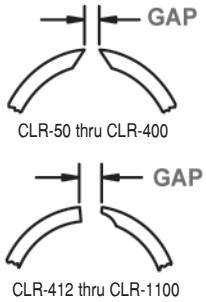


Free Diameter & Ring Measurements



Shaft Diameter & Groove Dimensions

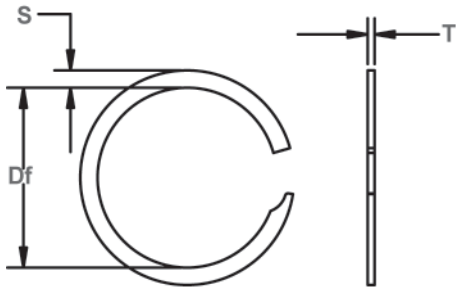
End Designs



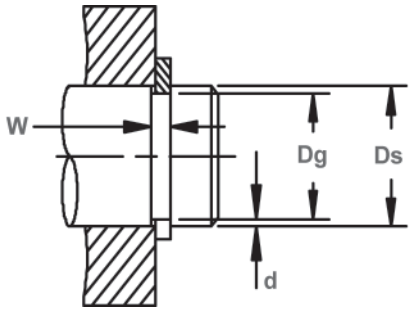
CLR-50 thru CLR-400

CLR-412 thru CLR-1100

RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE				RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	Standard Material (Carbon Steel)
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.			
CLR-50	.500	.476		.043		.471		.037		.055		2325	424	32573
CLR-56	.562	.532	+.000	.043		.524		.037		.055		2613	596	32410
CLR-62	.625	.595	-.004	.043		.590		.037		.065		2906	663	22107
CLR-68	.687	.655		.043		.649		.037		.065		3194	777	19520
CLR-75	.750	.710		.051		.701	+.000	.045		.075		4241	1060	22451
CLR-81	.812	.772	+.000	.051		.764	-.013	.045		.075		4592	1148	17414
CLR-87	.875	.831	-.005	.051		.820		.045		.075		4948	1361	17374
CLR-93	.937	.893		.051		.886		.045		.085		5334	1457	12757
CLR-100	1.000	.952	+.000	.051		.933		.045		.085		5698	1696	18675
CLR-106	1.062	1.014	-.008	.051		1.004		.045	±.002	.085	+.003	6045	1802	11446
CLR-112	1.125	1.077		.063		1.069		.057		.128	-.005	7615	1909	12107
CLR-118	1.187	1.131		.063		1.116		.057		.128		8035	2349	15056
CLR-125	1.250	1.188		.063		1.176	+.000	.057		.128		8461	2739	11970
CLR-131	1.312	1.242		.063		1.223	-.015	.057		.128		8881	3246	13786
CLR-137	1.375	1.297		.063		1.282		.057		.128		9307	3791	11008
CLR-143	1.437	1.359		.073		1.344		.067		.158		11408	3961	11594
CLR-150	1.500	1.422		.073		1.402		.067		.158		11908	4135	12178
CLR-156	1.562	1.470	+.000	.073	+.006	1.457		.067		.158		12400	5079	9004
CLR-162	1.625	1.533	-.010	.073	-.000	1.517		.067		.158		12901	5284	9118
CLR-168	1.687	1.595		.073		1.578	+.000	.067		.158		13393	5485	8595
CLR-175	1.750	1.658		.073		1.640	-.020	.067		.158		13893	5690	8101
CLR-181	1.812	1.720		.073		1.697		.067		.158		14385	5892	8470
CLR-187	1.875	1.783		.073		1.767		.067		.158		14885	6097	6440
CLR-193	1.937	1.819		.085		1.800		.076		.200		16649	8078	8047
CLR-200	2.000	1.882		.085		1.862		.076		.200		17191	8341	7650
CLR-206	2.062	1.944		.085		1.924		.076		.200		17724	8599	7103
CLR-212	2.125	2.007		.085		1.987		.076		.200		18265	8862	6603
CLR-218	2.187	2.069		.085		2.048		.076		.200		18798	9121	6316
CLR-225	2.250	2.132		.085		2.110	+.000	.076		.200		19340	9384	6040
CLR-231	2.312	2.194		.085		2.171	-.025	.076		.200		19873	9642	5786
CLR-237	2.375	2.257		.085		2.226		.076		.200	+.004	20414	9905	6343
CLR-243	2.437	2.319		.085		2.296		.076		.200	-.006	20947	10163	5089
CLR-250	2.500	2.382		.085		2.357		.076		.200		21488	10426	4994
CLR-256	2.562	2.444	+.000	.104		2.415		.095	±.003	.200		26252	10685	5118
CLR-262	2.625	2.507	-.012	.104		2.486		.095		.200		26898	10947	4073
CLR-268	2.687	2.569		.104		2.537		.095		.200		27533	11206	4797
CLR-275	2.750	2.632		.104		2.607		.095		.200		28179	11469	3981
CLR-281	2.812	2.694		.104		2.665		.095		.200		28814	11727	4074
CLR-287	2.875	2.757		.104		2.727		.095		.200		29460	11990	3927
CLR-293	2.937	2.819		.104		2.789	+.000	.095		.200		30095	12249	3727
CLR-300	3.000	2.882		.104		2.852	-.030	.095		.200		30740	12511	3537
CLR-306	3.062	2.944		.104		2.916		.095		.200		31376	12770	3245
CLR-312	3.125	2.987		.104		2.955		.095		.237		32021	15242	3853
CLR-318	3.187	3.049		.104		3.016		.095		.237	±.005	32657	15544	3731
CLR-325	3.250	3.112		.104		3.079		.095		.237		33302	15851	3557

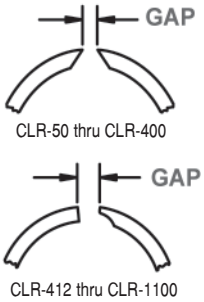


Free Diameter & Ring Measurements



Shaft Diameter & Groove Dimensions

End Designs



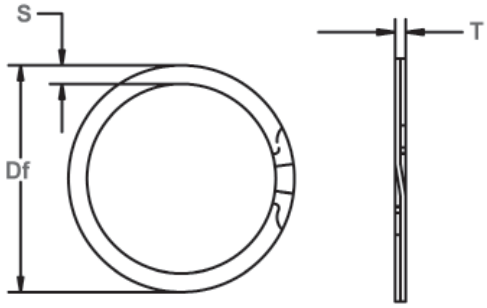
RING NO.	SHAFT DIAMETER (In.)	GROOVE SIZE				RING SIZE						THRUST LOAD (lbs.)		R.P.M. LIMITS
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	Standard Material (Carbon Steel)
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.			
CLR-331	3.312	3.174		.124		3.140	+.000-.030	.115		.248		39088	16154	3595
CLR-337	3.375	3.237		.124		3.203		.115		.248		39831	16461	3433
CLR-343	3.437	3.299		.124		3.264		.115		.248		40563	16763	3334
CLR-350	3.500	3.362		.124		3.326		.115		.248		41307	17071	3236
CLR-356	3.562	3.424		.124		3.378		.115		.248		42038	17373	3528
CLR-362	3.625	3.487	+.000	.124		3.451	+.000	.115	±.003	.248		42782	17680	2970
CLR-368	3.687	3.549	-.014	.124		3.512	-.035	.115		.248		43514	17983	2890
CLR-375	3.750	3.612		.124		3.570		.115		.248		44257	18290	2964
CLR-381	3.812	3.674		.124		3.636		.115		.248		44989	18592	2701
CLR-387	3.875	3.737		.124		3.689		.115		.248		45732	18900	2934
CLR-393	3.937	3.799		.124		3.760		.115		.248	±.005	46464	19202	2529
CLR-400	4.000	3.862		.124		3.828		.115		.248		47208	19509	2264
CLR-412	4.125	3.967	+.000	.163		3.930		.153		.265		62126	23035	2367
CLR-425	4.250	4.092	-.021	.163		4.050		.153		.265		64008	23733	2360
CLR-437	4.375	4.217		.163		4.174		.153		.265		65891	24431	2215
CLR-450	4.500	4.342		.163		4.297	+.000	.153		.265		67774	25129	2116
CLR-462	4.625	4.467		.163		4.421	-.051	.153		.265		69656	25827	2001
CLR-475	4.750	4.592		.163		4.530		.153		.265		71539	26525	2193
CLR-487	4.875	4.717		.163		4.668		.153		.265		73421	27223	1816
CLR-500	5.000	4.842		.163		4.792		.153		.265		75304	27921	1724
CLR-525	5.250	5.092	+.000	.163	+.007	5.039		.153	±.004	.265		79069	29317	
CLR-550	5.500	5.342	-.024	.163	-.000	5.292		.153		.265		82834	30713	
CLR-575	5.750	5.592		.163		5.535		.153		.265		86599	32109	
CLR-600	6.000	5.804		.163		5.744		.153		.316		90365	41563	
CLR-625	6.250	6.054		.163		5.992	+.000	.153		.316		94130	43295	
CLR-650	6.500	6.304		.163		6.236	-.060	.153		.316		97985	45027	
CLR-675	6.750	6.554		.163		6.486		.153		.316	±.006	101727	46759	
CLR-700	7.000	6.804		.163		6.734		.153		.316		105494	48490	CONTACT FACTORY REGARDING MAX RPM LIMITS FOR LARGER DIAMETER RINGS
CLR-725	7.250	7.054		.163		6.993		.153		.316		109262	50222	
CLR-750	7.500	7.304		.163		7.219		.153		.316		113030	51954	
CLR-775	7.750	7.554		.163		7.477		.153		.316		116797	53686	
CLR-800	8.000	7.764	+.000	.203		7.683	+.000	.192		.435		142932	66727	
CLR-825	8.250	8.014	-.028	.203		7.940	-.070	.192		.435		147399	68813	
CLR-850	8.500	8.264		.203		8.179		.192		.435		151866	70898	
CLR-875	8.750	8.514		.203		8.427		.192		.435		156332	72983	
CLR-900	9.000	8.764		.203		8.673		.192		.435		160799	75068	
CLR-925	9.250	9.014		.203		8.922		.192		.435	±.007	165265	77154	
CLR-950	9.500	9.240		.203		9.130		.192	±.005	.435		169732	87297	
CLR-975	9.750	9.490		.203		9.393		.192		.435		174199	98594	
CLR-1000	10.000	9.686		.203		9.586		.192		.500		178665	110977	
CLR-1025	10.250	9.936	+.000	.203		9.826	+.000	.192		.500		183132	113751	
CLR-1050	10.500	10.186	-.031	.203		10.081	-.091	.192		.500		187599	116526	
CLR-1075	10.750	10.436		.203		10.329		.192		.500		192056	119300	
CLR-1100	11.000	10.686		.203		10.584		.192		.500		196532	122074	

DKR Spiral Housing Rings

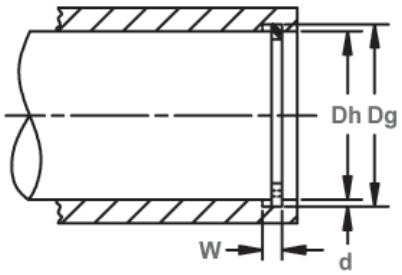
DIN 472 Groove

Internal, Heavy Duty DIN

These 2-turn rings are ideal for applications with high thrust loads and are designed to fit into a groove established by DIN specifications.

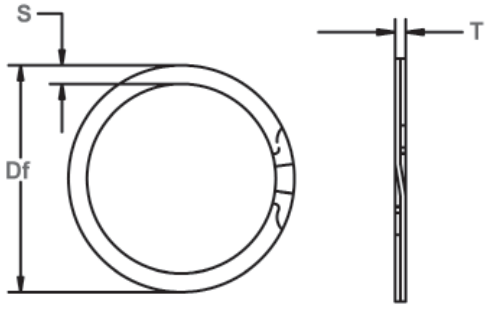


Free Diameter & Ring Measurements

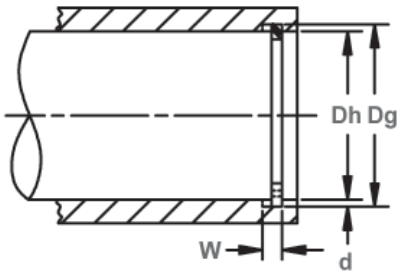


Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE					RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
DKR-13	13	13,6		1,10		0,3	13,72		0,99		1,40		13474	1901
DKR-14	14	14,6	+0,11	1,10		0,3	14,75		0,99		1,40		14510	2047
DKR-15	15	15,7	-0,00	1,10		0,4	15,85		0,99		1,40		15547	2559
DKR-16	16	16,8		1,10		0,4	16,97		0,99		1,65		16583	3119
DKR-17	17	17,8		1,10		0,4	17,98	+0,33	0,99		1,65		17620	3314
DKR-18	18	19,0		1,10		0,5	19,18	-0,00	0,99		1,91		18656	4386
DKR-19	19	20,0	+0,13	1,10		0,5	20,19		0,99		1,91		19693	4630
DKR-20	20	21,0	-0,00	1,10		0,5	21,21		0,99		1,91		20729	4874
DKR-21	21	22,0		1,10		0,5	22,23		0,99		1,91		21766	5117
DKR-22	22	23,0		1,10		0,5	23,23		0,99		1,91		22802	5361
DKR-23	23	24,1		1,30		0,6	24,33		1,14		2,18		23853	6165
DKR-24	24	25,2		1,30	+0,14	0,6	25,45		1,14	±0,05	2,18	±0,10	24891	7018
DKR-25	25	26,2	+0,21	1,30	-0,00	0,6	26,45		1,14		2,18		25928	7310
DKR-26	26	27,2	-0,00	1,30		0,6	27,48		1,14		2,18		26965	7603
DKR-27	27	28,4		1,30		0,7	28,68		1,14		2,41		28002	9211
DKR-28	28	29,4		1,30		0,7	29,69		1,14		2,41		29039	9552
DKR-29	29	30,4		1,30		0,7	30,71		1,14		2,41		30076	9893
DKR-30	30	31,4		1,30		0,7	31,71	+0,38	1,14		2,41		31113	10235
DKR-31	31	32,7		1,30		0,9	33,02	-0,00	1,14		2,41		32150	12842
DKR-32	32	33,7		1,30		0,9	34,04		1,14		2,41		33187	13256
DKR-33	33	34,7	+0,25	1,30		0,9	35,05		1,14		2,41		34224	13670
DKR-34	34	35,7	-0,00	1,60		0,9	36,07		1,44		3,25		44541	14085
DKR-35	35	37,0		1,60		1,0	37,38		1,44		3,25		45851	17058
DKR-36	36	38,0		1,60		1,0	38,39		1,44		3,25		47161	17545
DKR-37	37	39,0		1,60		1,0	39,40		1,44		3,25		48471	18032
DKR-38	38	40,0		1,60		1,0	40,41		1,44		3,25		49781	18520



Free Diameter & Ring Measurements



Housing Diameter & Groove Dimensions

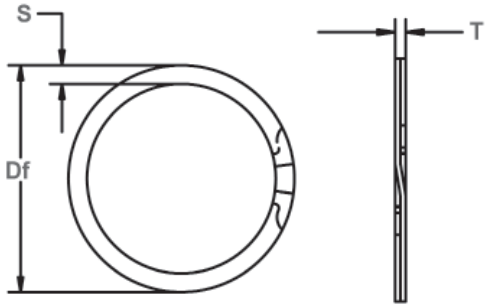
RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE					RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.	3	2
DKR-40	40	42,5		1,85		1,3	42,93		1,69		4,01		61498	24368
DKR-41	41	43,5	+0,25	1,85		1,3	43,94		1,69		4,01		63036	24977
DKR-42	42	44,5	-0,00	1,85		1,3	44,96	+0,51	1,69	±0,05	4,01	±0,10	64573	25586
DKR-45	45	47,5		1,85		1,3	47,98	-0,00	1,69		4,01		69186	27414
DKR-47	47	49,5		1,85		1,3	49,99		1,69		4,01		72261	28633
DKR-48	48	50,5		1,85		1,3	51,00		1,69		4,01		73798	29242
DKR-50	50	53,0		2,15		1,5	53,54		1,93		5,08		87790	36552
DKR-51	51	54,0		2,15		1,5	54,54		1,93		5,08		89546	37283
DKR-52	52	55,0		2,15		1,5	55,55		1,93		5,08		91302	38014
DKR-55	55	58,0		2,15		1,5	58,57		1,93		5,08		96569	40207
DKR-56	56	59,0		2,15	+0,14	1,5	59,59	+0,63	1,93		5,08		98325	40938
DKR-57	57	60,0		2,15	-0,00	1,5	60,60	-0,00	1,93		5,08		100081	41669
DKR-58	58	61,0		2,15		1,5	61,62		1,93		5,08		101836	42400
DKR-60	60	63,0	+0,30	2,15		1,5	63,63		1,93		5,08		105348	43863
DKR-62	62	65,0	-0,00	2,15		1,5	65,66		1,93		5,08	±0,12	108860	45325
DKR-63	63	66,0		2,15		1,5	66,67		1,93	±0,08	5,08		110615	46056
DKR-64	64	67,0		2,15		1,5	67,67		1,93		5,08		112371	46787
DKR-65	65	68,0		2,65		1,5	68,67		2,41		5,08		135725	47518
DKR-67	67	70,0		2,65		1,5	70,67		2,41		5,08		139901	48980
DKR-68	68	71,0		2,65		1,5	71,67		2,41		5,08		141989	49711
DKR-70	70	73,0		2,65		1,5	73,67		2,41		5,08		146165	51173
DKR-72	72	75,0		2,65		1,5	75,67	+0,76	2,41		5,08		150341	52635
DKR-75	75	78,0		2,65		1,5	78,68	-0,00	2,41		5,08		156605	54828
DKR-76	76	79,0		2,65		1,5	79,68		2,41		5,08		158694	55559
DKR-78	78	81,0	+0,35	2,65		1,5	81,69		2,41		5,08		162870	57021
DKR-80	80	83,5	-0,00	2,65		1,8	84,19		2,41		6,05	±0,13	167046	68231

DKR Spiral Housing Rings

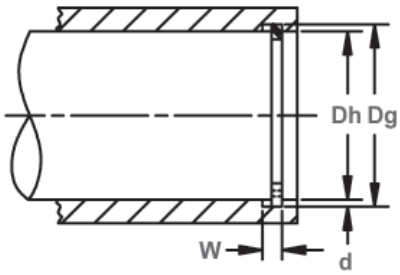
DIN 472 Groove

Internal, Heavy Duty DIN

These 2-turn rings are ideal for applications with high thrust loads and are designed to fit into a groove established by DIN specifications.

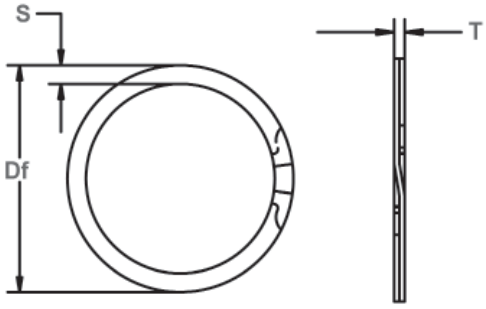


Free Diameter & Ring Measurements

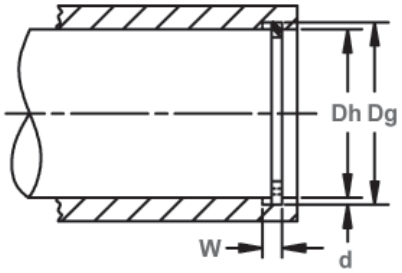


Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE					RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
DKR-82	82	85,5		2,65	+0,14 -0,00	1,8	86,20	+0,76 -0,00	2,41		6,05		171222	69936
DKR-85	85	88,5		3,15		1,8	89,20		2,91		6,05		214309	72495
DKR-88	88	91,5	+0,35	3,15		1,8	92,21		2,91		6,05		221873	75054
DKR-90	90	93,5	-0,00	3,15		1,8	94,21	+0,89	2,91	±0,08	6,05		226915	76759
DKR-92	92	95,5		3,15		1,8	96,22	-0,00	2,91		6,05		231958	78465
DKR-95	95	98,5		3,15		1,8	99,24		2,91		6,05		239522	81024
DKR-98	98	101,5		3,15		1,8	102,26		2,91		6,05		247068	83583
DKR-100	100	103,5		3,15		1,8	104,29		2,91		6,05		252128	85288
DKR-102	102	106,0		4,15		2,0	106,79		3,89		6,73		343778	99422
DKR-105	105	109,0		4,15		2,0	109,79		3,89		6,73	±0,13	353889	102346
DKR-108	108	112,0	+0,54	4,15		2,0	112,80		3,89		6,73		364000	105270
DKR-110	110	114,0	-0,00	4,15		2,0	114,83		3,89		6,73		370741	107220
DKR-112	112	116,0		4,15	+0,18	2,0	116,84		3,89		6,73		377482	109169
DKR-115	115	119,0		4,15	-0,00	2,0	119,86	+1,30	3,89		6,73		387593	112093
DKR-120	120	124,0		4,15		2,0	124,92	-0,00	3,89		6,73		404445	116967
DKR-125	125	129,0		4,15		2,0	129,97		3,89		6,73		421297	121840
DKR-127	127	131,0		4,15		2,0	131,97		3,89	±0,10	6,73		428038	123790
DKR-130	130	134,0		4,15		2,0	135,00		3,89		6,73		438149	126714
DKR-135	135	139,0	+0,63	4,15		2,0	140,03		3,89		6,73		455001	131588
DKR-140	140	144,0	-0,00	4,15		2,0	145,11		3,89		6,73		471852	136461
DKR-145	145	149,0		4,15		2,0	150,11		3,89		6,73		488704	141335
DKR-150	150	155,0		4,15		2,5	156,13		3,89		7,92		505556	182761
DKR-155	155	160,0		4,15		2,5	161,19	+1.40	3,89		7,92		522408	188853
DKR-160	160	165,0		4,15		2,5	166,22	-0.00	3,89		7,92	±0,15	539260	194945
DKR-165	165	170,0		4,15		2,5	171,27		3,89		7,92		556112	201037
DKR-170	170	175,0		4,15		2,5	176,33		3,89		7,92		572964	207129



Free Diameter & Ring Measurements

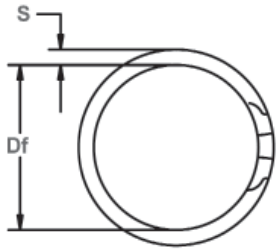


Housing Diameter & Groove Dimensions

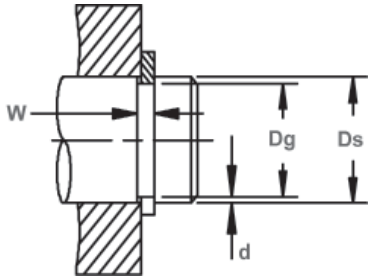
RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE					RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.		
DKR-175	175	180,0	+0,63 -0,00	4.15		2,5	181,36	+1,40	3,89		7,92		589815	213221
DKR-180	180	185,0		4.15		2,5	186,39	-0,00	3,89		7,92		606667	219313
DKR-185	185	190,0		4.15		2,5	191,44		3,89	±0,10	7,92		623519	225405
DKR-190	190	195,0		4.15		2,5	196,47		3,89		7,92		640371	231497
DKR-195	195	200,0	+0.72	4.15		2,5	201,52		3,89		7,92		657223	237589
DKR-200	200	205,0	-0.00	4.15		2,5	206,58		3,89		7,92		674075	243681
DKR-210	210	216,0		5.15	+0,18	3,0	217,58	+1,78	4,86		9,53		884268	307038
DKR-220	220	226,0		5.15	-0,00	3,0	227,66	-0,00	4,86		9,53	±0,15	926376	321659
DKR-230	230	236,0		5.15		3,0	237,72		4,86		9,53		968484	336280
DKR-240	240	246,0		5.15		3,0	247,80		4,86		9,53		1010592	350900
DKR-250	250	256,0		5.15		3,0	257,89		4,86		9,53		1052700	365521
DKR-260	260	268,0		5.15		4,0	269,93		4,86		11,18		1094808	506856
DKR-270	270	278,0	+0.81	5.15		4,0	280,01		4,86		11,18		1136916	526351
DKR-280	280	288,0	-0.00	5.15		4,0	290,09		4,86		11,18		1179024	545845
DKR-290	290	298,0		5.15		4,0	300,15		4,86	±0,13	11,18		1221132	565340
DKR-300	300	308,0		5.15		4,0	310,24	+3,05	4,86		11,18		1263241	584834
DKR-310	310	320,0		6.20		5,0	322,25	-0,00	5,87		12,70		1576625	755411
DKR-320	320	330,0		6.20		5,0	332,33		5,87		12,70		1627484	779779
DKR-330	330	340,0		6.20		5,0	342,42		5,87		12,70		1678342	804147
DKR-340	340	350,0		6.20		5,0	352,50		5,87		12,70		1729201	828515
DKR-350	350	360,0	+0.89	6.20	+0,22	5,0	362,56		5,87		12,70	±0,19	1780060	852883
DKR-360	360	370,0	-0.00	6.20	-0,00	5,0	372,64	+3,56	5,87		12,70		1830919	877251
DKR-370	370	380,0		6.20		5,0	382,73	-0,00	5,87		12,70		1881778	901619
DKR-380	380	390,0		6.20		5,0	392,79		5,87		12,70		1932637	925987
DKR-390	390	400,0		6.20		5,0	402,84		5,87		12,70		1983496	950355
DKR-400	400	410,0		6.20		5,0	412,93		5,87		12,70		2034354	974723

DCR Spiral Shaft Rings
DIN 471 Groove

External, Heavy Duty DIN
These 2-turn rings are ideal for applications with high thrust loads and are designed to fit into a groove established by DIN specifications.

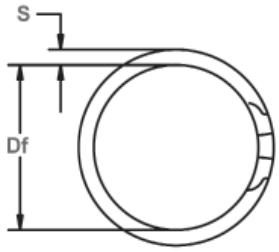


Free Diameter & Ring Measurements

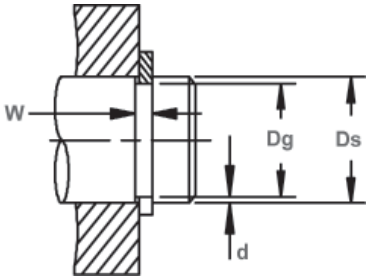


Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE					RING SIZE						THRUST LOAD (N)		R.P.M. LIMITS
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	Standard Material (Carbon Steel)
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	Tol.			
DCR-13	13	12,4		1,10		0,3	12,27		0,99		1,4		13474	1901	22915
DCR-14	14	13,4		1,10		0,3	13,26		0,99		1,4		14510	2047	19967
DCR-15	15	14,3	+0,00	1,10		0,4	14,15		0,99		1,4		15547	2559	17836
DCR-16	16	15,2	-0,11	1,10		0,4	15,04		0,99		1,65		16583	3119	18132
DCR-17	17	16,2		1,10		0,4	16,04		0,99		1,65		17620	3314	15677
DCR-18	18	17,0		1,30		0,5	16,83		1,14		1,91		18668	4386	16195
DCR-19	19	18,0		1,30		0,5	17,83	+0,00	1,14		1,91		19705	4630	14221
DCR-20	20	19,0		1,30		0,5	18,82	-0,33	1,14		1,91		20742	4874	12948
DCR-21	21	20,0	+0,00	1,30		0,5	19,79		1,14		1,91		21779	5117	12475
DCR-22	22	21,0	-0,13	1,30		0,5	20,78		1,14		1,91		22816	5361	11421
DCR-23	23	22,0		1,30		0,5	21,77		1,14		1,91		23853	5605	10495
DCR-24	24	22,9		1,30		0,6	22,66		1,14		2,18		24891	6433	10825
DCR-25	25	23,9		1,30		0,6	23,65		1,14		2,18		25928	6701	10020
DCR-26	26	24,9	+0,00	1,30		0,6	24,64		1,14		2,18		26965	6969	9301
DCR-27	27	25,6	-0,21	1,30		0,7	25,34		1,14	±0,05	2,18	±0,10	28002	9211	8721
DCR-28	28	26,6		1,60		0,7	26,34		1,44		2,39		36681	9552	8609
DCR-29	29	27,6		1,60		0,7	27,33		1,44		2,39		37991	9893	8060
DCR-30	30	28,6		1,60		0,7	28,32		1,44		2,39		39301	10235	7562
DCR-32	32	30,3		1,60		0,9	30,00	+0,00	1,44		3,25		41921	13256	8686
DCR-33	33	31,3		1,60	+0,14	0,9	30,99	-0,38	1,44		3,25		43231	13670	8205
DCR-34	34	32,3		1,60	-0,00	0,9	31,98		1,44		3,25		44541	14085	7763
DCR-35	35	33,0		1,60		1.0	32,66		1,44		3,25		45851	17058	7628
DCR-36	36	34,0		1,85		1.0	33,65		1,69		4,01		55349	17545	8474
DCR-38	38	36,0	+0,00	1,85		1.0	35,64		1,69		4,01		58424	18520	7556
DCR-40	40	37,5	-0,25	1,85		1,3	37,11		1,69		4,01		61498	24368	7181
DCR-42	42	39,5		1,85		1,3	39,09		1,69		4,01		64573	25586	6546
DCR-45	45	42,5		1,85		1,3	42,06	+0,00	1,69		4,01		69186	27414	5740
DCR-46	46	43,5		1,85		1,3	43,05	-0,51	1,69		4,01		70723	28023	5505
DCR-47	47	44,5		1,85		1,3	44,04		1,69		4,01		72261	28633	5283
DCR-48	48	45,5		1,85		1,3	45,03		1,69		4,01		73798	29242	5075
DCR-50	50	47,0		2,15		1,5	46,53		1,93		5,08		87790	36552	5651
DCR-52	52	49,0		2,15		1,5	48,51		1,93		5,08		91302	38014	5251
DCR-54	54	51,0		2,15		1,5	50,50		1,93		5,08		94813	39476	4842
DCR-55	55	52,0		2,15		1,5	51,49		1,93		5,08		96569	40207	4680
DCR-56	56	53,0		2,15		1,5	52,48	+0,00	1,93		5,08		98325	40938	4525
DCR-58	58	55,0		2,15		1,5	54,43	-0,63	1,93		5,08		101836	42400	4359
DCR-60	60	57,0		2,15		1,5	56,42		1,93		5,08		105348	43863	4050
DCR-62	62	59,0		2,15		1,5	58,42		1,93		5,08	±0,12	108860	45325	3738
DCR-63	63	60,0		2,15		1,5	59,39		1,93		5,08		110615	46056	3691
DCR-65	65	62,0	+0,00	2,65		1,5	61,39		2,41	±0,08	5,08		135725	47518	3430
DCR-67	67	64,0	-0,30	2,65		1,5	63,37		2,41		5,08		139901	48980	3239
DCR-68	68	65,0		2,65		1,5	64,34		2,41		5,08		141989	49711	3201
DCR-70	70	67,0		2,65		1,5	66,34		2,41		5,08		146165	51173	2982
DCR-72	72	69,0		2,65		1,5	68,33		2,41		5,08		150341	52635	2805
DCR-75	75	72,0		2,65		1,5	71,33	+0,00	2,41		5,08		156605	54828	2537
DCR-77	77	74,0		2,65		1,5	73,33	-0,76	2,41		5,08		160782	56290	2379
DCR-78	78	75,0		2,65		1,5	74,33		2,41		5,08		162870	57021	2304
DCR-80	80	76,5		2,65		1,8	75,81		2,41		6,05	±0,13	167046	68231	2576
DCR-82	82	78,5		2,65		1,8	77,81		2,41		6,05		171222	69936	2425



Free Diameter & Ring Measurements

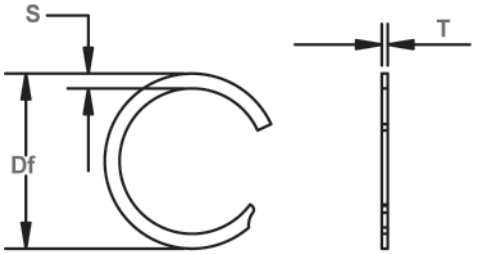


Shaft Diameter & Groove Dimensions

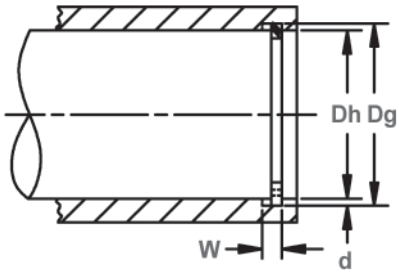
RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE					RING SIZE						THRUST LOAD (N)		R.P.M. LIMITS
		DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	Standard Material (Carbon Steel)
	Ds	Dg	Tol.	W	Tol.	d	Df	Tol.	T	Tol.	S	tol.			
DCR-85	85	81,5		3,15		1,8	80,80	+0,00 '-0,76	2,91		6,35		214309	72495	2333
DCR-88	88	84,5		3,15		1,8	83,80		2,91		6,35		221873	75054	2143
DCR-90	90	86,5	+0,00	3,15		1,8	85,80	+0,00	2,91	±0,08	6,35		226915	76759	2029
DCR-95	95	91,5	- 0,35	3,15		1,8	90,80	-0,89	2,91		6,35		239522	81024	1777
DCR-98	98	94,5		3,15		1,8	93,79		2,91		6,35		247086	83583	1659
DCR-100	100	96,5		3,15		1,8	95,79		2,91		6,35		252128	85288	1579
DCR-102	102	98,0		4,15		2,0	97,29		3,89		6,73		343778	99422	1530
DCR-105	105	101,0		4,15		2,0	100,28		3,89		6,73	±0,13	353889	102346	1435
DCR-108	108	104,0	+0,00	4,15		2,0	103,25		3,89		6,73		364000	105270	1368
DCR-110	110	106,0	-0,54	4,15		2,0	105,23		3,89		6,73		370741	107220	1391
DCR-115	115	111,0		4,15		2,0	110,19		3,89		6,73		387593	112093	1280
DCR-120	120	116,0		4,15		2,0	115,16	+0,00	3,89		6,73		404445	116967	1175
DCR-125	125	121,0		4,15		2,0	120,12	-1,30	3,89		6,73		421297	121840	1088
DCR-130	130	126,0		4,15		2,0	125,07		3,89		6,73		438149	126714	1017
DCR-135	135	131,0		4,15		2,0	130,02		3,89		6,73		455001	131588	952
DCR-140	140	136,0		4,15		2,0	134,98		3,89		6,73		471852	136461	888
DCR-145	145	141,0		4,15		2,0	139,93		3,89	±0,10	6,73		488704	141335	835
DCR-150	150	145,0	+0,00	4,15	+0,18	2,5	143,91		3,89		7,92		505556	182761	788
DCR-155	155	150,0	-0,63	4,15	-0,00	2,5	148,89		3,89		7,92		522408	188853	733
DCR-160	160	155,0		4,15		2,5	153,85		3,89		7,92		539260	194945	690
DCR-165	165	160,0		4,15		2,5	158,80	+0,00	3,89		7,92		556112	201037	753
DCR-170	170	165,0		4,15		2,5	163,75	-1,52	3,89		7,92		572964	207129	715
DCR-175	175	170,0		4,15		2,5	168,73		3,89		7,92		589815	213221	671
DCR-180	180	175,0		4,15		2,5	173,69		3,89		7,92		606667	219313	636
DCR-185	185	180,0		4,15		2,5	178,66		3,89		7,92	±0,15	623519	225405	601
DCR-190	190	185,0		4,15		2,5	183,59		3,89		7,92		640371	231497	577
DCR-195	195	190,0		4,15		2,5	188,54		3,89		7,92		657223	237589	551
DCR-200	200	195,0		4,15		2,5	193,54		3,89		7,92		674075	243681	518
DCR-205	205	199,0	+0,00	5,15		3,0	197,54	+0,00	4,86		11,18		863214	299727	495
DCR-210	210	204,0	-0,72	5,15		3,0	202,54	-1,78	4,86		11,18		884268	307038	466
DCR-220	220	214,0		5,15		3,0	212,47		4,86		11,18		926376	321659	425
DCR-230	230	224,0		5,15		3,0	222,40		4,86		11,18		968484	336280	527
DCR-240	240	234,0		5,15		3,0	232,33		4,86		11,18		1010592	350900	486
DCR-250	250	244,0		5,15		3,0	242,24		4,86		11,18		1052700	365521	451
DCR-260	260	252,0		5,15		4,0	250,19		4,86		12,70		1094808	506856	424
DCR-270	270	262,0		5,15		4,0	260,15	+0,00	4,86		12,70		1136916	526351	390
DCR-280	280	272,0	+0,00	5,15		4,0	270,08	-2,30	4,86		12,70		1179024	545845	363
DCR-290	290	282,0	-0,81	5,15		4,0	279,98		4,86	±0,13	12,70		1221132	565340	382
DCR-300	300	292,0		5,15		4,0	289,92		4,86		12,70		1263241	584834	357
DCR-310	310	300,0		6,20		5,0	297,84		5,87		15,88		576625	755411	342
DCR-320	320	310,0		6,20		5,0	307,84		5,87		15,88		627484	779779	316
DCR-330	330	320,0		6,20		5,0	317,75		5,87		15,88	±0,19	1678342	804147	299
DCR-340	340	330,0		6,20		5,0	327,69		5,87		15,88		729201	828515	343
DCR-350	350	340,0		6,20	+0,22	5,0	337,64	+0,00	5,87		15,88		1780060	852883	322
DCR-360	360	350,0	+0,00	6,20	-0,00	5,0	347,57	-2,80	5,87		15,88		1830919	877251	305
DCR-370	370	360,0	-0,89	6,20		5,0	357,48		5,87		15,88		1881778	901619	291
DCR-380	380	370,0		6,20		5,0	367,41		5,87		15,88		1932637	925987	276
DCR-390	390	380,0		6,20		5,0	377,34		5,87		15,88		1983496	950355	262
DCR-400	400	390,0		6,20		5,0	387,25		5,87		15,88		2034354	974723	251

DKL Spiral Housing Rings
DIN 472 Groove

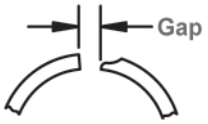
Internal, Heavy-Duty, Metric
These snap rings are ideal for applications with high thrust loads and are designed to fit into a groove established by DIN specifications.



Free Diameter & Ring Measurements

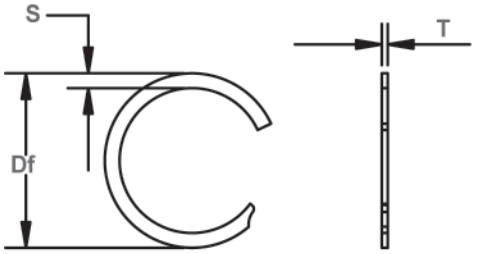


Housing Diameter & Groove Dimensions

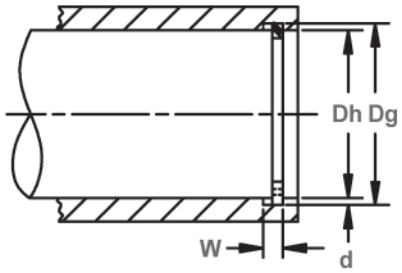


End Design

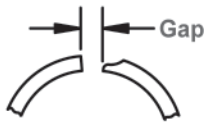
RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
DKL-13	13	13,60		1,10		13,73		0,94		1,40		10591	1931
DKL-14	14	14,60	+0,11 -0,00	1,10		14,74		0,94		1,40		11396	2077
DKL-15	15	15,70		1,10		15,85		0,94		1,40		12224	2602
DKL-16	16	16,80		1,10		16,90		0,94		1,65		13029	3172
DKL-17	17	17,80		1,10		17,97	+0,33 -0,00	0,94		1,65		13838	3367
DKL-18	18	19,00		1,10		19,18		0,94		1,90		14666	4457
DKL-19	19	20,00	+0,13 -0,00	1,10		20,25		0,94		1,90		15471	5702
DKL-20	20	21,00		1,10		21,20		0,94		1,90		16276	4951
DKL-21	21	22,00		1,10		22,21		0,94		1,90		17103	5200
DKL-22	22	23,00		1,10		23,22		0,94		1,90		17913	5445
DKL-23	23	24,00		1,10		24,23		0,94		1,90		18736	5698
DKL-24	24	25,20		1,30		25,40		1,15		2,15		23927	6539
DKL-25	25	26,20	+0,21 -0,00	1,30		26,45		1,15		2,15		24914	6806
DKL-26	26	27,20		1,30		27,46		1,15	±0,05	2,15	±0,10	25929	7082
DKL-27	27	28,20		1,30		28,47		1,15		2,38		26916	7353
DKL-28	28	29,40		1,30		29,68		1,15		2,38		27904	9702
DKL-29	29	30,40		1,30		30,69	+0,38 -0,00	1,15		2,38		28918	10053
DKL-30	30	31,40		1,30		31,79		1,15		2,38		29905	10395
DKL-31	31	32,70		1,30		33,01		1,15		2,38		30893	12660
DKL-32	32	33,70		1,30		33,93		1,15		2,38		31907	13073
DKL-33	33	34,70		1,30	+0,14 -0,00	35,03		1,15		2,38		32895	13478
DKL-34	34	35,70		1,60		36,04		1,44		3,25		40319	13892
DKL-35	35	37,00	+0,25 -0,00	1,60		37,35		1,44		3,25		41493	16899
DKL-36	36	38,00		1,60		38,36		1,44		3,25		42663	17375
DKL-37	37	39,00		1,60		39,37		1,44		3,25		43868	17869
DKL-38	38	40,00		1,60		40,44		1,44		3,25		45043	18344
DKL-40	40	42,50		1,85		42,86		1,69		4,01		55621	24265
DKL-41	41	43,50		1,85		43,91		1,69		4,01		56995	24866
DKL-42	42	44,50		1,85		44,92	+0,51 -0,00	1,69		4,01		58410	25484
DKL-45	45	47,50		1,85		47,88		1,69		4,01		62578	27303
DKL-47	47	49,50		1,85		49,97		1,69		4,01		65331	28504
DKL-48	48	50,50		1,85		50,98		1,69		4,01		66741	29118
DKL-50	50	53,00		2,15		53,50		1,93		5,08		75282	36529
DKL-51	51	54,00		2,15		54,43		1,93		5,08		76776	37249
DKL-52	52	55,00		2,15		55,52		1,93		5,08		78266	37974
DKL-55	55	58,00		2,15		58,55		1,93		5,08		82777	40163
DKL-56	56	59,00		2,15		59,56	+0,63 -0,00	1,93		5,08		84307	40906
DKL-57	57	60,00	+0,30 -0,00	2,15		60,68		1,93		5,08		85797	41631
DKL-58	58	61,00		2,15		61,58		1,93	±0,08	5,08	±0,13	87287	42352
DKL-60	60	63,00		2,15		63,60		1,93		5,08		90308	43819
DKL-62	62	65,00		2,15		65,58		1,93		5,08		93328	45283
DKL-63	63	66,00		2,15		66,63		1,93		5,08		94823	46008
DKL-64	64	67,00		2,65		67,64		2,41		5,08		114742	46751
DKL-65	65	68,00		2,65		68,70		2,41		5,08		116517	47471
DKL-67	67	70,00		2,65		70,54	+0,76 -0,00	2,41		5,08		120115	48939
DKL-68	68	71,00		2,65		71,84		2,41		5,08		121890	49660
DKL-70	70	73,00		2,65		73,64		2,41		5,08		125489	51128



Free Diameter & Ring Measurements



Housing Diameter & Groove Dimensions

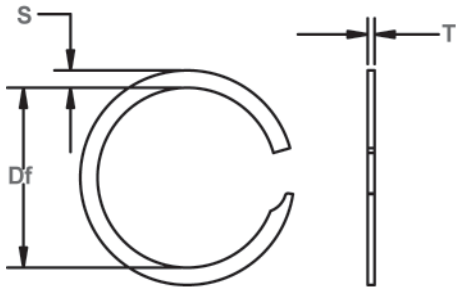


End Design

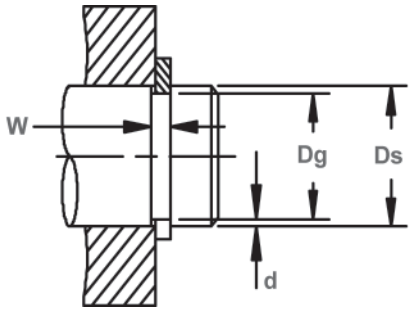
RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.	3	2
DKL-72	72	75,00	+0,30 -0,00	2,65		75,72		2,41		5,08		129083	52591
DKL-75	75	78,00		2,65		78,75		2,41		5,08		134456	54780
DKL-76	76	79,00		2,65	+0,14 -0,00	79,88	+0,76 -0,00	2,41		5,08		136231	55505
DKL-78	78	81,00		2,65		81,73		2,41		5,08		139830	56968
DKL-80	80	83,50		2,65		84,30		2,41		6,02		143428	68342
DKL-82	82	85,50		2,65		86,32		2,41	±0,08	6,02		146978	70033
DKL-85	85	88,50	+0,35 -0,00	3,15		89,35		2,91		6,30		175046	72595
DKL-88	88	91,50		3,15		92,38		2,91		6,30		181269	75175
DKL-90	90	93,50		3,15		94,70	+0,89 -0,00	2,91		6,30		185353	76865
DKL-92	92	95,50		3,15		96,50		2,91		6,30		189485	78582
DKL-95	95	98,50		3,15		99,62		2,91		6,30		195659	81140
DKL-98	98	101,50		3,15		102,71		2,91		6,30	±0,13	201829	83702
DKL-100	100	103,50		3,15		104,50		2,91		6,30		205962	85415
DKL-102	102	106,00		4,15		107,27		3,89		6,73		269224	87127
DKL-105	105	109,00		4,15		109,96		3,89		6,73		277133	102687
DKL-108	108	112,00	+0,54 -0,00	4,15		113,09		3,89		6,73		285042	105619
DKL-110	110	114,00		4,15		115,10		3,89		6,73		290340	107580
DKL-112	112	116,00		4,15		117,12		3,89		6,73		295567	109520
DKL-115	115	119,00		4,15		120,15	+1,30 -0,00	3,89		6,73		303547	112473
DKL-120	120	124,00		4,15		125,60		3,89		6,73		316678	117344
DKL-125	125	129,00		4,15		130,25		3,89		6,73		329893	122237
DKL-127	127	131,00		4,15		132,27		3,89		6,73		335187	124199
DKL-130	130	134,00		4,15	+0,18 -0,00	135,30		3,89		6,73		343096	127130
DKL-135	135	139,00		4,15		140,35		3,89		6,73		356303	132023
DKL-140	140	144,00	+0,63 -0,00	4,15		145,26		3,89	±0,10	6,73		369509	136916
DKL-145	145	149,00		4,15		150,45		3,89		6,73		382716	141809
DKL-150	150	155,00		4,15		156,50		3,89		8,03		395923	181986
DKL-155	155	160,00		4,15		161,55		3,89		8,03		409063	188026
DKL-160	160	165,00		4,15		166,60	+1,40 -0,00	3,89		8,03		422270	194094
DKL-165	165	170,00		4,15		171,70		3,89		8,03		435476	200166
DKL-170	170	175,00		4,15		176,70		3,89		8,03		448683	206237
DKL-175	175	180,00		4,15		181,75		3,89		8,03		461890	212305
DKL-180	180	185,00		4,15		186,80		3,89		8,03	±0,15	475097	218377
DKL-185	185	190,00		4,15		191,85		3,89		8,03		488232	224417
DKL-190	190	195,00		4,15		197,15		3,89		8,03		501439	230489
DKL-195	195	200,00	+0,72 -0,00	4,15		201,95		3,89		8,03		514646	236556
DKL-200	200	205,00		4,15		207,00	+1,78 -0,00	3,89		8,03		527853	242628
DKL-210	210	216,00		5,15		217,93		4,87		9,48		657096	306763
DKL-220	220	226,00		5,15		228,20		4,87		9,48		688327	321344
DKL-230	230	236,00		5,15		238,30		4,87		9,48		719638	335961
DKL-240	240	246,00		5,15		248,40		4,87		9,48		750953	350578
DKL-250	250	256,00		5,15		258,50		4,87	±0,13	9,48		782264	365199
DKL-260	260	268,00		5,15		270,77		4,87		11,05		813500	505300
DKL-270	270	278,00	+0,81 -0,00	5,15		280,70		4,87		11,05		844811	524748
DKL-280	280	288,00		5,15		290,57	+3,05 -0,00	4,87		11,05	±0,18	876126	544200
DKL-290	290	298,00		5,15		300,90		4,87		11,05		907357	563599
DKL-300	300	308,00		5,15		311,00		4,87		11,05		938673	583051

DCL Spiral Housing Rings
DIN 471 Groove

External, Heavy Duty, Metric
These snap rings are ideal for applications with high thrust loads and are designed to fit into a groove established by DIN specifications.

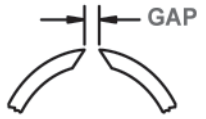


Free Diameter & Ring Measurements



Shaft Diameter & Groove Dimensions

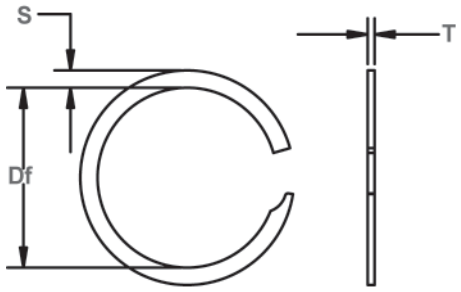
End Designs



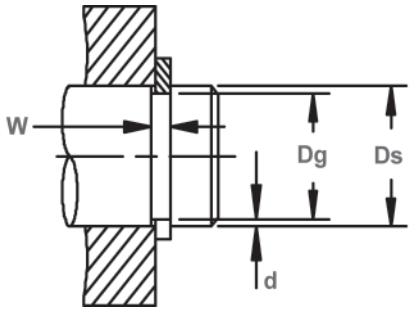
DCL-13 thru DCL-102

DCL-105 thru DCL-300

RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)		R.P.M. LIMITS
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of	Standard Material
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.	3	2	(Carbon Steel)
DCL-13	13	12,4		1,10		12,27		0,94		1,40		10591	1931	31185
DCL-14	14	13,4		1,10		13,31		0,94		1,40		11396	2077	21602
DCL-15	15	14,3	+0,00	1,10		14,15		0,94		1,40		12224	2602	24273
DCL-16	16	15,2	-0,11	1,10		14,98		0,94		1,65		13029	3172	29110
DCL-17	17	16,2		1,10		16,06		0,94		1,65		13838	3367	19841
DCL-18	18	17,0		1,30		16,82		1,15		1,90		17953	4457	22605
DCL-19	19	18,0		1,30		17,81	+0,00	1,15		1,90		18941	4702	20417
DCL-20	20	19,0		1,30		18,80	-0,33	1,15		1,90		19928	4951	18532
DCL-21	21	20,0	+0,00	1,30		19,79		1,15		1,90		20942	5200	16896
DCL-22	22	21,0	-0,13	1,30		20,83		1,15		1,90		21930	5445	13523
DCL-23	23	22,0		1,30		21,77		1,15		1,90		22939	5698	14213
DCL-24	24	22,9		1,30		22,50		1,15		2,15		23927	6539	19083
DCL-25	25	23,9		1,30		23,70		1,15		2,15		24914	6806	11982
DCL-26	26	24,9	+0,00	1,30		24,64		1,15	±0,05	2,15	±0,10	25929	7082	12494
DCL-27	27	25,9	-0,21	1,30		25,50		1,15		2,15		26916	7353	14320
DCL-28	28	26,6		1,60		26,32		1,44		3,25		33179	9702	15229
DCL-29	29	27,6		1,60		27,15		1,44		3,25		34385	10053	18016
DCL-30	30	28,6		1,60	+0,14	28,35		1,44		3,25		35559	10395	12189
DCL-32	32	30,3		1,60	-0,00	29,87	+0,00	1,44		3,25		37939	13073	14215
DCL-33	33	31,3		1,60		31,07	-0,38	1,44		3,25		39113	13478	9511
DCL-34	34	32,3		1,60		31,96		1,44		3,25		40319	13892	10847
DCL-35	35	33,0		1,60		32,57		1,44		3,25		41493	16899	11685
DCL-36	36	34,0		1,85		33,64		1,69		4,01		50038	17375	11640
DCL-38	38	36,0	+0,00	1,85		35,62		1,69		4,01		52827	18344	10520
DCL-40	40	37,5	-0,25	1,85		37,02		1,69		4,01		55621	24265	10841
DCL-42	42	39,5		1,85		39,08		1,69		4,01		58410	25484	8972
DCL-45	45	42,5		1,85		42,05	+0,00	1,69		4,01		62578	27303	7861
DCL-46	46	43,5		1,85		43,10	-0,51	1,69		4,01		63952	27904	7006
DCL-47	47	44,5		1,85		44,03		1,69		4,01		65331	28504	7232
DCL-48	48	45,5		1,85		44,89		1,69		4,01		66741	29118	7881
DCL-50	50	47,0		2,15		46,50		1,93		5,08		75282	36529	7885
DCL-52	52	49,0		2,15		48,48		1,93		5,08		78266	37974	7318
DCL-54	54	51,0		2,15		50,46		1,93		5,08		81287	39438	6811
DCL-55	55	52,0		2,15		51,45		1,93		5,08		82777	40163	6576
DCL-56	56	53,0		2,15		52,44	+0,00	1,93		5,08		84307	40906	6354
DCL-58	58	55,0		2,15		54,42	-0,63	1,93		5,08		87287	42352	5942
DCL-60	60	57,0		2,15		56,55		1,93		5,08		90308	43819	4793
DCL-62	62	59,0	+0,00	2,15		58,32		1,93	±0,08	5,08	±0,13	93328	45283	5490
DCL-63	63	60,0	-0,30	2,15		59,37		1,93		5,08		94823	46008	5071
DCL-65	65	62,0		2,65		61,35		2,41		5,08		116641	47471	4806
DCL-67	67	64,0		2,65		63,35		2,41		5,08		120240	48939	4463
DCL-68	68	65,0		2,65		64,45	+0,00	2,41		5,08		122019	49660	3945
DCL-70	70	67,0		2,65		66,22	-0,76	2,41		5,08		125618	51128	4411
DCL-72	72	69,0		2,65		68,62		2,41		5,08		129221	52591	3947

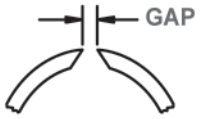


Free Diameter & Ring Measurements



Shaft Diameter & Groove Dimensions

End Designs



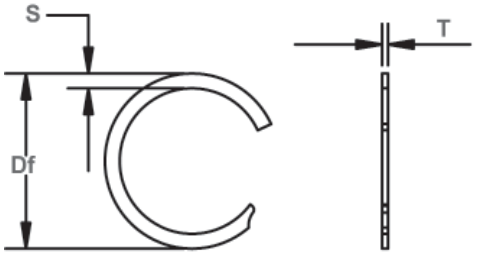
DCL-13 thru DCL-102

DCL-105 thru DCL-300

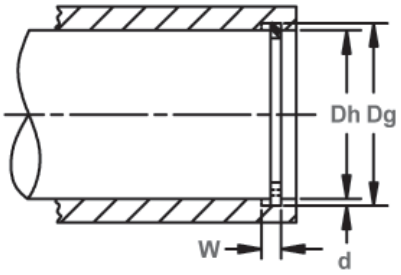
RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)		R.P.M. LIMITS
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of	Standard Material
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.	3	2	(Carbon Steel)
DCL-75	75	72,0		2,65		71,25		2,41		5,08		134599	54780	3648
DCL-77	77	74,0	+0,00	2,65	+0,14	73,23		2,41		5,08		138153	56230	3467
DCL-78	78	75,0	-0,30	2,65	-0,00	74,06	+0,00	2,41		5,08		139977	56968	3731
DCL-80	80	76,50		2,65		75,70	-0,76	2,41		6,02		143575	68342	3747
DCL-82	82	78,50		2,65		77,68		2,41		6,02		147134	70033	3574
DCL-85	85	81,50		3,15		80,65		2,91	±0,08	6,30		175656	72595	3476
DCL-88	88	84,50		3,15		83,60		2,91		6,30		181906	75175	3252
DCL-90	90	86,50	+0,00	3,15		85,80	+0,00	2,91		6,30		185998	76865	2731
DCL-95	95	91,50	-0,35	3,15		90,68	-0,89	2,91		6,30		196340	81140	2598
DCL-98	98	94,50		3,15		93,70		2,91		6,30		202536	83702	2377
DCL-100	100	96,50		3,15		95,50		2,91		6,30		206682	85415	2542
DCL-102	102	98,50		3,15		97,23		2,91		6,30	±0,13	210828	87127	2746
DCL-105	105	100,00		4,15		99,83		3,89		6,73		276951	102687	2640
DCL-108	108	104,00	+0,00	4,15		102,87		3,89		6,73		284855	105619	2418
DCL-110	110	106,00	-0,54	4,15		104,90		3,89		6,73		290149	107580	2279
DCL-115	115	111,00		4,15		109,85	+0,00	3,89		6,73		303346	112473	2090
DCL-120	120	116,00		4,15		115,06	-1,30	3,89		6,73		316478	117344	1694
DCL-125	125	121,00		4,15		119,75		3,89		6,73		329676	122237	1778
DCL-130	130	126,00		4,15		124,70		3,89		6,73		342873	127130	1647
DCL-135	135	131,00		4,15		129,65		3,89		6,73		356071	132023	1530
DCL-140	140	136,00		4,15		134,42		3,89		6,73		369269	136916	1519
DCL-145	145	141,00		4,15		139,55		3,89	±0,10	6,73		382467	141809	1331
DCL-150	150	145,00	+0,00	4,15	+0,18	143,50		3,89		8,03		395665	181986	1470
DCL-155	155	150,00	-0,63	4,15	-0,00	148,45		3,89		8,03		408796	188026	1379
DCL-160	160	155,00		4,15		153,40	+0,00	3,89		8,03		421994	194094	1296
DCL-165	165	160,00		4,15		158,40	-1,52	3,89		8,03		435192	200166	1201
DCL-170	170	165,00		4,15		163,30		3,89		8,03		448683	206237	1151
DCL-175	175	170,00		4,15		168,25		3,89		8,03	±0,15	461890	212305	1088
DCL-180	180	175,00		4,15		173,20		3,89		8,03		475097	218377	1030
DCL-185	185	180,00		4,15		177,62		3,89		8,03		488232	224417	1115
DCL-190	190	185,00		4,15		183,35		3,89		8,03		501439	230489	860
DCL-195	195	190,00		4,15		188,05		3,89		8,03		514646	236556	880
DCL-200	200	195,00		4,15		193,00	+0,00	3,89		8,03		527853	242628	837
DCL-205	205	199,00	+0,00	5,15		196,95	-1,78	4,87		11,05		641438	299454	1068
DCL-210	210	204,00	-0,72	5,15		201,67		4,87		11,05		657096	306763	1077
DCL-220	220	214,00		5,15		211,80		4,87		11,05		688327	321344	932
DCL-230	230	224,00		5,15		221,70		4,87		11,05		719638	335961	854
DCL-240	240	234,00		5,15		231,89		4,87		11,05		750953	350578	735
DCL-250	250	244,00		5,15		241,50		4,87	±0,13	11,05	±0,18	782264	365199	726
DCL-260	260	252,00		5,15		249,59		4,87		12,70		813500	505300	743
DCL-270	270	262,00	+0,00	5,15		259,30	+0,00	4,87		12,70		844811	524748	718
DCL-280	280	272,00	-0,81	5,15		268,83	-2,30	4,87		12,70		876126	544200	714
DCL-290	290	282,00		5,15		279,10		4,87		12,70		907357	563599	624
DCL-300	300	292,00		5,15		289,00		4,87		12,70		938673	583051	584

KLM Spiral Housing Rings

Internal, Light-Duty, Metric
These single-turn snap rings are ideal for light duty applications.



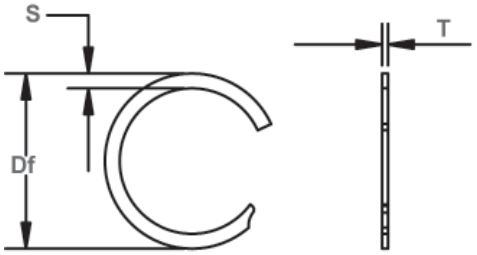
Free Diameter & Ring Measurements



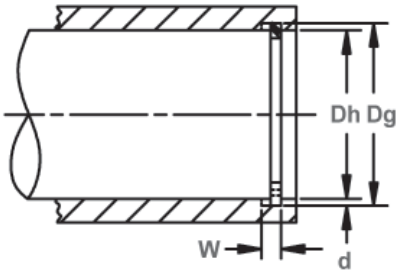
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (kN)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
KLM-6*	6	6.30		0.38		6.35		0.30		0.51		1.99	0.44
KLM-7*	7	7.32		0.38		7.38	+0.25	0.30		0.51		2.32	0.55
KLM-8*	8	8.36		0.46		8.44	-0.00	0.38		0.64		3.18	0.70
KLM-9*	9	9.46		0.46		9.54		0.38		0.76		3.58	1.00
KLM-10*	10	10.50		0.46		10.58	+0.30	0.38		0.76		3.98	1.24
KLM-11	11	11.60		0.46		11.68	-0.00	0.38		0.89		4.39	1.63
KLM-12	12	12.66	±0.05	0.46		12.74		0.38		0.89		4.77	1.93
KLM-13	13	13.72		0.56		13.80		0.46		1.14		6.26	2.28
KLM-14	14	14.72		0.56		14.80		0.46		1.14		6.74	2.46
KLM-15	15	15.72		0.56		15.80		0.46		1.14		7.22	2.63
KLM-16	16	16.72		0.56		16.80		0.46		1.14		7.71	2.81
KLM-17	17	17.72		0.56	+0.05	17.82		0.46		1.14		8.19	2.98
KLM-18	18	18.72		0.56	-0.00	18.82	+0.33	0.46	±0.04	1.14		8.67	3.16
KLM-19	19	19.76		0.56		19.86	-0.00	0.46		1.14		9.15	3.52
KLM-20	20	21.06		0.66		21.26		0.53		1.65		11.10	5.17
KLM-21	21	22.06		0.66		22.27		0.53		1.65		11.65	5.42
KLM-22	22	23.06	±0.08	0.66		23.28		0.53		1.65		12.21	5.68
KLM-24	24	25.06		0.66		25.29		0.53		1.65		13.32	6.20
KLM-25	25	26.06		0.66		26.30		0.53		1.65		13.87	6.46
KLM-26	26	27.06		0.66		27.31		0.53		1.65		14.43	6.72
KLM-28	28	29.12		0.79		29.40		0.64		2.24	±0.10	16.30	7.64
KLM-29	29	30.12		0.79		30.41		0.64		2.24		16.88	7.91
KLM-30	30	31.12		0.79		31.42		0.64		2.24		17.47	8.19
KLM-31	31	32.12	±0.10	0.79		32.43	+0.38	0.64		2.24		18.05	8.46
KLM-32	32	33.12		0.79		33.44	-0.00	0.64		2.24		18.63	8.73
KLM-34	34	35.12		0.79		35.45		0.64		2.24		19.80	9.28
KLM-35	35	36.12		0.79		36.47		0.64		2.24		20.38	9.55
KLM-36	36	37.12		0.79		37.48		0.64		2.24		20.96	9.83
KLM-37	37	38.12		0.79		38.49		0.64		2.24		21.54	10.10
KLM-38	38	39.12		0.79		39.50		0.64		2.24		22.12	10.37
KLM-40	40	41.48		0.99		41.94		0.79		3.00		28.75	14.43
KLM-42	42	43.48		0.99		43.96		0.79		3.00		30.19	15.15
KLM-45	45	46.48		0.99		46.99	+0.51	0.79		3.00		32.34	16.23
KLM-47	47	48.48	±0.13	0.99		49.00	-0.00	0.79		3.00		33.78	16.95
KLM-48	48	49.48		0.99		50.01		0.79		3.00		34.50	17.31
KLM-50	50	51.48		0.99	+0.08	52.04		0.79		3.00		35.93	18.03
KLM-52	52	53.94		0.99	-0.00	54.55		0.79	±0.05	4.01		37.37	24.58
KLM-55	55	56.94		0.99		57.57		0.79		4.01		39.53	26.00
KLM-56	56	57.94		0.99		58.58		0.79		4.01		40.25	26.47
KLM-58	58	59.94		0.99		60.60	+0.64	0.79		4.01		41.68	27.42
KLM-60	60	61.94	±0.15	0.99		62.64	-0.00	0.79		4.01		43.12	28.36
KLM-62	62	63.94		0.99		64.67		0.79		4.01		44.56	29.31
KLM-63	63	64.94		0.99		65.69		0.79		4.01		45.28	29.78
KLM-65	65	66.94		0.99		67.70		0.79		4.01		46.72	30.73

* No Removal Notch.
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.



Free Diameter & Ring Measurements



Housing Diameter & Groove Dimensions

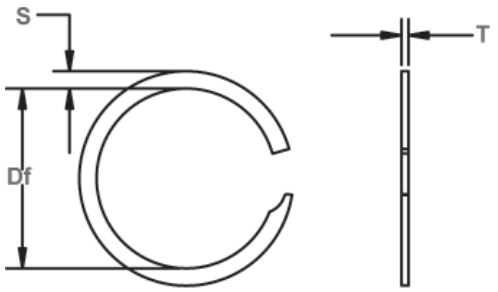
RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (kN)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
KLM-68	68	69.94		0.99		70.72		0.79		4.01		48.87	32.15
KLM-70	70	71.94		0.99		72.74	+0.64 -0.00	0.79		4.01	±0.10	50.31	33.09
KLM-72	72	73.94		0.99		74.77		0.79		4.01		51.75	34.04
KLM-75	75	76.94		0.99		77.80		0.79		4.01		53.90	35.46
KLM-78	78	80.34		1.12		81.20		0.99		4.78		70.25	44.48
KLM-80	80	82.34		1.12	+0.08 -0.00	83.23		0.99		4.78		72.05	45.62
KLM-82	82	84.34		1.12		85.25		0.99		4.78		73.85	46.76
KLM-85	85	87.34		1.12		88.29		0.99		4.78		76.55	48.47
KLM-88	88	90.34	±0.15	1.12		91.32	+0.76 -0.00	0.99		4.78		79.26	50.18
KLM-90	90	92.34		1.12		93.36		0.99		4.78		81.06	51.32
KLM-92	92	94.34		1.12		95.37		0.99		4.78		82.86	52.46
KLM-95	95	97.34		1.12		98.39		0.99		4.78		85.56	54.17
KLM-98	98	100.34		1.12		101.41		0.99		4.78		88.26	55.88
KLM-100	100	102.34		1.12		103.43		0.99		4.78		90.06	57.02
KLM-102	102	104.34		1.12		105.44		0.99		4.78	±0.13	91.87	58.16
KLM-105	105	107.80		1.32		108.92		1.17		5.72		106.44	71.64
KLM-110	110	112.80		1.32		113.98		1.17		5.72		111.51	75.05
KLM-112	112	114.80		1.32		116.01	+0.89 -0.00	1.17		5.72		113.54	76.42
KLM-115	115	117.88		1.32		119.12		1.17		5.72		116.58	80.71
KLM-120	120	123.00		1.32		124.30		1.17		5.72		121.65	87.73
KLM-125	125	128.12		1.32		129.47		1.17	±0.05	5.72		126.71	95.04
KLM-130	130	133.26		1.32		134.66		1.17		5.72		131.78	103.27
KLM-135	135	138.38	±0.18	1.70		139.83		1.55		5.72		181.30	111.19
KLM-140	140	143.50		1.70	+0.10 -0.00	145.00		1.55		5.72		188.01	119.40
KLM-150	150	153.76		1.70		155.30		1.55		6.73		201.44	137.44
KLM-155	155	158.88		1.70		160.46	+1.14 -0.00	1.55		6.73		208.16	146.36
KLM-160	160	164.00		1.70		165.64		1.55		6.73		214.87	155.96
KLM-165	165	169.13		1.70		170.82		1.55		6.73		221.59	165.86
KLM-170	170	174.25		1.70		175.99		1.55		6.73		228.30	176.06
KLM-175	175	179.38		1.70		181.17		1.55		6.73		235.02	186.57
KLM-180	180	184.50		1.70		186.35		1.55		6.73		241.73	197.38
KLM-185	185	189.63		1.70		191.52		1.55		6.73		248.45	208.50
KLM-190	190	194.75		1.70		196.70	+1.52 -0.00	1.55		6.73		255.16	219.92
KLM-195	195	199.88		1.70		201.87		1.55		7.62		261.88	231.65
KLM-200	200	205.00	±0.20	1.70		207.05		1.55		7.62		268.59	243.68
KLM-210	210	215.25		1.70		217.40		1.55		7.62		282.02	268.66
KLM-220	220	225.50		2.08		227.76		1.93		8.76		367.88	294.85
KLM-230	230	235.75		2.08		238.11		1.93		8.76		384.60	322.27
KLM-240	240	246.00		2.08		248.46		1.93		8.76	±0.15	401.33	350.90
KLM-250	250	256.25		2.08	+0.13 -0.00	258.81		1.93		8.76		418.05	380.75
KLM-260	260	266.50		2.08		269.17	+1.78 -0.00	1.93		9.65		434.77	411.82
KLM-270	270	276.75		2.08		279.52		1.93		9.65		451.49	444.11
KLM-280	280	287.00		2.08		289.87		1.93		9.65		468.21	477.61
KLM-290	290	297.25		2.08		300.22		1.93		9.65		484.94	512.34
KLM-300	300	307.50		2.08		310.58		1.93		9.65		501.66	548.28

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.

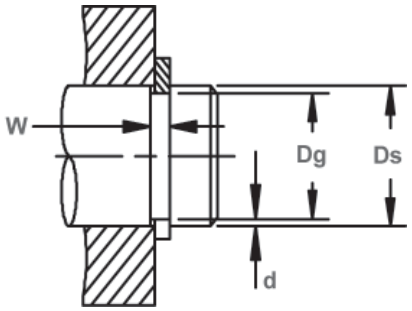
CLM Spiral Shaft Rings

External, Light-Duty, Metric

These single-turn snap rings are ideal for light duty applications.



Free Diameter & Ring Measurements

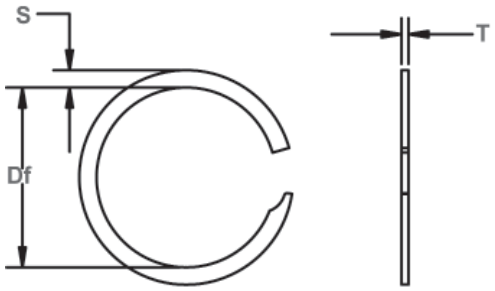


Shaft Diameter & Groove Dimensions

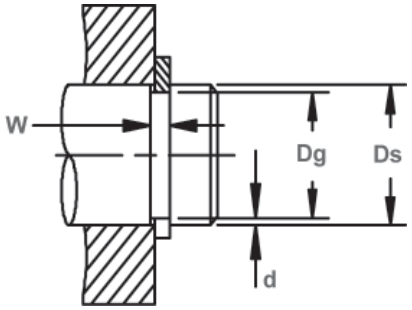
RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (kN)		R.P.M. LIMITS
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2	Standard Material (Carbon Steel)
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.			
CLM-6*	6	5.70		0.38		5.65		0.30		0.51		1.99	0.44	51561
CLM-7*	7	6.64		0.38		6.58		0.30		0.51		2.23	0.61	39742
CLM-8*	8	7.60		0.46		7.52	+0.00	0.38		0.64		3.18	0.78	40518
CLM-9*	9	8.50		0.46		8.42	-0.25	0.38		0.76		3.58	1.11	35627
CLM-10*	10	9.40		0.46		9.32	+0.00	0.38		0.89		3.98	1.46	31833
CLM-11	11	10.40		0.46		10.32	-0.30	0.38		0.89		4.38	1.61	25202
CLM-12	12	11.34	±0.05	0.56		11.22		0.46		1.14		5.78	1.93	30875
CLM-13	13	12.28		0.56		12.15		0.46		1.14		6.26	2.28	26805
CLM-14	14	13.28		0.56	+0.05	13.15		0.46		1.14		6.74	2.46	22359
CLM-15	15	14.28		0.56	-0.00	14.14		0.46		1.14		7.22	2.63	19625
CLM-16	16	15.28		0.56		15.13		0.46		1.14		7.71	2.81	17364
CLM-17	17	16.28		0.56		16.13	+0.00	0.46	±0.04	1.14		8.19	2.98	14958
CLM-18	18	17.28		0.56		17.12	-0.33	0.46		1.14		8.67	3.16	13439
CLM-19	19	18.28		0.56		18.11		0.46		1.14		9.15	3.33	12140
CLM-20	20	19.28		0.56		19.10		0.46		1.14		9.63	3.51	11066
CLM-21	21	19.94		0.66		19.74		0.53		1.65		11.65	5.42	15326
CLM-22	22	20.94	±0.08	0.66		20.73		0.53		1.65		12.21	5.68	13341
CLM-24	24	22.94		0.66		22.72		0.53		1.65		13.32	6.20	11035
CLM-25	25	23.94		0.66		23.71		0.53		1.65	±0.10	13.87	6.46	10214
CLM-26	26	24.88		0.79		24.63		0.64		2.24		15.14	7.10	12483
CLM-28	28	26.88		0.79		26.62		0.64		2.24		16.30	7.64	10648
CLM-29	29	27.88		0.79		27.61		0.64		2.24		16.88	7.91	9973
CLM-30	30	28.88		0.79		28.59	+0.00	0.64		2.24		17.47	8.19	9534
CLM-32	32	30.88	±0.10	0.79		30.57	-0.38	0.64		2.24		18.63	8.73	8437
CLM-34	34	32.88		0.79		32.56		0.64		2.24		19.80	9.28	7398
CLM-35	35	33.88		0.79		33.55		0.64		2.24		20.38	9.55	7004
CLM-36	36	34.88		0.79		34.54		0.64		2.24		20.96	9.83	6641
CLM-38	38	36.88		0.79		36.52		0.64		2.24		22.12	10.37	5994
CLM-40	40	38.52		0.99	+0.08	38.09		0.79		3.00		28.75	14.43	7573
CLM-42	42	40.52		0.99	-0.00	40.07	+0.00	0.79		3.00		30.19	15.15	6888
CLM-45	45	43.52	±0.13	0.99		43.04	-0.51	0.79		3.00		32.34	16.23	6021
CLM-48	48	46.52		0.99		46.01		0.79		3.00		34.50	17.31	5309
CLM-50	50	48.52		0.99		47.99		0.79		3.00		35.93	18.03	4901
CLM-52	52	50.06		0.99		49.48		0.79		4.01		37.37	24.58	6057
CLM-55	55	53.06		0.99		52.46		0.79	±0.05	4.01		39.53	26.00	5380
CLM-56	56	54.06		0.99		53.44		0.79		4.01		40.25	26.47	5238
CLM-58	58	56.06	±0.15	0.99		55.42	+0.00	0.79		4.01		41.68	27.42	4890
CLM-60	60	58.06		0.99		57.40	-0.64	0.79		4.01		43.12	28.36	4575
CLM-62	62	60.06		0.99		59.37		0.79		4.01		44.56	29.31	4323
CLM-63	63	61.06		0.99		60.35		0.79		4.01		45.28	29.78	4220
CLM-65	65	63.06		0.99		62.33		0.79		4.01		46.72	30.73	3967

* No Removal Notch.

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.



Free Diameter & Ring Measurements



Shaft Diameter & Groove Dimensions

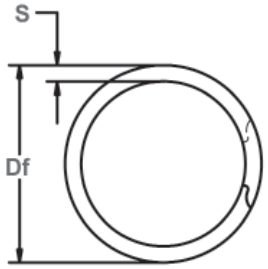
RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (kN)		R.P.M. LIMITS
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of	Standard Material
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.	3	2	(Carbon Steel)
CLM-68	68	66.06		0.99		65.31		0.79		4.01		48.87	32.15	3602
CLM-70	70	68.06		0.99		67.29	+0.00	0.79		4.01	±0.10	50.31	33.09	3402
CLM-72	72	70.06		0.99		69.27	-0.64	0.79		4.01		51.75	34.04	3218
CLM-75	75	73.06		0.99		72.25		0.79		4.01		53.90	35.45	2949
CLM-78	78	75.66		1.12		74.85		0.99		4.78		70.25	44.48	3158
CLM-80	80	77.66	±0.15	1.12	+0.08	76.82		0.99		4.78		72.05	45.62	3025
CLM-82	82	79.66		1.12	-0.00	78.79		0.99		4.78		73.85	46.76	2900
CLM-85	85	82.66		1.12		81.76	+0.00	0.99		4.78		76.55	48.47	2703
CLM-88	88	85.66		1.12		84.73	-0.76	0.99		4.78		79.26	50.18	2526
CLM-90	90	87.66		1.12		86.69		0.99		4.78		81.06	51.32	2443
CLM-95	95	92.66		1.12		91.66		0.99		4.78		85.56	54.17	2174
CLM-100	100	97.66		1.12		96.62		0.99		4.78		90.06	57.02	1955
CLM-105	105	102.20		1.32		101.13		1.17		5.72		106.44	71.64	2082
CLM-110	110	107.20		1.32		106.08		1.17		5.72		111.51	75.05	1902
CLM-115	115	112.20		1.32		111.03	+0.00	1.17		5.72	±0.13	116.58	78.47	1745
CLM-120	120	117.20		1.32		115.98	-0.89	1.17		5.72		121.65	81.88	1606
CLM-125	125	122.20		1.32		120.93		1.17		5.72		126.71	85.29	1483
CLM-130	130	127.20		1.32		125.88		1.17	±0.05	5.72		131.78	88.70	1374
CLM-135	135	131.63		1.70		130.31		1.55		5.72		181.30	111.03	1270
CLM-140	140	136.50		1.70		135.13		1.55		5.72		188.01	119.40	1186
CLM-150	150	146.25	±0.18	1.70	+0.10	144.83		1.55		5.72		201.44	137.07	1022
CLM-155	155	151.13		1.70	-0.00	149.66	+0.00	1.55		5.72		208.16	146.36	961
CLM-160	160	156.00		1.70		154.44	-1.14	1.55		6.73		214.87	155.96	1060
CLM-165	165	160.88		1.70		159.27		1.55		6.73		221.59	165.86	1000
CLM-170	170	165.75		1.70		164.09		1.55		6.73		228.30	176.06	945
CLM-175	175	170.63		1.70		168.92		1.55		6.73		235.02	186.57	894
CLM-180	180	175.50		1.70		173.75		1.55		6.73		241.73	197.38	848
CLM-185	185	180.38		1.70		178.57		1.55		7.62		248.45	208.50	898
CLM-190	190	185.25		1.70		183.40		1.55		7.62		255.16	219.92	854
CLM-195	195	190.13		1.70		188.22	+0.00	1.55		7.62		261.88	231.65	813
CLM-200	200	195.00		1.70		193.05	-1.52	1.55		7.62		268.59	243.68	775
CLM-210	210	204.75		2.08		202.70		1.93		8.76		351.16	268.66	802
CLM-220	220	214.50		2.08		212.36		1.93		8.76		367.88	294.85	734
CLM-230	230	224.25		2.08		222.01		1.93		8.76	±0.15	384.60	322.27	674
CLM-240	240	234.00		2.08		231.66		1.93		8.76		401.33	350.90	622
CLM-250	250	243.75	±0.20	2.08	+0.13	241.31		1.93		8.76		418.05	380.75	575
CLM-260	260	253.50		2.08	-0.00	250.97	+0.00	1.93		9.65		434.77	411.82	582
CLM-270	270	263.25		2.08		260.62	-1.78	1.93		9.65		451.49	444.11	541
CLM-280	280	273.00		2.08		270.27		1.93		9.65		468.21	477.61	505
CLM-290	290	282.75		2.08		279.92		1.93		9.65		484.94	512.34	472
CLM-300	300	292.50		2.08		289.58		1.93		9.65		501.66	548.28	443

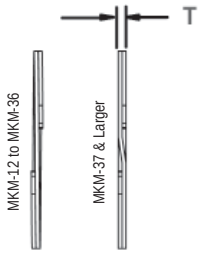
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.

MKM Spiral Housing Rings

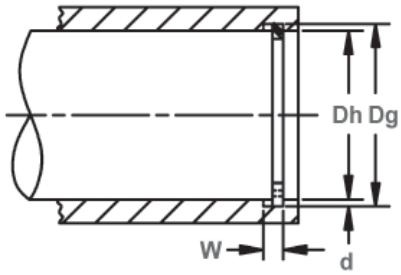
Internal, Medium Duty, Metric

These 2-turn rings provide 360° groove contact and are designed for applications with medium thrust loads.



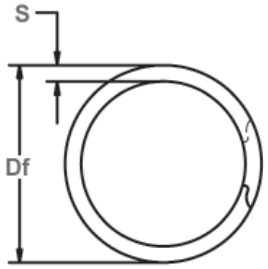


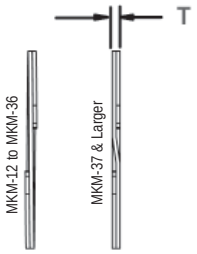
Free Diameter & Ring Measurements



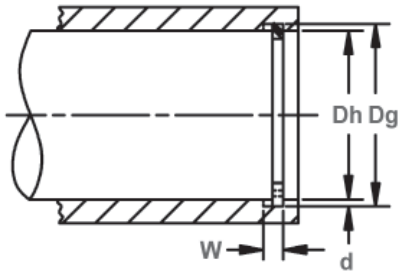
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
MKM-12	12	12.66		0.75		12.78		0.64		1.14		8484	1591
MKM-13	13	13.72		0.75		13.84		0.64		1.14		9191	2008
MKM-14	14	14.72	+0.00	0.75		14.85		0.64		1.14		9898	2311
MKM-15	15	15.72	-0.10	0.75		15.85		0.64		1.14		10605	2621
MKM-16	16	16.72		0.75		16.85		0.64		1.14		11312	2953
MKM-17	17	17.72		0.75		17.85		0.64		1.14		12091	3308
MKM-18	18	18.72		0.75		18.85		0.64		1.14		12726	3685
MKM-19	19	19.86		0.91	+0.08	20.00	+0.33	0.80		1.65		15145	3627
MKM-20	20	20.86		0.91	-0.00	21.10	-0.00	0.80		1.65		15942	4196
MKM-21	21	21.86		0.91		22.04		0.80		1.65		16739	4444
MKM-22	22	23.00		0.91		23.18		0.80		1.65		17536	5657
MKM-23	23	24.00	+0.00	0.91		24.19		0.80		1.65		18333	6166
MKM-24	24	25.00	-0.15	0.91		25.20		0.80	+0.05	1.65		19131	6697
MKM-25	25	26.26		1.07		26.45		0.94	-0.05	1.90		23415	7653
MKM-26	26	27.26		1.07		27.50		0.94		1.90		24352	8376
MKM-28	28	29.26		1.07		29.50		0.94		1.90		26225	9596
MKM-29	29	30.26		1.07		30.50		0.94		1.90		27161	10242
MKM-30	30	31.32		1.22		31.55		1.10		2.16		32881	9817
MKM-32	32	33.32		1.22		33.57		1.10		2.16		35073	11131
MKM-33	33	34.32		1.22		34.57		1.10		2.16		36169	11789
MKM-34	34	35.32	+0.00	1.22		35.57	+0.40	1.10		2.16		37265	12469
MKM-35	35	36.42	-0.20	1.22		36.70	-0.00	1.10		2.40	+0.08	38361	14414
MKM-36	36	37.42		1.22		37.70		1.10		2.40	-0.13	39457	15194
MKM-37	37	38.42		1.22		38.70		1.10		2.40		40553	15997
MKM-38	38	39.42		1.22		39.70		1.10		2.40		41649	16824
MKM-39	39	40.60		1.42		40.90		1.25		2.75		44350	16130
MKM-40	40	41.60		1.42		41.90		1.25		2.75		45487	16904
MKM-41	41	42.60		1.42		42.92		1.25		2.75		46624	17780
MKM-42	42	43.60		1.42		43.93		1.25		2.75		47761	18636
MKM-43	43	44.72	+0.00	1.42		45.00		1.25		3.00		48899	20883
MKM-44	44	45.72	-0.25	1.42		46.02	+0.50	1.25		3.00		50036	21903
MKM-45	45	46.72		1.42		47.08	-0.00	1.25		3.00		51173	23143
MKM-47	47	48.80		1.42		49.18		1.25		3.00		53447	26412
MKM-48	48	49.80		1.42		50.18		1.25		3.00		54584	27474
MKM-50	50	51.92		1.42	+0.10	52.30		1.25		3.25		56859	31907
MKM-52	52	53.92		1.42	-0.00	54.30		1.25		3.25		59133	34360
MKM-53	53	54.92		1.42		55.32		1.25	+0.08	3.25		60270	35132
MKM-55	55	57.00		1.42		57.38		1.25	-0.08	3.50		62545	37976
MKM-56	56	58.00		1.42		58.40		1.25		3.50		63682	38667
MKM-58	58	60.00		1.42		60.43		1.25		3.50		65956	40048
MKM-59	59	61.08		1.42		61.54		1.25		3.50		67093	42368
MKM-60	60	62.14		1.42		62.57	+0.63	1.25		3.50		68231	44329
MKM-61	61	63.24	+0.00	1.42		63.65	-0.00	1.25		3.76		69368	47174
MKM-62	62	64.24	-0.30	1.42		64.70		1.25		3.76		70505	47947
MKM-63	63	65.24		1.42		65.70		1.25		3.76		71642	48720
MKM-64	64	66.34		1.42		66.77		1.25		3.76		72779	51703
MKM-65	65	67.34		1.42		67.82		1.25		3.76		73916	52511
MKM-66	66	68.34		1.42		68.80		1.25		3.76		75054	53319





Free Diameter & Ring Measurements



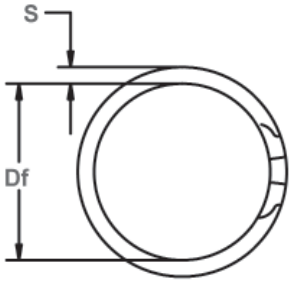
Housing Diameter & Groove Dimensions

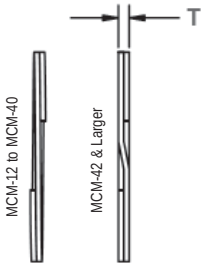
RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
MKM-67	67	69.40		1.42		69.90		1.25		3.76		76191	55515
MKM-68	68	70.44		1.42		70.94		1.25		4.01	+0.08	77328	57282
MKM-69	69	71.44		1.42	+0.10	71.94	+0.63	1.25		4.01	-0.13	78465	58125
MKM-70	70	72.44		1.42	-0.00	72.94	-0.00	1.25		4.01		79602	58967
MKM-71	71	73.44		1.42		73.99		1.25		4.01		80740	59809
MKM-72	72	74.54		1.42		75.04		1.25		4.27		81877	63137
MKM-75	75	77.54		1.42		78.07		1.25		4.27		85288	65768
MKM-78	78	80.60		1.73		81.21		1.55		4.27		109988	70015
MKM-80	80	82.64		1.73		83.22		1.55		4.52		112808	72915
MKM-82	82	84.70		1.73		85.28		1.55	+0.08	4.52		115628	76436
MKM-85	85	87.80	+0.00	1.73		88.38		1.55	-0.08	4.78		119858	82167
MKM-88	88	90.84	-0.30	1.73		91.45	+0.76	1.55		4.78		124089	86282
MKM-90	90	92.94		1.73		93.58	-0.00	1.55		5.03		126909	91350
MKM-92	92	95.00		1.73		95.66		1.55		5.03		129729	95286
MKM-95	95	98.00		1.73		98.69		1.55		5.03		133959	98393
MKM-98	98	101.14		1.73		101.83		1.55		5.28		138190	106237
MKM-100	100	103.14		1.73		103.83		1.55		5.28		141010	108405
MKM-102	102	105.30		1.73		106.00		1.55		5.54	+0.10	143830	116208
MKM-105	105	108.30		1.73	+0.13	109.00		1.55		5.54	-0.15	148060	119626
MKM-108	108	111.46		1.73	-0.00	112.22		1.55		5.80		152291	129009
MKM-110	110	113.46		1.73		114.25		1.55		5.80		155111	131398
MKM-112	112	115.60		1.73		116.44	+0.90	1.55		6.05		157931	139201
MKM-115	115	118.60		1.73		119.44	-0.00	1.55		6.05		162161	142929
MKM-120	120	123.70		2.00		124.54		1.83		6.35		199779	153286
MKM-125	125	128.70		2.00		129.59		1.83		6.35		208103	159673
MKM-130	130	133.80		2.00		134.71		1.83		6.35		216427	170548
MKM-135	135	138.80		2.00		139.74		1.83		6.35		224752	177108
MKM-140	140	143.90	+0.00	2.00		144.87	+1.14	1.83		6.35		233076	188501
MKM-145	145	149.00	-0.35	2.00		150.04	-0.00	1.83		6.35		241400	200239
MKM-150	150	154.00		2.00		155.07		1.83		6.35		249724	207144
MKM-155	155	159.60		2.40		160.72		2.18		7.92		307401	246156
MKM-160	160	164.60		2.40		165.74		2.18		7.92		317318	254096
MKM-165	165	169.60		2.40		170.77	+1.40	2.18	+0.10	7.92		327234	262037
MKM-170	170	174.80		2.40		176.05	-0.00	2.18	-0.10	7.92		337150	281716
MKM-175	175	179.80		2.40		181.05		2.18		7.92		347066	290001
MKM-180	180	185.08		2.40		186.38		2.18		7.92		356982	315687
MKM-185	185	190.08		2.40		191.10		2.18		7.92		366899	324456
MKM-190	190	195.08	+0.00	2.40	+0.15	196.45		2.18		7.92	+0.10	376815	333225
MKM-195	195	200.34	-0.40	2.40	-0.00	201.74		2.18		7.92	-0.20	386731	359498
MKM-200	200	205.34		2.40		206.76		2.18		7.92		396647	368716
MKM-210	210	215.60		2.40		217.10		2.18		9.52		416479	406002
MKM-220	220	225.84		2.40		227.40	+1.65	2.18		9.52		436312	443564
MKM-230	230	236.10		2.40		237.73	-0.00	2.18		9.52		456144	484371
MKM-240	240	246.10		2.40		247.80		2.18		9.52		475976	505431
MKM-250	250	256.36		2.40		258.10		2.18		9.52		495809	548931
MKM-260	260	266.60		2.40		268.43		2.18		9.52		515641	592431
MKM-270	270	276.60		2.40		278.50		2.18		9.52		535474	615217
MKM-280	280	286.86		2.40		288.82		2.18		9.52		555306	663136

MCM Spiral Shaft Rings

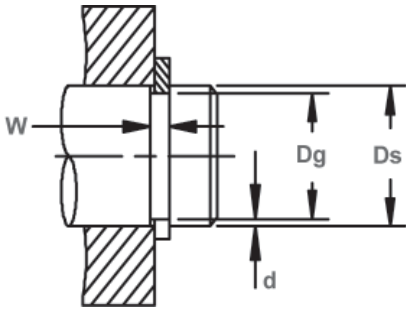
External, Medium Duty, Metric

These 2-turn rings provide 360° groove contact and are designed for applications with medium thrust loads.



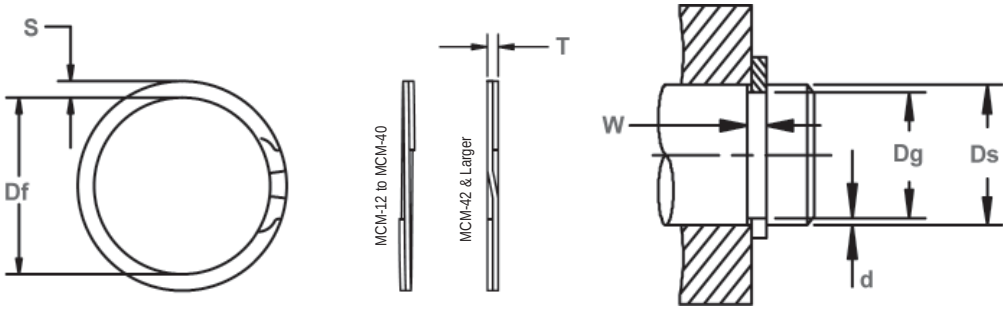


Free Diameter & Ring Measurements



Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.	3	2
MCM-12	12	11.34		0.75		11.17		0.64		1.14		8484	2246
MCM-13	13	12.28		0.75		12.15		0.64		1.14		9191	2951
MCM-14	14	13.28		0.75		13.15		0.64		1.14		9898	3480
MCM-15	15	14.28		0.75		14.15		0.64		1.14		10605	3729
MCM-16	16	15.14		0.75		14.98		0.64		1.40		11312	4750
MCM-17	17	16.14		0.75		15.98		0.64		1.40		12091	5047
MCM-18	18	17.14	+ 0.10 -0.00	0.75		16.98		0.64		1.40		12726	5344
MCM-19	19	18.14		0.91	+ 0.08 -0.00	17.98	+ 0.00 -0.33	0.80		1.65		15145	5573
MCM-20	20	19.14		0.91		18.98		0.80		1.65		15942	5938
MCM-21	21	20.14		0.91		19.98		0.80		1.65		16739	6235
MCM-22	22	21.00		0.91		20.82		0.80	+0.05 -0.05	1.65		17536	7595
MCM-23	23	22.00		0.91		21.82		0.80		1.65		18333	7941
MCM-24	24	23.00		0.91		22.80		0.80		1.65		19131	8286
MCM-25	25	23.84		1.07		23.64		0.94		1.90		23415	10012
MCM-26	26	24.84	+0.13 -0.00	1.07		24.61		0.94		1.90		24352	10412
MCM-27	27	25.84		1.07		25.61		0.94		1.90		25288	10813
MCM-28	28	26.84		1.07		26.61		0.94		1.90		26225	11213
MCM-29	29	27.84		1.07		27.61		0.94		1.90		27161	11614
MCM-30	30	28.68		1.22		28.45		1.10		2.16		32881	13671
MCM-32	32	30.68		1.22		30.43	+ 0.00 -0.38	1.10		2.16		35073	14583
MCM-33	33	31.68		1.22		31.42		1.10		2.40		36169	15039
MCM-34	34	32.68	+0.20 -0.00	1.22		32.43		1.10		2.40	+0.08 -0.13	37265	15494
MCM-35	35	33.60		1.22		33.32		1.10		2.40		38361	16917
MCM-36	36	34.60		1.22		34.32		1.10		2.40		39457	17400
MCM-37	37	35.66		1.22		35.36		1.10		2.40		40553	17883
MCM-38	38	36.60		1.22		36.32		1.10		2.40		41649	18367
MCM-39	39	37.48		1.42		37.25		1.25		2.75		44350	20466
MCM-40	40	38.48		1.42		38.18		1.25		2.75		45487	20991
MCM-42	42	40.40		1.42	+0.10 -0.00	40.10		1.25		2.75		47761	23200
MCM-43	43	41.38	+ 0.25 -0.00	1.42		41.04	+ 0.00 -0.50	1.25		3.00		48899	24049
MCM-44	44	42.38		1.42		42.06		1.25		3.00		50036	24609
MCM-45	45	43.28		1.42		42.95		1.25		3.00		51173	26722
MCM-47	47	45.22		1.42		44.85		1.25		3.25		53447	29207
MCM-48	48	46.20		1.42		45.85		1.25	+0.08 -0.08	3.25		54584	29829
MCM-50	50	48.20		1.42		47.82		1.25		3.25		56859	31072
MCM-52	52	50.00		1.42		49.62		1.25		3.25		59133	35905
MCM-53	53	51.00		1.42		50.62		1.25		3.25		60270	36595
MCM-54	54	52.00		1.42		51.62		1.25		3.25		61408	37286
MCM-55	55	53.00		1.42		52.62		1.25		3.50		62545	37976
MCM-56	56	54.00	+0.30 -0.00	1.42		53.62	+ 0.00 -0.63	1.25		3.50		63682	38667
MCM-58	58	55.86		1.42		55.43		1.25		3.50		65956	42851
MCM-59	59	56.86		1.42		56.43		1.25		3.50		67093	43590
MCM-60	60	57.86		1.42		57.43		1.25		3.50		68231	44329
MCM-61	61	58.76		1.42		58.36		1.25		3.50		69368	47174
MCM-62	62	59.76		1.42		59.30		1.25		3.76		70505	47947



Free Diameter & Ring Measurements

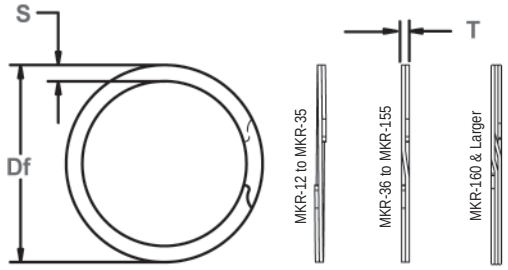
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
MCM-63	63	60.76		1.42		60.30		1.25		3.76		71642	48720
MCM-64	64	61.76		1.42		61.25		1.25		3.76		72779	49494
MCM-65	65	62.66		1.42		62.20	+0.00	1.25		3.76		73916	50267
MCM-66	66	63.64		1.42		63.16	-0.63	1.25		3.76	+0.08	75054	53775
MCM-67	67	64.56		1.42	+0.10	64.16		1.25		3.76	-0.13	76191	56440
MCM-68	68	65.56		1.42	-0.00	65.08		1.25		4.00		77328	57282
MCM-69	69	66.56		1.42		66.06		1.25		4.00		78465	58125
MCM-70	70	67.56		1.42		67.08		1.25		4.00		79602	58967
MCM-71	71	68.56		1.42		68.04		1.25	+0.08	4.00		80740	59809
MCM-72	72	69.50		1.42		69.00	+0.00	1.25	-0.08	4.27		81877	62143
MCM-75	75	72.46	+0.30	1.42		71.93	-0.76	1.25		4.27		85288	65768
MCM-78	78	75.40	-0.00	1.73		74.84		1.55		4.27		109988	70015
MCM-80	80	77.36		1.73		76.80		1.55		4.52		112808	72915
MCM-82	82	79.30		1.73		78.72		1.55		4.52		115628	76436
MCM-85	85	82.20		1.73		81.62		1.55		4.77		119858	82167
MCM-88	88	85.16		1.73		84.53		1.55		4.77		124089	86282
MCM-90	90	87.06		1.73		86.43		1.55		5.03		126909	91350
MCM-95	95	92.00		1.73		91.37		1.55		5.03		133959	98393
MCM-100	100	96.86		1.73		96.10	+0.00	1.55		5.28		141010	108405
MCM-105	105	101.70		1.73	+0.13	100.94	-1.00	1.55		5.53	+0.10	148060	119626
MCM-110	110	106.54		1.73	-0.00	105.75		1.55		5.80	-0.15	155111	131398
MCM-115	115	111.40		1.73		110.59		1.55		6.05		162161	142929
MCM-120	120	116.30		2.00		115.49		1.83		6.35		199779	153286
MCM-125	125	121.30		2.00		120.44		1.83		6.35		208103	159673
MCM-130	130	126.20		2.00		125.34		1.83		6.35		216427	170548
MCM-135	135	131.10		2.00		130.20		1.83		6.35		224752	181769
MCM-140	140	136.08	+0.35	2.00		135.14	+0.00	1.83		6.35		233076	189468
MCM-145	145	141.00	-0.00	2.00		140.00	-1.30	1.83		6.35		241400	200293
MCM-150	150	146.00		2.00		145.00		1.83		6.35		249724	207144
MCM-155	155	150.40		2.40		149.33		2.18		7.92		307401	246156
MCM-160	160	155.40		2.40		154.31		2.18		7.92		317318	254096
MCM-165	165	160.40		2.40		159.23	+0.00	2.18		7.92		327234	262037
MCM-170	170	165.20		2.40		164.00	-1.52	2.18	+0.10	7.92		337150	281716
MCM-175	175	170.20		2.40		169.00		2.18	-0.10	7.92		347066	290001
MCM-180	180	175.00		2.40		173.78		2.18		7.92		356982	310716
MCM-185	185	180.00		2.40		178.70		2.18		7.92		366899	319347
MCM-190	190	185.00	+0.40	2.40	+0.15	183.70		2.18		7.92	+0.10	376815	327978
MCM-195	195	189.80	-0.00	2.40	-0.00	188.43		2.18		7.92	-0.20	386731	350073
MCM-200	200	194.80		2.40		193.43		2.18		7.92		396647	359049
MCM-210	210	204.40		2.40		202.93		2.18		9.52		416479	406002
MCM-220	220	214.20		2.40		212.65	+0.00	2.18		9.52		436312	440526
MCM-230	230	224.20		2.40		222.60	-1.78	2.18		9.52		456144	460550
MCM-240	240	234.00		2.40		232.32		2.18		9.52		475976	497145
MCM-250	250	243.60		2.40		241.83		2.18		9.52		495809	552383
MCM-260	260	253.40		2.40		251.57		2.18		9.52		515641	592431
MCM-270	270	263.20		2.40		261.30		2.18		9.52		535474	633806
MCM-280	280	273.00		2.40		271.04		2.18		9.52		555306	676670

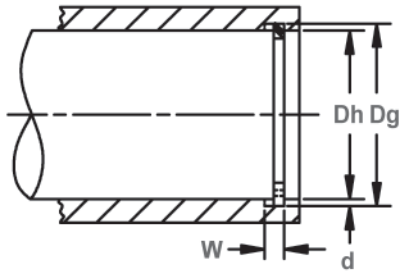
MKR Spiral Housing Rings

Internal, Medium-Heavy Duty Metric

These 2-turn and multi-turn rings provide 360° groove contact and are designed for applications with medium-high thrust loads.

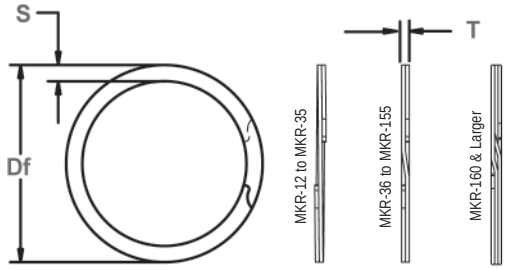


Free Diameter & Ring Measurements

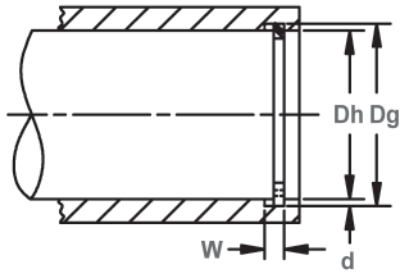


Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
MKR-12	12	12.60		1.00		12.73		0.89		1.14		10641	929
MKR-13	13	13.60		1.00		13.73		0.89		1.14		11528	1067
MKR-14	14	14.76		1.00		14.89		0.89		1.14		12415	1555
MKR-15	15	15.86		1.00		16.01		0.89		1.14		13302	2026
MKR-16	16	16.86		1.00		17.01		0.89		1.14		14188	2275
MKR-17	17	17.90		1.00		18.05		0.89		1.40		15075	2711
MKR-18	18	18.90	+0.08	1.00	+0.08	19.05	+0.33	0.89		1.40		15962	3005
MKR-19	19	20.00	-0.08	1.00	-0.00	20.15	-0.00	0.89		1.40		16849	3700
MKR-20	20	21.06		1.17		21.21		1.07		1.65		21323	3707
MKR-21	21	22.12		1.17		22.30		1.07		1.65		22389	4352
MKR-22	22	23.16		1.17		23.34		1.07		1.65		23455	4910
MKR-23	23	24.22		1.17		24.50		1.07	+0.05	1.65		24521	5831
MKR-24	24	25.26		1.17		25.46		1.07	-0.05	1.90		25587	6398
MKR-25	25	26.40		1.17		26.60		1.07		1.90		26653	7693
MKR-26	26	27.42		1.17		27.62		1.07		1.90	+0.08	27719	8389
MKR-28	28	29.48		1.42		29.71		1.27		1.98	-0.13	32350	7734
MKR-29	29	30.52		1.42		30.77		1.27		1.98		33506	8531
MKR-30	30	31.56		1.42		31.81		1.27		2.24		34661	9422
MKR-32	32	33.80		1.42		34.05		1.27		2.50		36972	12416
MKR-33	33	34.84		1.42		35.12		1.27		2.50		38127	13561
MKR-34	34	35.88	+0.10	1.42		36.16	+0.38	1.27		2.50		39283	14638
MKR-35	35	36.90	-0.10	1.42		37.18	-0.00	1.27		2.50		40438	15603
MKR-36	36	37.90		1.42		38.18		1.27		2.50		41593	16429
MKR-37	37	39.00		1.42	+0.10	39.28		1.27		2.75		42749	18368
MKR-38	38	40.00		1.42	-0.00	40.28		1.27		2.75		43904	19289
MKR-39	39	41.06		1.42		41.37		1.27		2.75		45059	21028
MKR-40	40	42.14		1.73		42.44		1.57		3.00		57132	18286
MKR-41	41	43.24		1.73		43.54		1.57		3.00		58560	20065
MKR-42	42	44.34		1.73		44.64		1.57		3.00		59988	21951
MKR-43	43	45.36		1.73		45.69		1.57		3.00		61417	23283
MKR-44	44	46.38	+0.13	1.73		46.81	+0.50	1.57		3.00		62845	25023
MKR-45	45	47.40	-0.13	1.73		47.73	-0.00	1.57		3.00		64273	25764
MKR-47	47	49.54		1.73		49.84		1.57		3.25		67130	29617
MKR-48	48	50.54		1.73		50.90		1.57		3.25		68558	31168
MKR-50	50	52.64		1.73		53.00		1.57		3.50		71415	35192
MKR-52	52	54.84		2.18		55.22		1.98	+0.08	3.58		93667	32153
MKR-53	53	55.88		2.18		56.26		1.98	-0.08	3.58		95468	33791
MKR-55	55	57.94		2.18		58.34		1.98		3.58		99071	37098
MKR-56	56	58.94		2.18		59.34		1.98		3.58		100872	38358
MKR-58	58	61.20		2.18		61.63		1.98		4.77		104475	49567
MKR-59	59	62.22	+0.15	2.18	+0.13	62.65	+0.63	1.98		4.77		106276	47432
MKR-60	60	63.30	-0.15	2.18	-0.00	63.73	-0.00	1.98		4.77		108077	50494
MKR-61	61	64.30		2.18		64.76		1.98		4.77	+0.10	109879	52323
MKR-62	62	65.36		2.18		65.82		1.98		4.77	-0.15	111680	54926
MKR-63	63	66.40		2.18		66.86		1.98		4.77		113481	57265
MKR-64	64	67.40		2.18		67.90		1.98		4.77		115282	59331
MKR-65	65	68.50		2.62		69.00		2.36		4.77		132909	50522
MKR-66	66	69.50		2.62		70.03		2.36		4.77		134954	52189



Free Diameter & Ring Measurements



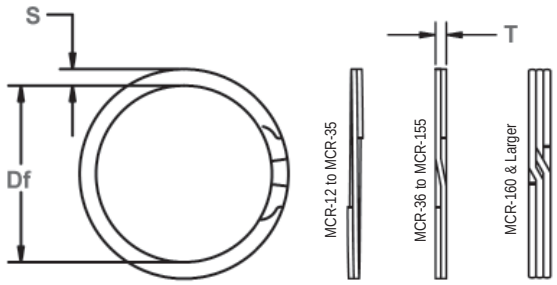
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
MKR-67	67	70.60		2.62		71.13		2.36		4.77		136998	55235
MKR-68	68	71.66		2.62		72.19		2.36		4.77		139043	57735
MKR-69	69	72.74		2.62		73.27	+0.63	2.36		4.77		141088	60650
MKR-70	70	73.80		2.62		74.33	-0.00	2.36		4.77		143133	63315
MKR-71	71	74.80		2.62		75.36		2.36		4.77		145177	65251
MKR-72	72	75.86		2.62		76.42		2.36		4.77		147222	68052
MKR-75	75	79.00		2.62		79.58		2.36		4.77		153356	76340
MKR-78	78	82.26		3.05		82.95		2.82		6.35	+0.10	190578	75542
MKR-80	80	84.36		3.30		85.02		2.82		6.35	-0.15	195464	80623
MKR-82	82	86.40		3.05		87.06		2.82		6.35		200351	85092
MKR-85	85	89.58	+0.15	3.05	+0.13	90.21		2.82	+0.08	6.35		207681	94335
MKR-88	88	92.78	-0.15	3.05	-0.00	93.44	+0.76	2.32	-0.08	6.35		215011	105482
MKR-90	90	94.88		3.05		95.54	-0.00	2.82		6.35		219897	112323
MKR-92	92	97.00		3.05		97.68		2.82		6.35		224784	120232
MKR-95	95	100.20		3.05		100.88		2.82		6.35		232114	132913
MKR-98	98	103.40		3.05		104.11		2.82		6.35		239444	146909
MKR-100	100	105.40		3.05		106.11		2.82		6.35		244330	152534
MKR-102	102	107.60		3.05		108.31		2.82		6.35		249217	164421
MKR-105	105	110.60		3.05		111.34		2.82		7.92		256547	176970
MKR-108	108	113.60		3.05		114.36		2.82		7.92		263877	186814
MKR-110	110	115.74		3.05		116.50		2.82		7.92		268763	198334
MKR-112	112	117.84		3.05		118.60	+0.90	2.82		7.92		273650	208838
MKR-115	115	121.00		3.05		121.83	-0.00	2.82		7.92		280980	227125
MKR-120	120	126.20		3.05		127.04		2.82		7.92		293197	254750
MKR-125	125	131.50		3.05		132.39		2.82		7.92		305413	280507
MKR-130	130	136.70		3.05		137.61		2.82		7.92		317630	300704
MKR-135	135	141.90		3.53		142.90		3.23		9.52		377802	314888
MKR-140	140	146.90	+0.18	3.53	+0.15	147.91	+1.14	3.23	+0.10	9.52		391795	333502
MKR-145	145	151.90	-0.18	3.53	-0.00	152.97	-0.00	3.23	-0.10	9.52		405788	345412
MKR-150	150	156.90		3.53		158.02		3.23		9.52	+0.10	419780	357323
MKR-155	155	161.90		3.53		163.04		3.23		9.52	-0.20	433773	369234
MKR-160	160	167.10		4.42		168.27		4.20		7.92		582234	392192
MKR-165	165	172.36		4.42		173.55	+1.40	4.20		7.92		600429	419259
MKR-170	170	177.70		4.42		178.94	-0.00	4.20		7.92		618624	451919
MKR-175	175	182.80		4.42		184.09		4.20		7.92		636819	471252
MKR-180	180	188.00		4.42		189.30		4.20		7.92		655014	497145
MKR-185	185	193.24	+0.20	5.30	+0.20	194.59		4.80	+0.13	9.52		769381	526283
MKR-190	190	198.64	-0.20	5.30	-0.00	200.04		4.80	-0.13	9.52		790175	566745
MKR-195	195	203.74		5.30		205.14		4.80		9.52		810969	588392
MKR-200	200	208.90		5.30		210.37		4.80		9.52		831763	614527
MKR-210	210	219.40		5.30		220.92	+1.78	4.80		9.52		873351	681503
MKR-220	220	229.90		5.30		231.52	-0.00	4.80		9.52		914940	751932
MKR-230	230	240.20		5.30		241.90		4.80		9.52		956528	809932
MKR-240	240	250.90		5.30		252.65		4.80		9.52		998116	903147
MKR-250	250	260.90		5.30		262.70		4.80		9.52		1039704	940778
MKR-260	260	271.40		5.30		273.20		4.80		9.52		1081292	1023290
MKR-270	270	281.40		5.30		283.20		4.80		9.52		1122880	1062648
MKR-280	280	291.40		5.30		293.30		4.80		9.52		1164468	1102005

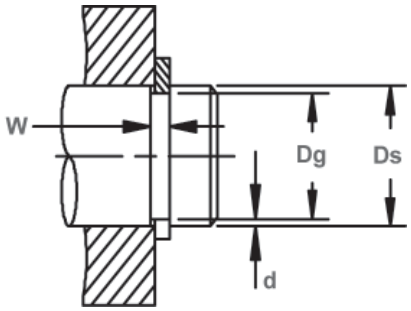
MCR Spiral Shaft Rings

External, Medium-Heavy Duty, Metric

These 2-turn and multi-turn rings provide 360° groove contact and are designed for applications with medium-high thrust loads.

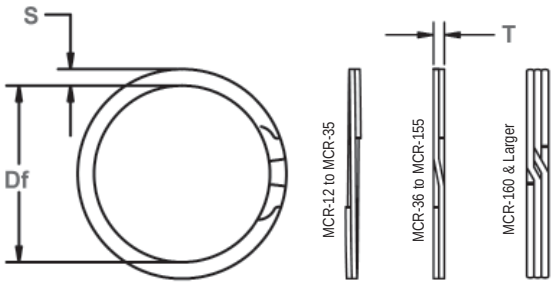


Free Diameter & Ring Measurements

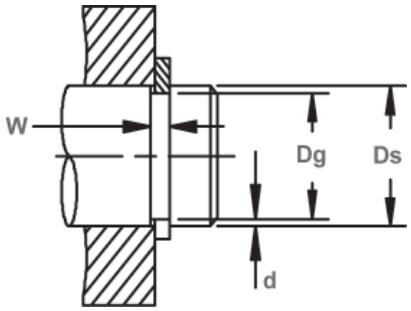


Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of	GROOVE Safety factor of
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.	3	2
MCR-12	12	11.34		1.00		11.21		0.89		1.14		10641	1384
MCR-13	13	12.34		1.00		12.21		0.89		1.14		11528	1678
MCR-14	14	13.30		1.00		13.15		0.89		1.14		12415	2069
MCR-15	15	14.28		1.00		14.13		0.89		1.14		13302	2499
MCR-16	16	15.28		1.00		15.13		0.89		1.40		14188	2837
MCR-17	17	16.20		1.00		16.05		0.89		1.40		15075	3609
MCR-18	18	17.14		1.17		16.96		1.07		1.65		19190	3571
MCR-19	19	18.12	+0.08	1.17	+0.08	17.94	+0.00	1.07		1.65		20256	4148
MCR-20	20	19.08	-0.08	1.17	-0.00	18.90	-0.33	1.07		1.65		21323	4878
MCR-21	21	20.08		1.17		19.88		1.07		1.65		22389	5397
MCR-22	22	20.94		1.17		20.74		1.07		1.90		23455	6765
MCR-23	23	21.94		1.17		21.74		1.07		1.90		24521	7511
MCR-24	24	22.94		1.17		22.74		1.07	+0.05	1.90		25587	8297
MCR-25	25	23.88		1.17		23.68		1.07	-0.05	1.90		26653	9608
MCR-26	26	24.84		1.17		24.69		1.07		1.90		27719	10412
MCR-27	27	25.80		1.42		25.55		1.27		2.24		31195	8706
MCR-28	28	26.80		1.42		26.55		1.27		2.24		32350	9487
MCR-29	29	27.74		1.42		27.46		1.27		2.24		33506	10629
MCR-30	30	28.68		1.42		28.40		1.27		2.24		34661	12032
MCR-32	32	30.60		1.42		30.32		1.27		2.50		36972	14621
MCR-33	33	31.50	+0.10	1.42		31.22	+0.00	1.27		2.50	+0.08	38127	16774
MCR-34	34	32.40	-0.10	1.42		32.12	-0.40	1.27		2.50	-0.13	39283	18781
MCR-35	35	33.36		1.42		33.06		1.27		2.75		40438	19917
MCR-36	36	34.28		1.42		33.98		1.27		2.75		41953	21377
MCR-37	37	35.28		1.42	+0.10	34.88		1.27		2.75		42749	21971
MCR-38	38	36.20		1.42	-0.00	35.90		1.27		2.75		43904	23614
MCR-39	39	37.70		1.73		37.40		1.58		3.00		56058	22989
MCR-40	40	38.12		1.73		37.76		1.58		3.00		57496	24462
MCR-42	42	40.08		1.73		39.72		1.58		3.00		60370	27840
MCR-43	43	41.08		1.73		40.69	+0.00	1.58		3.00		61808	28503
MCR-44	44	41.96	+0.13	1.73		41.60	-0.50	1.58		3.25		63245	29166
MCR-45	45	42.90	-0.13	1.73		42.54		1.58		3.25		64683	32625
MCR-47	47	44.80		1.73		44.39		1.58		3.25		67557	35698
MCR-48	48	45.80		1.73		45.39		1.58	+0.08	3.25		68995	36457
MCR-50	50	47.70		1.73		47.29		1.58	-0.08	3.25		71870	39703
MCR-52	52	49.66		2.18		49.28		1.98		3.58		93667	42009
MCR-53	53	50.60		2.18		50.25		1.98		3.58		95468	43914
MCR-54	54	51.50		2.18		51.11		1.98		3.58		97270	46607
MCR-55	55	52.46		2.18		52.05		1.98		3.58		99071	48230
MCR-56	56	53.46	+0.15	2.18	+0.13	53.06	+0.00	1.98		3.58		100872	49107
MCR-58	58	55.26	-0.15	2.18	-0.00	54.83	-0.63	1.98		3.58		104475	54865
MCR-59	59	56.26		2.18		55.75		1.98		3.58		106276	55811
MCR-60	60	57.20		2.18		56.77		1.98		3.58		108077	58000
MCR-61	61	58.20		2.18		57.73		1.98		3.58		109879	58967
MCR-62	62	59.16		2.18		58.70		1.98		3.58		111680	60790



Free Diameter & Ring Measurements



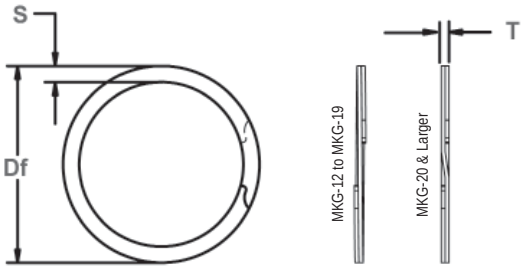
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
MCR-63	63	60.10		2.18		59.62		1.98		4.77		113481	63075
MCR-64	64	61.10		2.18		60.62		1.98		4.77		115282	64076
MCR-65	65	62.10		2.18		61.62	+0.00	1.98		4.77		117084	65078
MCR-66	66	63.04		2.18		62.58	-0.63	1.98		4.77		118885	67446
MCR-67	67	63.90		2.18		64.38		1.98		4.77		120686	71706
MCR-68	68	64.90		2.18		64.40		1.98		4.77		122488	72777
MCR-69	69	65.90		2.18		65.38		1.98		4.77		124289	73847
MCR-70	70	66.86		2.62		66.33		2.36		4.77		143133	75884
MCR-71	71	67.70		2.62		67.15		2.36		4.77		145177	80890
MCR-72	72	68.70		2.62		68.20		2.36		4.77		147222	82029
MCR-75	75	71.54	+0.15	2.62	+0.13	71.00	+0.00	2.36	+0.08	4.77	+0.10	153356	89590
MCR-78	78	74.40	-0.15	2.62	-0.00	73.82	-0.75	2.36	-0.08	4.77	-0.15	159491	96943
MCR-80	80	76.30		2.62		75.69		2.36		4.77		163580	102191
MCR-82	82	78.20		2.62		77.57		2.36		4.77		167670	107577
MCR-85	85	81.10		2.62		80.44		2.36		4.77		173804	114447
MCR-88	88	84.00		2.62		83.34		2.36		4.77		179938	121524
MCR-90	90	85.90		3.05		85.27		2.82		6.35		219897	127393
MCR-95	95	90.60		3.05		89.91		2.82		6.35		232114	144310
MCR-100	100	95.40		3.05		94.70		2.82		6.35		244330	158810
MCR-105	105	100.32		3.05		99.61	+0.00	2.82		6.35		256547	169651
MCR-110	110	105.32		3.05		104.60	-1.00	2.82		6.35		268763	177729
MCR-115	115	110.16		3.05		109.40		2.82		6.35		280980	192160
MCR-120	120	114.92		3.05		114.03		2.82		6.35		293197	210458
MCR-125	125	119.70		3.05		118.81		2.82		6.35		305413	228721
MCR-130	130	124.56		3.05		123.65		2.82		6.35		317630	244153
MCR-135	135	129.40		3.53		128.50		3.23		9.52		377802	261001
MCR-140	140	134.06	+0.18	3.53	+0.15	133.15	+0.00	3.23	+0.10	9.52		391795	287101
MCR-145	145	138.80	-0.18	3.53	-0.00	137.80	-1.27	3.23	-0.10	9.52		405788	310370
MCR-150	150	143.64		3.53		142.60		3.23		9.52		419780	329359
MCR-155	155	148.50		3.53		147.43		3.23		9.52		433773	347829
MCR-160	160	153.30		4.42		152.11		4.20		7.92		582234	370097
MCR-165	165	158.00		4.42		156.81		4.20		7.92		600429	398752
MCR-170	170	162.80		4.42		161.61	+0.00	4.20		7.92		618624	422573
MCR-175	175	167.60		4.42		166.41	-1.52	4.20		7.92		636819	447085
MCR-180	180	172.40		4.42		171.20		4.20		7.92	+0.10	655014	472288
MCR-185	185	177.40		4.42		176.18		4.20		7.92	-0.20	673208	485407
MCR-190	190	182.40	+0.20	5.30	+0.20	181.13		4.80	+0.13	9.52		790175	498526
MCR-195	195	186.60	-0.20	5.30	-0.00	185.33		4.80	-0.13	9.52		810969	565503
MCR-200	200	191.52		5.30		190.14		4.80		9.52		831763	585526
MCR-210	210	201.20		5.30		199.80		4.80		9.52		873351	638003
MCR-220	220	210.80		5.30		209.30	+0.00	4.80		9.52		914940	698765
MCR-230	230	220.36		5.30		218.74	-1.78	4.80		9.52		956528	765465
MCR-240	240	230.00		5.30		228.30		4.80		9.52		998116	828575
MCR-250	250	239.40		5.30		237.70		4.80		9.52		1039704	914885
MCR-260	260	249.20		5.30		247.50		4.80		9.52		1081292	969433
MCR-270	270	259.10		5.30		257.33		4.80		9.52		1122880	1016040
MCR-280	280	269.00		5.30		267.17		4.80		9.52		1164468	1063338

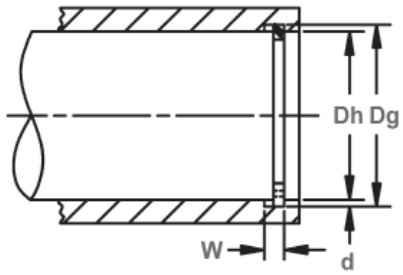
MKG Spiral Housing Rings

Internal, Heavy Duty, Metric

These 2-turn rings provide 360° groove contact and are ideal for applications with high thrust loads.

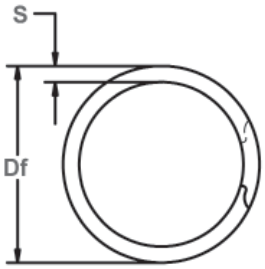


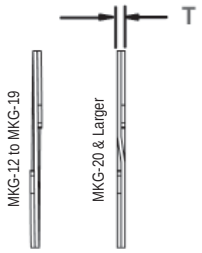
Free Diameter & Ring Measurements



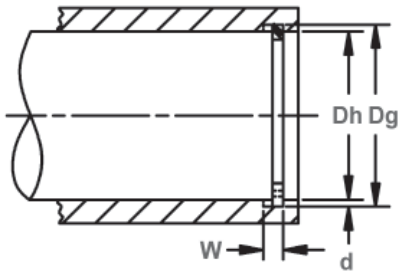
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
MKG-12	12	12.70		0.70		12.89		0.60		1.14		7954	1794
MKG-13	13	13.75		1.00		13.95		0.89		1.14		11528	1421
MKG-14	14	14.85	+0,05	1.00		15.07		0.89		1.40		12415	1925
MKG-15	15	15.90	-0,05	1.00		16.14		0.89		1.40		13302	2318
MKG-16	16	16.95		1.00		17.15		0.89		1.40		14188	2660
MKG-17	17	18.05		1.00		18.32		0.89		1.65		15075	3507
MKG-18	18	19.10		1.00		19.39		0.89		1.65		15962	4089
MKG-19	19	20.17		1.00	+0.08	20.48		0.89		1.65		16849	4817
MKG-20	20	21.22		1.00	-0.00	21.51		0.89		1.90		17736	5556
MKG-21	21	22.26		1.00		22.56		0.89	+0,05	1.90		18622	6286
MKG-22	22	23.37		1.20		23.65		1.07	-0,05	1.90		23455	6200
MKG-23	23	24.42	+0,08	1.20		24.69		1.07		2.16		24521	7040
MKG-24	24	25.47	-0,08	1.20		25.78		1.07		2.16		25587	7819
MKG-25	25	26.67		1.20		27.08		1.07		2.16		26653	9992
MKG-26	26	27.77		1.20		28.07	+0.35	1.07		2.16	+0,08	27719	11102
MKG-27	27	28.87		1.40		29.11	-0.00	1.27		2.62	-0,13	31195	9571
MKG-28	28	29.87		1.40		30.10		1.27		2.62		32350	10153
MKG-29	29	30.95		1.40		31.21		1.27		2.62		33506	11428
MKG-30	30	32.00		1.40		32.28		1.27		2.62		34661	12552
MKG-31	31	33.05		1.40		33.32		1.27		2.62		35817	13599
MKG-32	32	34.00		1.40		34.23		1.27		2.62		36972	13830
MKG-34	34	36.20		1.40		36.46		1.27		3.00		39283	17447
MKG-35	35	37.30		1.40		37.55		1.27		3.00		40438	19195
MKG-36	36	38.40	+0,10	1.40	+0.10	38.68		1.27		3.00		41593	21326
MKG-37	37	39.40	-0,10	1.40	-0.00	39.60		1.27		3.00		42749	21876
MKG-38	38	40.50		1.40		40.77		1.27		3.00		43904	24484
MKG-40	40	42.50		1.75		42.91		1.57		3.25		57132	22319
MKG-42	42	44.60		1.75		45.01		1.57		3.25		59988	25347
MKG-45	45	47.70		1.75		48.13		1.57		3.25		64273	29964
MKG-46	46	48.80		1.75		49.28		1.57		3.25		65701	32717
MKG-47	47	49.90		1.75		50.32		1.57		4.01		67130	35606
MKG-48	48	51.00		1.75		51.46		1.57	+0,08	4.01		68558	38663
MKG-50	50	53.20		1.75		53.66		1.57	-0,08	4.01		71415	44490
MKG-52	52	55.45		2.15		55.91		1.98		4.27		93667	40681
MKG-55	55	58.55		2.15		59.28		1.98		4.27		99071	48699
MKG-57	57	60.65	+0,15	2.15	+0.20	60.93	+0.65	1.98		4.27	+0,10	102673	49284
MKG-58	58	61.75	-0,15	2.15	-0.00	62.66	-0.00	1.98		5.08	-0,15	104475	91487
MKG-60	60	63.95		2.15		64.39		1.98		5.08		108077	99943
MKG-62	62	65.95		2.15		66.40		1.98		5.08		111680	109065
MKG-63	63	67.05		2.15		67.74		1.98		5.08		113481	121272





Free Diameter & Ring Measurements



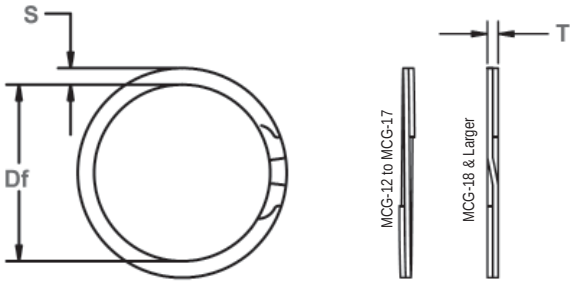
Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
MKG-65	65	69.15		2.55		69.63		2.29		5.72		128967	62641
MKG-68	68	72.35		2.55		72.86	+0.75	2.29		5.72		134919	71755
MKG-70	70	74.55		2.55		75.06	-0.00	2.29		5.72		138887	79264
MKG-72	72	76.65		2.55		77.18		2.29		5.72		142855	85617
MKG-75	75	79.85		2.55		80.40		2.29		5.72	+0,10	148808	96681
MKG-78	78	82.95		2.95		83.53		2.72		7.14	-0,15	183820	91487
MKG-80	80	85.15	+0,15	2.95		85.74		2.72		7.14		188533	99943
MKG-82	82	87.35	-0,15	2.95		87.96		2.72		7.14		193246	109065
MKG-85	85	90.55		2.95		91.18		2.72		7.14		200316	121272
MKG-88	88	93.75		2.95		94.41		2.72		7.14		207386	134554
MKG-90	90	95.85		2.95	+0.20	96.51		2.72	+0,08	7.14		212100	142716
MKG-92	92	97.95		2.95	-0.00	98.64		2.72	-0,08	7.14		216813	151766
MKG-95	95	101.15		2.95		101.86	+0.90	2.72		7.92		223883	168598
MKG-98	98	104.35		2.95		105.09	-0.00	2.72		7.92		230953	185160
MKG-100	100	106.50		2.95		107.29		2.72		7.92		235666	197997
MKG-102	102	108.60		2.95		109.42		2.72		7.92		240380	209267
MKG-105	105	111.70		2.95		112.52		2.72		7.92		247450	224146
MKG-108	108	114.80		2.95		115.64		2.72		7.92		254520	240221
MKG-110	110	116.90		2.95		117.77		2.72		7.92		259233	253044
MKG-115	115	122.10		2.95		123.00		2.72		7.92		271016	281888
MKG-120	120	127.20	+0,20	2.95		128.14		2.72		7.92		282799	298287
MKG-125	125	132.30	-0,20	2.95		133.28		2.72		7.92		294583	315031
MKG-130	130	137.40		2.95		138.40		2.72		7.92		306366	332121
MKG-135	135	142.50		3.40		143.53		3.12		8.89	+0,10	364936	349555
MKG-140	140	146.70		3.40		148.64	+1.25	3.12	+0,10	8.89	-0,20	378452	367335
MKG-145	145	152.70		3.40		153.79	-0.00	3.12	-0,10	8.89		391968	385460
MKG-150	150	157.80		3.40		158.93		3.12		8.89		405485	403930
MKG-155	155	162.90		3.40		164.05		3.12		8.89		419001	422746
MKG-160	160	168.00		4.25		169.18		3.78		9.65		524011	429949
MKG-165	165	173.15		4.25		174.42	+1.40	3.78		9.65		540386	464261
MKG-170	170	178.25		4.25		179.55	-0.00	3.78		9.65		556761	484199
MKG-175	175	183.45		4.25	+0.25	184.78		3.78		9.65		573137	510523
MKG-180	180	188.65		4.25	-0.00	190.01		3.78		9.65		589512	537538
MKG-185	185	193.85	+0,25	5.10		195.25		4.55	+0,13	10.62		729309	530579
MKG-190	190	199.05	-0,25	5.10		200.50		4.55	-0,13	10.62		749020	572409
MKG-200	200	209.25		5.10		210.76		4.55		10.62		788442	638693
MKG-210	210	219.65		5.10		221.22	+1.80	4.55		10.62		827864	699628
MKG-220	220	230.25		5.10		231.91	-0.00	4.55		10.62		867286	778515
MKG-230	230	240.85		5.10		242.59		4.55		10.62		906709	861546
MKG-240	240	251.25		5.10		253.06		4.55		10.62		946131	932147
MKG-250	250	261.65		5.10		263.12		4.55		10.62		985553	1005511

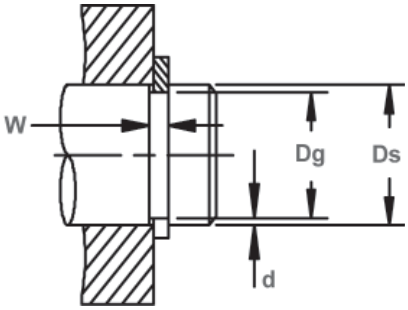
MCG Spiral Shaft Rings

External, Heavy Duty, Metric

These 2-turn rings provide 360° groove contact and are ideal for applications with high thrust loads.

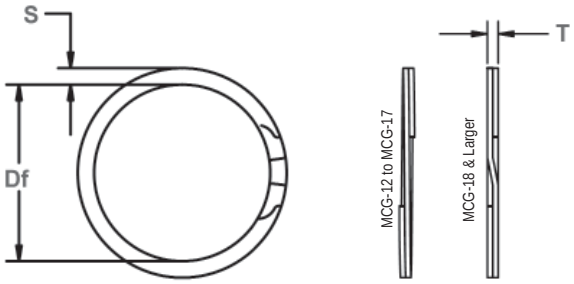


Free Diameter & Ring Measurements

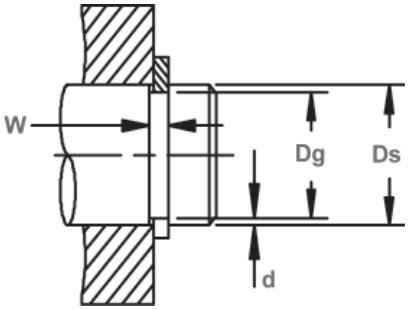


Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
MCG-12	12	11.29		0.70		11.18		0.60		1.14		7954	2461
MCG-13	13	12.24	+0.06	1.00		12.13		0.89		1.27		11528	1930
MCG-14	14	13.19	-0.06	1.00		13.06		0.89		1.27		12415	2384
MCG-15	15	14.09		1.00		13.98		0.89		1.27		13302	3181
MCG-16	16	15.03		1.00		14.90		0.89		1.40		14188	3811
MCG-17	17	16.03		1.00		15.82		0.89		1.40		15075	4107
MCG-18	18	16.93		1.20		16.80		1.07		1.65		19190	4561
MCG-19	19	17.88		1.20	+0.08	17.73		1.07		1.65		20256	5309
MCG-20	20	18.78	+0.07	1.20	-0.00	18.62		1.07		1.65		21323	6427
MCG-21	21	19.73	-0.07	1.20		19.57		1.07		1.65		22389	7470
MCG-22	22	20.63		1.20		20.45	+0.00	1.07	+0.05	1.91	+0.08	23455	8686
MCG-23	23	21.58		1.20		21.39	-0.33	1.07	-0.05	1.91	-0.13	24521	9906
MCG-24	24	22.53		1.20		22.35		1.07		1.91		25587	11366
MCG-25	25	23.43		1.20		23.25		1.07		2.16		26653	13132
MCG-26	26	24.43		1.20		24.21		1.07		2.16		27719	14085
MCG-27	27	25.35		1.40		25.04		1.27		2.62		31195	10968
MCG-28	28	26.30		1.40		26.00		1.27		2.62		32350	12439
MCG-29	29	27.27		1.40		26.95		1.27		2.62		33506	13626
MCG-30	30	28.25	+0.10	1.40	+0.10	27.92		1.27		2.62		34661	14898
MCG-31	31	29.17	-0.10	1.40	-0.00	28.84		1.27		2.62		35817	16835
MCG-32	32	30.10		1.40		29.77		1.27		2.62		36972	18840
MCG-34	34	31.90		1.40		31.54		1.27		3.00		39283	23123
MCG-35	35	32.80		1.40		32.44		1.27		3.00		40438	25932
MCG-36	36	33.75		1.40		33.40		1.27		3.00		41593	27964
MCG-37	37	34.67	+0.15	1.40		34.24		1.27		3.00		42749	29763
MCG-38	38	35.65	-0.15	1.40		35.18		1.27		3.00		43904	30830



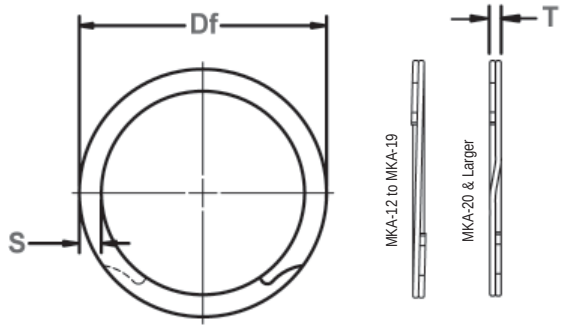
Free Diameter & Ring Measurements



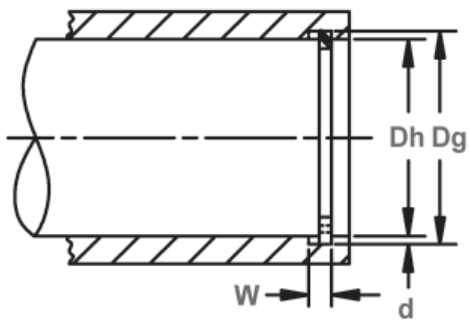
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE						THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION		RING Safety factor of 3	GROOVE Safety factor of 2
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	Tol.		
MCG-40	40	37.55		1.75		37.15		1.57		3.25		57132	30470
MCG-42	42	39.45		1.75		39.02		1.57		3.25		59988	35208
MCG-45	45	42.25		1.75	+0.10	41.77	+0.00	1.57		3.25	+0.08	64273	42723
MCG-46	46	43.15	+0.15	1.75	-0.00	42.67	-0.51	1.57		3.25	-0.13	65701	45261
MCG-47	47	44.31	-0.15	1.75		43.81		1.57		4.01		67130	43649
MCG-48	48	45.05		1.75		44.48		1.57		4.01		68558	48886
MCG-50	50	47.05		1.75		46.69		1.57		4.01		71415	50923
MCG-52	52	48.95		2.15		48.60		1.98		4.27		93667	53451
MCG-54	54	50.85		2.15		50.52		1.98		4.27		97270	58725
MCG-55	55	51.65		2.15		51.26		1.98		4.27		99071	63610
MCG-57	57	53.60		2.15		53.17	+0.00	1.98		4.27		102673	66907
MCG-58	58	54.50		2.15		54.08	-0.64	1.98	+0.08	4.27		104475	70084
MCG-60	60	56.50		2.15		56.05		1.98	-0.08	5.08		108077	72500
MCG-62	62	58.40		2.15		57.99		1.98		5.08		111680	77057
MCG-65	65	61.40		2.15		60.92		1.98		5.08		117084	80786
MCG-68	68	64.30		2.15	+ 0.13	63.80		1.98		5.08	+0.10	122488	86862
MCG-70	70	66.20		2.55	-0.00	65.70		2.29		5.72	-0.15	138887	91834
MCG-72	72	68.10	+0.20	2.55		67.57		2.29		5.72		142855	96943
MCG-75	75	71.00	-0.20	2.55		70.47	+0.00	2.29		5.72		148808	103572
MCG-78	78	73.80		2.55		73.25	-0.76	2.29		5.72		154760	113101
MCG-80	80	75.70		2.55		75.12		2.29		5.72		158728	118762
MCG-82	82	77.60		2.55		77.00		2.29		5.72		162696	124562
MCG-85	85	80.40		2.55		79.79		2.29		5.72		168649	134989
MCG-88	88	83.30		2.95		82.67		2.72		6.86		207386	142791
MCG-90	90	85.20		2.95		84.54	+0.00	2.72		6.86		212110	149144
MCG-95	95	90.00		2.95		89.32	-0.89	2.72		6.86		223883	163989
MCG-100	100	94.80		2.95		94.09		2.72		6.86		235666	179525

MKA Spiral Housing Rings



Free Diameter & Ring Measurements



Housing Diameter & Groove Dimensions

RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE					THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION	RING Safety factor of	GROOVE Safety factor of
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	3	2
MKA-12	12.00	12.70		0.70	+0.15/-0.00	12.89		0.60		1.02-1.22	7950	2050
MKA-13	13.00	13.75		1.00		13.95		0.89		1.02-1.22	12110	2410
MKA-14	14.00	14.85		1.00		15.07		0.89		1.27-1.47	13040	2930
MKA-15	15.00	15.90	±0.05	1.00		16.14		0.89		1.27-1.47	13970	3290
MKA-16	16.00	16.95		1.00		17.15		0.89		1.27-1.47	14900	3740
MKA-17	17.00	18.05		1.00	+0.08	18.32		0.89		1.52-1.73	15830	4390
MKA-18	18.00	19.10		1.00	-0.00	19.39		0.89		1.52-1.73	16760	4820
MKA-19	19.00	20.17		1.00		20.48		0.89		1.52-1.73	17690	5460
MKA-20	20.00	21.22		1.00		21.51		0.89		1.78-1.98	18620	5940
MKA-21	21.00	22.27		1.00		22.56		0.89		1.78-1.98	19550	6550
MKA-22	22.00	23.37		1.20		23.65	+0.35	1.07	±0.05	1.78-1.98	24630	7390
MKA-23	23.00	24.42	±0.075	1.20		24.69	-0.00	1.07		2.03-2.24	25750	7950
MKA-24	24.00	25.47		1.20		25.73		1.07		2.03-2.24	26870	8650
MKA-25	25.00	26.67		1.20		27.03		1.07		2.03-2.24	27990	10230
MKA-26	26.00	27.77		1.20		28.07		1.07		2.03-2.24	29110	11270
MKA-27	27.00	28.87		1.40		29.11		1.27		2.49-2.69	31170	12360
MKA-28	28.00	29.87		1.40		30.10		1.27		2.49-2.69	32330	12820
MKA-29	29.00	30.95		1.40		31.21		1.27		2.49-2.69	33480	13840
MKA-30	30.00	32.00		1.40		32.28		1.27		2.49-2.69	34640	14610
MKA-31	31.00	33.05		1.40		33.32		1.27		2.49-2.69	35790	15550
MKA-32	32.00	34.00		1.40		34.23		1.27		2.49-2.69	36950	15880
MKA-34	34.00	36.20		1.40		36.46		1.27		2.87-3.07	39260	18210
MKA-35	35.00	37.30		1.40		37.55		1.27		2.87-3.07	40410	19600
MKA-36	36.00	38.40	±0.10	1.40		38.68		1.27		2.87-3.07	41560	21040
MKA-37	37.00	39.40		1.40		39.60		1.27		2.87-3.07	42720	21620
MKA-38	38.00	40.50		1.40		40.77		1.27		2.87-3.07	43870	23130
MKA-40	40.00	42.50		1.75		42.91		1.57		3.12-3.33	57090	24350
MKA-42	42.00	44.60		1.75	+0.10	45.01		1.57		3.12-3.33	59950	26590
MKA-45	45.00	47.70		1.75	-0.00	48.13	+0.51	1.57		3.12-3.33	64230	29590
MKA-46	46.00	48.80		1.75		49.28	-0.00	1.57	±0.075	3.12-3.33	65660	31370
MKA-47	47.00	49.90		1.75		50.32		1.57		3.89-4.09	67080	33190
MKA-48	48.00	51.00		1.75		51.46		1.57		3.89-4.09	68510	35070
MKA-50	50.00	53.20		1.75		53.66		1.57		3.89-4.09	71370	38960
MKA-52	52.00	53.79	±0.125	1.42		54.30	+0.50	1.25		3.12-3.33	59090	22790
MKA-53	53.00	54.79		1.42		55.32	-0.00	1.25		3.12-3.33	60230	23230
MKA-55	55.00	56.85		1.42		57.38		1.25		3.38-3.58	62500	24910
MKA-56	56.00	57.85		1.42		58.40		1.25		3.38-3.58	63640	25360
MKA-58	58.00	59.85		1.42		60.43		1.25		3.38-3.58	65910	26270
MKA-59	59.00	60.93		1.42		61.54		1.25		3.38-3.58	67050	27870
MKA-60	60.00	61.99		1.42		62.57	+0.63	1.25	±0.08	3.38-3.58	68180	29220
MKA-61	61.00	63.09	±0.15	1.42		63.65	-0.00	1.25		3.63-3.84	69320	31190
MKA-62	62.00	64.09		1.42		64.70		1.25		3.63-3.84	70460	31700
MKA-63	63.00	65.09		1.42		65.70		1.25		3.63-3.84	71590	32220
MKA-64	64.00	66.19		1.42		66.77		1.25		3.63-3.84	72730	34290
MKA-65	65.00	67.19		1.42		67.82		1.25		3.63-3.84	73870	34820
MKA-66	66.00	68.19		1.42		68.80		1.25		3.63-3.84	75000	35360
MKA-67	67.00	69.25		1.42		69.90		1.25		3.63-3.84	76140	36870

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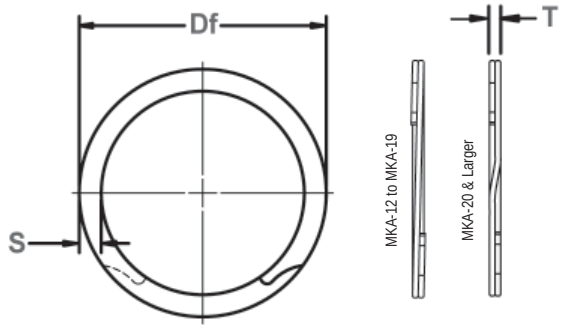
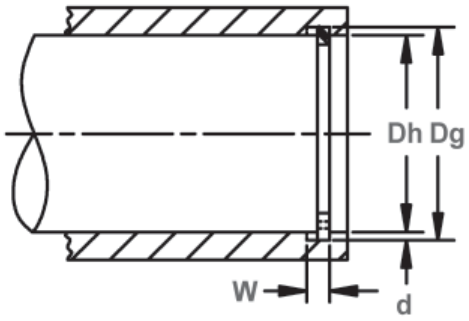


Free Diameter & Ring Measurements

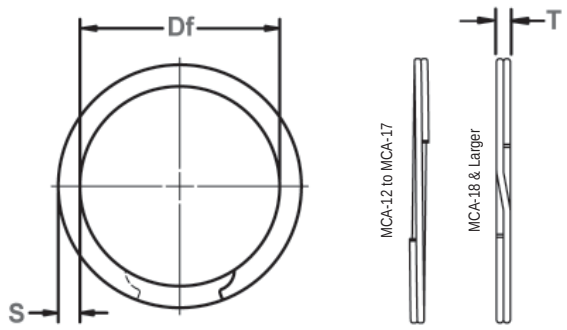


Housing Diameter & Groove Dimensions

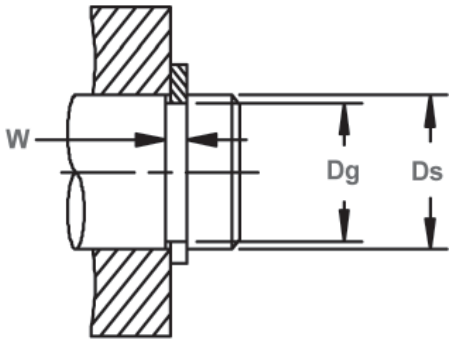
RING NO.	HOUSING DIAMETER (mm)	GROOVE SIZE				RING SIZE					THRUST LOAD (N)	
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION	RING Safety factor of 3	GROOVE Safety factor of 2
	Dh	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S		
MKA-68	68.00	70.29		1.42		70.94		1.25		3.88-4.09	77270	38090
MKA-69	69.00	71.29		1.42		71.94		1.25		3.88-4.09	78410	38650
MKA-70	70.00	72.29		1.42	+0.10	72.94	+0.63	1.25		3.88-4.09	79550	39210
MKA-71	71.00	73.29		1.42	-0.00	73.99	-0.00	1.25		3.88-4.09	80680	39770
MKA-72	72.00	74.39		1.42		75.04		1.25		4.11-4.39	81510	40910
MKA-75	75.00	77.39		1.42		78.07		1.25		4.11-4.39	85230	43830
MKA-78	78.00	80.45		1.73		81.21		1.55		4.11-4.39	109910	46730
MKA-80	80.00	82.49		1.73		83.22		1.55		4.37-4.62	112730	48700
MKA-82	82.00	84.55		1.73		85.28		1.55		4.37-4.62	115550	51120
MKA-85	85.00	87.65		1.73		88.38		1.55	±0.08	4.62-4.88	119780	55060
MKA-88	88.00	90.69		1.73		91.45	+0.76	1.55		4.62-4.88	124000	57860
MKA-90	90.00	92.79	±0.15	1.73		93.58	-0.00	1.55		4.88-5.13	126820	61370
MKA-92	92.00	94.85		1.73		95.66		1.55		4.88-5.13	129640	64070
MKA-95	95.00	97.85		1.73		98.69		1.55		4.88-5.13	133870	66160
MKA-98	98.00	100.99		1.73	+0.13	101.83		1.55		5.13-5.38	138090	71590
MKA-100	100.00	102.99		1.73	-0.00	103.83		1.55		5.13-5.38	140910	73050
MKA-102	102.00	105.15		1.73		106.00		1.55		5.38-5.64	143730	78490
MKA-105	105.00	108.15		1.73		109.00		1.55		5.38-5.64	147960	80800
MKA-108	108.00	111.31		1.73		112.22		1.55		5.64-5.89	152190	87310
MKA-110	110.00	113.31		1.73		114.25		1.55		5.64-5.89	155000	62140
MKA-112	112.00	115.45		1.73		116.44	+0.90	1.55		5.89-6.15	157820	94370
MKA-115	115.00	118.45		1.73		119.44	-0.00	1.55		5.89-6.15	162050	96890
MKA-120	120.00	123.55		2.00		124.54		1.83		6.20-6.45	199640	104030
MKA-125	125.00	128.55		2.00		129.59		1.83		6.20-6.45	207960	108360
MKA-130	130.00	133.65		2.00		134.71		1.83		6.20-6.45	216280	115860
MKA-135	135.00	138.62		2.00		139.74		1.83		6.20-6.45	224600	119000
MKA-140	140.00	143.72	±0.18	2.00		144.87	+1.14	1.83		6.20-6.45	232920	126820
MKA-145	145.00	148.82		2.00		150.04	-0.00	1.83		6.20-6.45	241230	134880
MKA-150	150.00	153.82		2.00		155.07		1.83		6.20-6.45	249550	139530
MKA-155	155.00	159.40		2.40		160.72		2.18		7.72-8.03	307190	166080
MKA-160	160.00	164.40		2.40		165.74		2.18		7.72-8.03	317100	171433
MKA-165	165.00	169.40		2.40		170.77	+1.40	2.18		7.72-8.03	327010	176790
MKA-170	170.00	174.60		2.40		176.05	-0.00	2.18		7.72-8.03	336920	190430
MKA-175	175.00	179.60		2.40		181.05		2.18	±0.10	7.72-8.03	346830	196030
MKA-180	180.00	184.88		2.40		186.38		2.18		7.72-8.03	356740	213900
MKA-185	185.00	189.88		2.40		191.10		2.18		7.72-8.03	366650	219840
MKA-190	190.00	194.88	±0.20	2.40	+0.15	196.45		2.18		7.72-8.03	376560	225790
MKA-195	195.00	200.14		2.40	-0.00	201.74		2.18		7.72-8.03	386460	244070
MKA-200	200.00	205.14		2.40		206.76		2.18		7.72-8.03	396370	250330
MKA-210	210.00	215.40		2.40		217.10	+1.65	2.18		9.32-9.63	416490	276140
MKA-220	220.00	225.64		2.40		227.40	-0.00	2.18		9.32-9.63	436010	257150
MKA-230	230.00	235.90		2.40		237.73		2.18		9.32-9.63	455830	330450
MKA-240	240.00	245.90		2.40		247.80		2.18		9.32-9.63	475650	344810
MKA-250	250.00	256.16		2.40		258.10		2.18		9.32-9.63	495470	375010
MKA-260	260.00	266.40		2.40		268.43		2.18		9.32-9.63	515290	405210
MKA-270	270.00	276.40		2.40		278.50		2.18		9.32-9.63	535100	420790
MKA-280	280.00	286.66		2.40		288.82		2.18		9.32-9.63	554920	454100

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.

MCA Spiral Shaft Rings



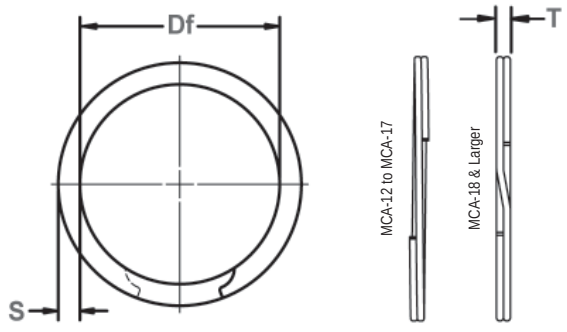
Free Diameter & Ring Measurements



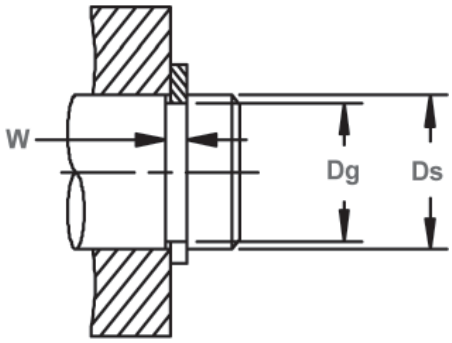
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE					THRUST LOAD (N)		R.P.M. LIMITS Standard Material (Carbon Steel)
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION	RING Safety factor of 3	GROOVE Safety factor of 2	
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S			
MCA-12	12	11.29		0.70		11.18		0.60		1.02-1.22	7950	2100	22153
MCA-13	13	12.24	±0.06	1.00		12.13		0.89		1.14-1.35	12100	2410	20094
MCA-14	14	13.19		1.00		13.06		0.89		1.14-1.35	13040	2800	18471
MCA-15	15	14.09		1.00		13.98		0.89		1.14-1.35	13970	3360	14543
MCA-16	16	15.02		1.00		14.90		0.89		1.27-1.48	14900	3820	14149
MCA-17	17	16.02		1.00		15.82		0.89		1.27-1.48	15830	4060	15923
MCA-18	18	16.92		1.20	+0.08	16.80		1.07		1.52-1.73	20150	4730	12233
MCA-19	19	17.87		1.20	-0.00	17.73		1.07		1.52-1.73	21270	5270	11685
MCA-20	20	18.77	±0.075	1.20		18.62		1.07		1.52-1.73	22390	6040	10810
MCA-21	21	19.72		1.20		19.57		1.07		1.52-1.73	23510	6550	9641
MCA-22	22	20.62		1.20		20.45	+0.00	1.07	±0.05	1.78-1.98	24630	7390	10397
MCA-23	23	21.57		1.20		21.39	-0.33	1.07		1.78-1.98	25750	8070	9652
MCA-24	24	22.52		1.20		22.35		1.07		1.78-1.98	26870	8650	8479
MCA-25	25	23.42		1.20		23.25		1.07		2.03-2.24	27990	9620	8524
MCA-26	26	24.42		1.20		24.21		1.07		2.03-2.24	29110	10000	8642
MCA-27	27	25.35		1.40		25.04		1.27		2.49-2.69	31170	10910	11357
MCA-28	28	26.30		1.40		26.00		1.27		2.49-2.69	32330	11590	10259
MCA-29	29	27.27		1.40		26.95		1.27		2.49-2.69	33480	12290	9765
MCA-30	30	28.25	±0.10	1.40		27.92		1.27		2.49-2.69	34640	12860	9149
MCA-31	31	29.17		1.40		28.84		1.27		2.49-2.69	35790	13890	8495
MCA-32	32	30.10		1.40		29.77		1.27		2.49-2.69	36950	14960	7778
MCA-34	34	31.90		1.40		31.54		1.27		2.87-3.07	39260	17390	7982
MCA-35	35	32.80		1.40		32.44		1.27		2.87-3.07	40410	18750	7485
MCA-36	36	33.75		1.40		33.40		1.27		2.87-3.07	41560	19810	6903
MCA-37	37	34.67		1.40		34.24		1.27		2.87-3.07	42720	21080	7227
MCA-38	38	35.65		1.40		35.18		1.27		2.87-3.07	43870	21650	7174
MCA-40	40	37.55		1.75		37.15		1.57		3.12-3.33	57090	23960	6172
MCA-42	42	39.45		1.75	+0.10	39.02		1.57		3.12-3.33	59990	26180	5715
MCA-45	45	42.25		1.75	-0.00	41.77		1.57		3.12-3.33	64230	30240	5158
MCA-46	46	43.15		1.75		42.67	+0.00	1.57	±0.075	3.12-3.33	65660	32040	4909
MCA-47	47	44.31		1.75		43.81	-0.51	1.57		3.89-4.09	67080	30900	5570
MCA-48	48	45.05		1.75		44.48		1.57		3.89-4.09	68510	34600	5744
MCA-50	50	47.05	±0.15	1.75		46.69		1.57		3.89-4.09	71370	36040	4084
MCA-52	52	50.15		1.42		49.62	+0.00/-0.50	1.25		3.12-3.33	59090	23550	3616
MCA-53	53	51.15		1.42		50.62		1.25		3.12-3.33	60230	24000	3450
MCA-54	54	52.15		1.42		51.62		1.25		3.12-3.33	61370	24460	3295
MCA-55	55	53.15		1.42		52.62		1.25		3.38-3.58	62500	24910	3360
MCA-56	56	54.15		1.42		53.62		1.25		3.38-3.58	63640	25370	3215
MCA-58	58	56.01		1.42		55.43	+0.00	1.25	±0.08	3.38-3.58	65910	28250	3111
MCA-59	59	57.01		1.42		56.43	-0.63	1.25		3.38-3.58	67050	28730	2982
MCA-60	60	58.01		1.42		57.43		1.25		3.38-3.58	68180	29220	2862
MCA-61	61	58.91		1.42		58.36		1.25		3.38-3.58	69320	31190	2683
MCA-62	62	59.91		1.42		59.30		1.25		3.63-3.84	70460	31710	2884
MCA-63	63	60.91		1.42		60.30		1.25		3.63-3.84	71590	32220	2773
MCA-64	64	61.91		1.42		61.25		1.25		3.63-3.84	72730	32730	2780

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.
***Contact factory on particulars for rings to meet aerospace specifications.**



Free Diameter & Ring Measurements



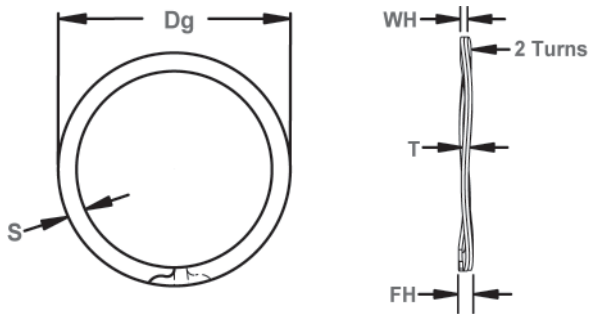
Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER (mm)	GROOVE SIZE				RING SIZE					THRUST LOAD (N)		R.P.M. LIMITS
		DIAMETER		WIDTH		FREE DIAMETER		THICKNESS		SECTION	RING Safety factor of	GROOVE Safety factor of	Standard Material
	Ds	Dg	Tol.	W	Tol.	Df	Tol.	T	Tol.	S	3	2	(Carbon Steel)
MCA-65	65	62.81		1.42		62.20		1.25		3.63-3.84	73870	34820	2577
MCA-66	66	63.79		1.42		63.16	+0.00	1.25		3.63-3.84	75000	35680	2526
MCA-67	67	64.71		1.42		64.16	-0.63	1.25		3.63-3.84	76140	37530	2275
MCA-68	68	65.71		1.42	+0.10	65.08		1.25		3.89-4.09	77270	38090	2486
MCA-69	69	66.71		1.42	-0.00	66.06		1.25		3.89-4.09	78410	38650	2438
MCA-70	70	67.71		1.42		67.08		1.25		3.89-4.09	79550	39210	2315
MCA-71	71	68.71		1.42		68.04		1.25		3.89-4.09	80680	39770	2309
MCA-72	72	69.65		1.42		69.00	+0.00	1.25		4.11-4.37	81820	41380	2321
MCA-75	75	72.61		1.42		71.93	-0.76	1.25		4.11-4.37	85230	43830	2152
MCA-78	78	75.55		1.73		74.84		1.55	±0.08	4.11-4.37	109910	46730	2007
MCA-80	80	77.51		1.73		76.80		1.55		4.37-4.62	112730	48700	1981
MCA-82	82	79.45	±0.15	1.73		78.72		1.55		4.37-4.62	115550	51120	1895
MCA-85	85	82.35		1.73		81.62		1.55		4.62-4.88	119780	55060	1825
MCA-88	88	85.31		1.73		84.53		1.55		4.62-4.88	124000	57860	1737
MCA-90	90	87.21		1.73		86.43		1.55		4.88-5.13	126820	61370	1721
MCA-95	95	92.15		1.73		91.37		1.55		4.88-5.13	133870	66160	1509
MCA-100	100	97.01		1.73		96.10		1.55		5.13-5.38	140910	73050	1508
MCA-105	105	101.85		1.73	+0.13	100.94	+0.00	1.55		5.38-5.64	147960	80780	1399
MCA-110	110	106.69		1.73	-0.00	105.75	-1.00	1.55		5.64-5.89	155000	88930	1323
MCA-115	115	111.55		1.73		110.59		1.55		5.89-6.15	162050	96890	1248
MCA-120	120	116.45		2.00		115.49		1.83		6.20-6.45	199640	104030	1176
MCA-125	125	121.45		2.00		120.44		1.83		6.20-6.45	207960	108360	1092
MCA-130	130	126.35		2.00		125.34		1.83		6.20-6.45	216280	115860	993
MCA-135	135	131.27		2.00		130.20		1.83		6.20-6.45	224600	122950	934
MCA-140	140	136.25	±0.175	2.00		135.14	+0.00	1.83		6.20-6.45	232920	128190	870
MCA-145	145	141.17		2.00		140.00	-1.30	1.83		6.20-6.45	241230	135590	821
MCA-150	150	146.17		2.00		145.00		1.83		6.20-6.45	249550	140260	755
MCA-155	155	150.60		2.40		149.33		2.18		7.72-8.03	307190	166080	891
MCA-160	160	155.60		2.40		154.31		2.18		7.72-8.03	317100	171430	831
MCA-165	165	160.60		2.40		159.23	+0.00	2.18		7.72-8.03	327010	176790	795
MCA-170	170	165.40		2.40		164.00	-1.52	2.18		7.72-8.03	336920	190430	749
MCA-175	175	170.40		2.40		169.00		2.18		7.72-8.03	346830	196030	697
MCA-180	180	175.20		2.40		173.78		2.18	±0.10	7.72-8.03	356740	210400	657
MCA-185	185	180.20		2.40		178.70		2.18		7.72-8.03	366650	216240	631
MCA-190	190	185.20	±0.20	2.40		183.70		2.18		7.72-8.03	376560	220080	591
MCA-195	195	190.00		2.40	+0.15	188.43		2.18		7.72-8.03	386460	237420	569
MCA-200	200	195.00		2.40	-0.00	193.43		2.18		7.72-8.03	396370	243510	534
MCA-210	210	204.60		2.40		202.93		2.18		9.32-9.63	416190	276140	579
MCA-220	220	214.40		2.40		212.65	+0.00	2.18		9.32-9.63	436010	300010	530
MCA-230	230	224.40		2.40		222.60	-1.78	2.18		9.32-9.63	455830	313640	482
MCA-240	240	234.20		2.40		232.32		2.18		9.32-9.63	475650	328970	444
MCA-250	250	243.80		2.40		241.83		2.18		9.32-9.63	495470	377440	413
MCA-260	260	253.60		2.40		251.57		2.18		9.32-9.63	515290	405210	381
MCA-270	270	263.40		2.40		261.30		2.18		9.32-9.63	535100	433940	354
MCA-280	280	273.20		2.40		271.04		2.18		9.32-9.63	554920	463650	328

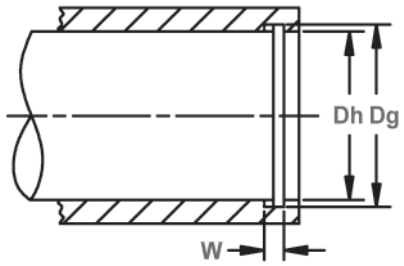
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.

NKG TruWave® Housing Ring

Internal, Spiral, Inch
The waves in this spiral ring compensate for accumulated tolerances.



Free Diameter & Ring Measurements



Shaft Diameter & Groove Dimensions

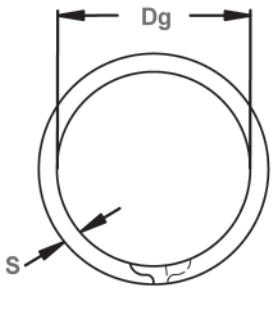
RING NO.	HOUSING DIAMETER	LOAD (lbs.) @ WORK HEIGHT	FREE HEIGHT (max.)	NUMBER OF WAVES	GROOVE SIZE		RING SIZE	
					DIAMETER	WIDTH	THICKNESS	SECTION
	Dh	WH	FH		Dg	W min.	T	S
NKG-75	.750	25 @ .080	.114	3	.796	.119	.035	.065
NKG-87	.875	30 @ .085	.110	3	.931	.115	.042	.085
NKG-100	1.000	34 @ .085	.120	3	1.066	.125	.042	.085
NKG-112	1.125	38 @ .100	.125	3	1.197	.130	.050	.128
NKG-125	1.250	40 @ .100	.135	3	1.330	.140	.050	.128
NKG-137	1.375	45 @ .100	.125	4	1.461	.130	.050	.128
NKG-150	1.500	50 @ .100	.135	4	1.594	.140	.050	.128
NKG-162	1.625	55 @ .110	.135	4	1.725	.140	.062	.158
NKG-175	1.750	60 @ .110	.140	4	1.858	.145	.062	.158
NKG-187	1.875	63 @ .110	.141	4	1.989	.146	.062	.158
NKG-200	2.000	65 @ .110	.150	4	2.122	.155	.062	.158
NKG-212	2.125	70 @ .130	.170	4	2.251	.175	.078	.188
NKG-225	2.250	75 @ .130	.175	4	2.382	.180	.078	.188
NKG-237	2.375	80 @ .130	.180	4	2.517	.185	.078	.188
NKG-250	2.500	84 @ .130	.183	4	2.648	.188	.078	.188
NKG-262	2.625	88 @ .170	.220	4	2.781	.225	.093	.225
NKG-275	2.750	94 @ .170	.229	4	2.914	.234	.093	.225
NKG-287	2.875	97 @ .170	.225	4	3.051	.230	.093	.225
NKG-300	3.000	100 @ .170	.230	4	3.182	.235	.093	.225
NKG-312	3.125	103 @ .185	.250	4	3.315	.255	.111	.281
NKG-325	3.250	106 @ .185	.250	4	3.446	.255	.111	.281
NKG-350	3.500	115 @ .185	.245	4	3.710	.250	.111	.281
NKG-362	3.625	117 @ .185	.250	4	3.841	.250	.111	.281
NKG-375	3.750	121 @ .185	.255	4	3.974	.260	.111	.312
NKG-387	3.875	126 @ .185	.260	4	4.107	.265	.111	.312
NKG-400	4.000	130 @ .185	.255	4	4.240	.260	.111	.312
NKG-412	4.125	134 @ .185	.258	4	4.365	.263	.111	.312
NKG-425	4.250	140 @ .185	.264	4	4.490	.269	.111	.312
NKG-450	4.500	150 @ .185	.250	5	4.740	.255	.111	.312
NKG-475	4.750	160 @ .185	.252	5	4.995	.257	.111	.312
NKG-500	5.000	170 @ .185	.247	5	5.260	.252	.111	.312

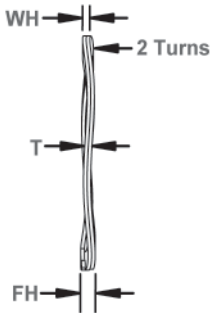
NOTE: SIZES -312 THRU -500 ARE CRIMPED.

External, Spiral, Inch

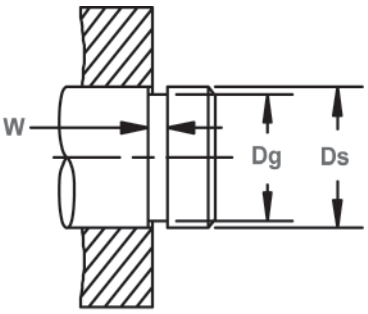
The waves in this spiral ring compensate for accumulated tolerances.

NCG TruWave® Shaft Ring





Free Diameter & Ring Measurements



Shaft Diameter & Groove Dimensions

RING NO.	SHAFT DIAMETER	LOAD (lbs.) @ WORK HEIGHT	FREE HEIGHT (max.)	NUMBER OF WAVES	GROOVE SIZE		RING SIZE	
					DIAMETER	WIDTH	THICKNESS	SECTION
	Ds	WH	FH		Dg	W min	T	S
NCG-75	.750	25 @ .085	.115	3	.704	.120	.042	.065
NCG-87	.875	30 @ .085	.131	3	.821	.136	.042	.075
NCG-100	1.000	34 @ .085	.129	3	.940	.134	.042	.085
NCG-112	1.125	38 @ .100	.137	3	1.059	.142	.050	.128
NCG-125	1.250	40 @ .100	.145	3	1.176	.150	.050	.128
NCG-137	1.375	45 @ .100	.130	4	1.291	.135	.050	.128
NCG-150	1.500	50 @ .100	.126	4	1.406	.131	.050	.128
NCG-162	1.625	55 @ .110	.138	4	1.529	.143	.062	.158
NCG-175	1.750	60 @ .110	.137	4	1.650	.142	.062	.158
NCG-187	1.875	63 @ .110	.140	4	1.769	.145	.062	.158
NCG-200	2.000	65 @ .110	.145	4	1.886	.150	.062	.158
NCG-212	2.125	70 @ .130	.170	4	2.003	.175	.078	.188
NCG-225	2.250	75 @ .130	.175	4	2.120	.180	.078	.188
NCG-237	2.375	80 @ .130	.175	4	2.239	.180	.078	.188
NCG-250	2.500	84 @ .130	.171	4	2.360	.176	.078	.188
NCG-262	2.625	88 @ .130	.181	4	2.481	.190	.078	.188
NCG-275	2.750	94 @ .170	.217	4	2.602	.222	.093	.225
NCG-287	2.875	97 @ .170	.217	4	2.721	.222	.093	.225
NCG-300	3.000	100 @ .170	.225	4	2.838	.230	.093	.225
NCG-312	3.125	103 @ .170	.230	4	2.957	.235	.093	.225
NCG-325	3.250	106 @ .170	.225	4	3.076	.230	.093	.225
NCG-350	3.500	115 @ .185	.245	4	3.316	.250	.111	.281
NCG-362	3.625	117 @ .185	.250	4	3.435	.255	.111	.281
NCG-375	3.750	121 @ .185	.258	4	3.552	.263	.111	.281
NCG-387	3.875	126 @ .185	.255	4	3.673	.260	.111	.281
NCG-400	4.000	130 @ .185	.268	4	3.792	.273	.111	.281
NCG-412	4.125	134 @ .185	.263	4	3.919	.268	.111	.281
NCG-425	4.250	140 @ .185	.248	5	4.065	.253	.111	.281
NCG-450	4.500	150 @ .185	.256	5	4.310	.261	.111	.281
NCG-475	4.750	160 @ .185	.253	5	4.550	.258	.111	.281
NCG-500	5.000	170 @ .185	.259	5	4.790	.264	.111	.281

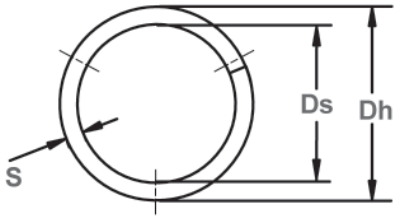
NOTE: SIZES -275 THRU -500 ARE CRIMPED.

SST Wave Springs

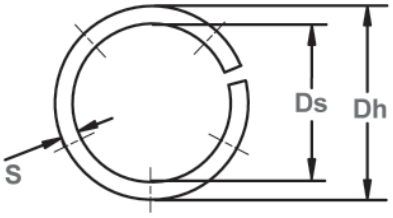
Single Turn, Inch

Ideal for short deflection applications with low to medium forces. Offered in a number of waves and material thicknesses. Designed for a wide range of bore and rod diameters.

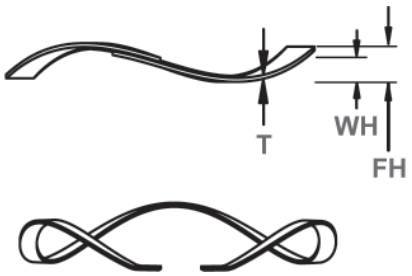
Wave Spring Measurements



Overlap: Sizes -50 to -162
3 Waves



Gap: Sizes -175 & up
*Multiple Waves
(see table)

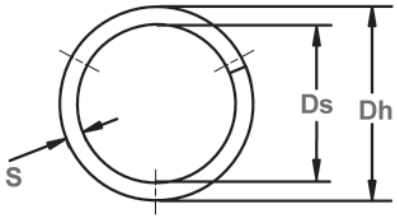


Optional End Design
(Patent Pending)

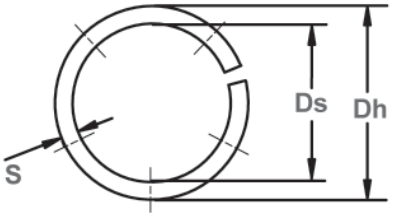
WAVE SPRING NO.	OPERATES IN HOUSING DIAMETER Dh	SHAFT DIAMETER CLEARANCE Ds	LOAD (lb)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NO. OF WAVES*	THICKNESS T	SECTION S	SPRING RATE Ref. Lb/in.
SST-50	.500	.400	7	.050	.085	3	.008	.040	200
SST-62	.625	.480	10	.050	.095	3	.010	.058	222
SST-75	.750	.500	14	.062	.160	3	.010	.078	143
SST-87	.875	.620	16	.062	.130	3	.012	.094	235
SST-100	1.000	.780	18	.062	.160	3	.012	.094	184
SST-112	1.125	.840	20	.078	.130	3	.016	.133	385
SST-125	1.250	.960	22	.078	.150	3	.016	.133	306
SST-137	1.375	1.090	24	.078	.190	3	.016	.133	214
SST-150	1.500	1.170	26	.078	.170	3	.018	.143	283
SST-162	1.625	1.310	28	.078	.200	3	.018	.143	230
SST-175	1.750	1.440	30	.078	.140	4	.018	.143	484
SST-187	1.875	1.560	32	.078	.150	4	.018	.143	444
SST-200	2.000	1.680	34	.093	.140	4	.024	.150	723
SST-212	2.125	1.800	36	.093	.150	4	.024	.150	632
SST-225	2.250	1.930	38	.093	.170	4	.024	.150	494
SST-237	2.375	1.990	40	.093	.160	4	.024	.178	597
SST-250	2.500	2.120	42	.093	.170	4	.024	.178	545
SST-262	2.625	2.240	44	.093	.190	4	.024	.178	454
SST-275	2.750	2.340	46	.109	.170	4	.030	.188	754
SST-287	2.875	2.470	48	.109	.180	4	.030	.188	676
SST-300	3.000	2.590	50	.109	.190	4	.030	.188	617
SST-312	3.125	2.710	52	.109	.210	4	.030	.188	515
SST-325	3.250	2.750	54	.109	.200	4	.030	.233	593
SST-337	3.375	2.840	56	.109	.220	4	.030	.233	505
SST-350	3.500	3.000	58	.109	.230	4	.030	.233	479
SST-362	3.625	3.120	60	.109	.240	4	.030	.233	458
SST-375	3.750	3.250	62	.109	.260	4	.030	.233	411
SST-387	3.875	3.370	64	.109	.300	4	.030	.233	335
SST-400	4.000	3.500	66	.109	.190	5	.030	.233	815
SST-412	4.125	3.620	67	.109	.200	5	.030	.233	736
SST-425	4.250	3.740	69	.109	.210	5	.030	.233	683
SST-437	4.375	3.860	70	.109	.210	5	.030	.233	693
SST-450	4.500	3.990	72	.109	.230	5	.030	.233	595
SST-462	4.625	4.110	73	.125	.270	5	.030	.233	503
SST-475	4.750	4.240	75	.125	.310	5	.030	.233	405
SST-487	4.875	4.370	76	.125	.290	5	.030	.233	461

TRU-WAVE

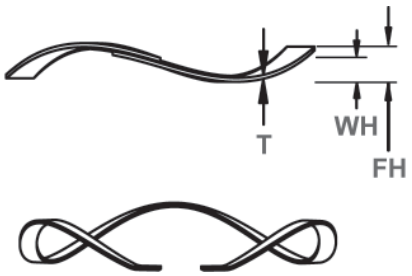
Wave Spring Measurements



Overlap: Sizes -50 to -162
3 Waves



Gap: Sizes -175 & up
*Multiple Waves
(see table)

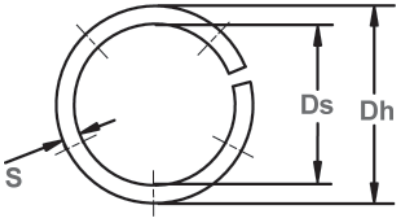


Optional End Design
(Patent Pending)

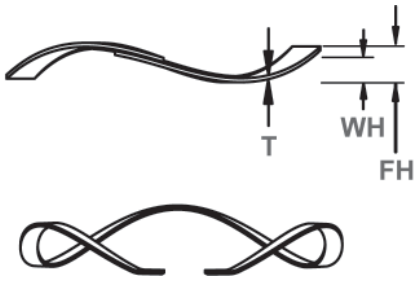
WAVE SPRING NO.	OPERATES IN HOUSING DIAMETER	SHAFT DIAMETER CLEARANCE	LOAD (lb)	WORK HEIGHT	FREE HEIGHT Ref.	NO. OF WAVES*	THICKNESS	SECTION	SPRING RATE Ref.
	Dh	Ds		WH	FH		T	S	Lb/in.
SST-500	5.000	4.490	78	.125	.310	5	.030	.233	422
SST-512	5.125	4.610	80	.125	.340	5	.030	.233	372
SST-525	5.250	4.740	82	.125	.370	5	.030	.233	335
SST-537	5.375	4.860	84	.125	.380	5	.030	.233	329
SST-550	5.500	4.990	86	.125	.250	6	.030	.233	688
SST-562	5.625	5.110	88	.125	.270	6	.030	.233	607
SST-575	5.750	5.240	90	.125	.280	6	.030	.233	581
SST-587	5.875	5.360	92	.125	.300	6	.030	.233	526
SST-600	6.000	5.490	94	.125	.300	6	.030	.233	537
SST-612	6.125	5.610	96	.125	.310	6	.030	.233	519
SST-625	6.250	5.730	98	.125	.340	6	.030	.233	456
SST-637	6.375	5.860	100	.125	.350	6	.030	.233	444
SST-650	6.500	5.980	102	.125	.390	6	.030	.233	385
SST-675	6.750	6.230	104	.125	.420	6	.030	.233	353
SST-700	7.000	6.160	106	.156	.320	6	.032	.375	646
SST-725	7.250	6.440	108	.156	.350	6	.032	.375	557
SST-750	7.500	6.690	110	.156	.360	6	.032	.375	539
SST-775	7.750	6.940	114	.156	.380	6	.032	.375	509
SST-800	8.000	7.190	118	.156	.390	6	.032	.375	504
SST-825	8.250	7.440	122	.156	.430	6	.032	.375	445
SST-850	8.500	7.680	126	.156	.340	7	.032	.375	685
SST-875	8.750	7.930	130	.156	.340	7	.032	.375	707
SST-900	9.000	8.180	134	.156	.290	8	.032	.375	1,000
SST-950	9.500	8.680	142	.156	.240	9	.032	.375	1,690
SST-1000	10.000	9.170	150	.156	.290	9	.032	.375	1,119
SST-1050	10.500	9.670	158	.156	.310	9	.032	.375	1,026
SST-1100	11.000	10.170	166	.156	.350	9	.032	.375	856
SST-1150	11.500	10.660	174	.156	.360	9	.032	.375	853
SST-1200	12.000	11.160	182	.156	.440	9	.032	.375	641
SST-1250	12.500	11.660	190	.156	.350	10	.032	.375	979
SST-1300	13.000	12.160	198	.156	.410	10	.032	.375	780
SST-1350	13.500	12.650	206	.156	.430	10	.032	.375	752
SST-1400	14.000	13.150	214	.156	.300	12	.032	.375	1,486
SST-1450	14.500	13.650	221	.156	.320	12	.032	.375	1,348
SST-1500	15.000	14.130	230	.156	.350	12	.032	.375	1,186
SST-1550	15.500	14.640	239	.156	.310	13	.032	.375	1,552
SST-1600	16.000	15.140	248	.156	.340	13	.032	.375	1,348

NST Wave Springs

Wave Spring Measurements



Gap Type
*Multiple Waves
(see table)



Optional End Design
(Patent Pending)

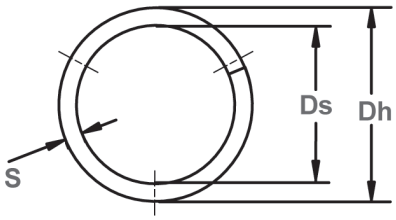
WAVE SPRING NO.	OPERATES IN HOUSING DIAMETER	SHAFT DIAMETER CLEARANCE	LOAD (lb)	WORK HEIGHT	FREE HEIGHT Ref.	NO. OF WAVES*	THICKNESS	SECTION	SPRING RATE Ref.
	Dh	Ds		WH	FH		T	S	Lb/in.
NST-325	3.250	2.820	54	.109	.200	4	.03	.188	593
NST-337	3.375	2.940	56	.109	.220	4	.03	.188	505
NST-350	3.500	3.070	58	.109	.260	4	.03	.188	384
NST-362	3.625	3.190	60	.109	.270	4	.03	.188	373
NST-375	3.750	3.320	62	.109	.280	4	.03	.188	363
NST-387	3.875	3.440	64	.109	.310	4	.03	.188	318
NST-400	4.000	3.570	66	.109	.200	5	.03	.188	725
NST-412	4.125	3.690	67	.109	.200	5	.03	.188	736
NST-425	4.250	3.820	69	.109	.240	5	.03	.188	527
NST-437	4.375	3.940	70	.109	.210	5	.03	.188	693
NST-450	4.500	4.070	72	.109	.280	5	.03	.188	421
NST-462	4.625	4.190	73	.125	.270	5	.03	.188	503
NST-475	4.750	4.320	75	.125	.320	5	.03	.188	385
NST-487	4.875	4.440	76	.125	.320	5	.03	.188	390
NST-500	5.000	4.570	78	.125	.350	5	.03	.188	347
NST-512	5.125	4.690	80	.125	.350	5	.03	.188	356
NST-525	5.250	4.820	82	.125	.360	5	.03	.188	349
NST-537	5.375	4.940	84	.125	.440	5	.03	.188	267
NST-550	5.500	5.070	86	.125	.280	6	.03	.188	555
NST-562	5.625	5.190	88	.125	.290	6	.03	.188	533
NST-575	5.750	5.320	90	.125	.340	6	.03	.188	419
NST-587	5.875	5.440	92	.125	.340	6	.03	.188	428
NST-600	6.000	5.570	94	.125	.340	6	.03	.188	437
NST-612	6.125	5.690	96	.125	.280	7	.03	.188	619
NST-625	6.250	5.820	98	.125	.280	7	.03	.188	632
NST-637	6.375	5.940	100	.125	.300	7	.03	.188	571
NST-650	6.500	6.070	102	.125	.300	7	.03	.188	583
NST-675	6.750	6.320	104	.125	.300	7	.03	.188	594
NST-700	7.000	6.480	106	.156	.320	7	.03	.233	646
NST-725	7.250	6.730	108	.156	.330	7	.03	.233	621
NST-750	7.500	6.980	110	.156	.360	7	.03	.233	539
NST-775	7.750	7.230	114	.156	.380	7	.03	.233	509

Single Turn, Metric

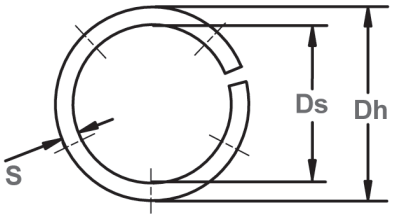
Ideal for short deflection applications with low to medium forces. Offered in a number of waves and material thicknesses. Designed for a wide range of bore and rod diameters.

MST Wave Springs

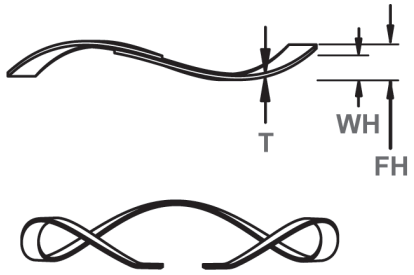
Wave Spring Measurements



Overlap: Sizes -35 to -374
3 Waves



Gap: Sizes -394 & up
*Multiple Waves
(see table)



Optional End Design
(Patent Pending)

WAVE SPRING NO.	CLINGS IN HOUSING DIAMETER	SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NO. OF WAVES*	THICKNESS	SECTION	SPRING RATE Ref.
	Dh	Ds		WH	FH		T	S	N/mm
MST-35	9,0	6,86	25,8	1,00	1,50	3	0,20	0,81	52
MST-39	10,0	7,49	27,6	1,00	1,57	3	0,20	1,02	48
MST-43	11,0	8,46	29,4	1,00	1,83	3	0,20	1,02	35
MST-47	12,0	9,17	33,4	1,00	1,57	3	0,25	1,17	59
MST-51	13,0	9,53	37,8	1,00	1,57	3	0,25	1,47	66
MST-63	16,0	11,28	44,5	1,57	2,29	3	0,25	1,98	65
MST-75	19,0	14,28	53,4	1,57	3,05	3	0,25	1,98	35
MST-87	22,0	16,46	62,3	1,57	2,79	3	0,30	2,39	48
MST-95	24,0	18,46	66,7	1,57	3,56	3	0,30	2,39	35
MST-102	26,0	18,22	71,2	1,98	2,54	3	0,41	3,38	111
MST-110	28,0	20,22	75,6	1,98	2,79	3	0,41	3,38	85
MST-118	30,0	22,22	84,5	1,98	3,30	3	0,41	3,38	66
MST-126	32,0	24,22	89,0	1,98	3,81	3	0,41	3,38	52
MST-138	35,0	27,22	97,9	1,98	4,57	3	0,41	3,38	38
MST-146	37,0	28,72	102,3	1,98	3,81	3	0,46	3,63	58
MST-158	40,0	31,72	111,2	1,98	5,08	3	0,46	3,63	37
MST-165	42,0	33,72	115,7	1,98	3,05	4	0,46	3,63	99
MST-185	47,0	38,72	129,0	1,98	3,81	4	0,46	3,63	68
MST-205	52,0	43,11	142,4	2,36	3,56	4	0,61	3,76	121
MST-217	55,0	46,11	151,3	2,36	3,81	4	0,61	3,76	100
MST-244	62,0	51,69	169,1	2,36	4,32	4	0,61	4,52	85
MST-268	68,0	57,17	186,9	2,77	4,32	4	0,76	4,78	131
MST-276	70,0	59,17	191,3	2,77	4,32	4	0,76	4,78	119
MST-284	72,0	61,17	195,8	2,77	4,57	4	0,76	4,78	108
MST-295	75,0	64,17	204,7	2,77	5,08	4	0,76	4,78	94
MST-315	80,0	68,66	218,0	2,77	5,59	4	0,76	4,78	76
MST-335	85,0	71,38	231,4	2,77	5,59	4	0,76	5,92	83
MST-354	90,0	76,38	249,2	2,77	6,35	4	0,76	5,92	68
MST-374	95,0	81,38	262,5	2,77	7,37	4	0,76	5,92	57
MST-394	100,0	86,38	275,9	2,77	4,57	5	0,76	5,92	157
MST-413	105,0	91,38	289,2	2,77	5,08	5	0,76	5,92	134
MST-433	110,0	96,38	302,6	2,77	5,33	5	0,76	5,92	115
MST-453	115,0	101,38	315,9	3,18	6,35	5	0,76	5,92	99
MST-472	120,0	106,38	329,3	3,18	7,11	5	0,76	5,92	86
MST-492	125,0	111,38	342,6	3,18	7,62	5	0,76	5,92	76
MST-512	130,0	116,38	356,0	3,18	8,64	5	0,76	5,92	67
MST-532	135,0	121,38	369,3	3,18	9,40	5	0,76	5,92	59
MST-551	140,0	126,38	382,7	3,18	6,86	6	0,76	5,92	108
MST-571	145,0	131,38	396,0	3,18	7,37	6	0,76	5,92	97
MST-591	150,0	136,38	404,9	3,18	7,87	6	0,76	5,92	87
MST-630	160,0	146,38	440,5	3,18	9,40	6	0,76	5,92	71
MST-650	165,0	151,38	453,9	3,18	10,41	6	0,76	5,92	64
MST-669	170,0	156,38	467,2	3,18	11,18	6	0,76	5,92	58

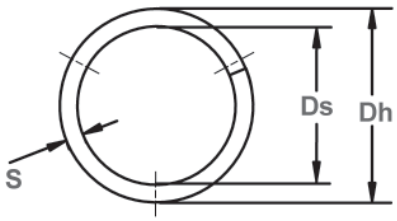
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.

MST Wave Springs

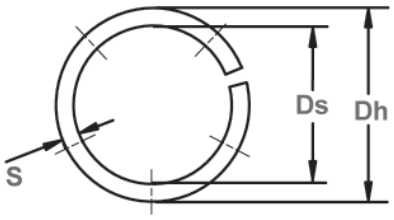
Single Turn, Metric

Ideal for short deflection applications with low to medium forces. Offered in a number of waves and material thicknesses. Designed for a wide range of bore and rod diameters.

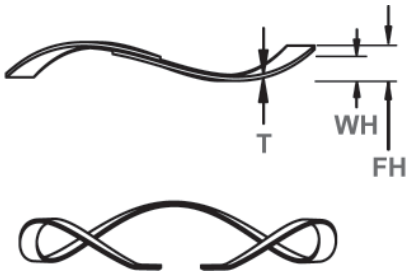
Wave Spring Measurements



Overlap: Sizes -35 to -374
3 Waves



Gap: Sizes -394 & up
*Multiple Waves
(see table)



Optional End Design
(Patent Pending)

WAVE SPRING NO.	CLINGS IN HOUSING DIAMETER	SHAFT DIAMETER CLEARANCE	LOAD (N)	WORK HEIGHT	FREE HEIGHT Ref.	NO. OF WAVES*	THICKNESS	SECTION	SPRING RATE Ref.
	Dh	Ds		WH	FH		T	S	N/mm
MST-689	175.0	154.16	480.6	3.96	8.13	6	0.81	9.53	116
MST-709	180.0	159.16	493.9	3.96	8.64	6	0.81	9.53	105
MST-728	185.0	164.16	507.3	3.96	9.14	6	0.81	9.53	97
MST-748	190.0	169.16	520.6	3.96	9.91	6	0.81	9.53	88
MST-787	200.0	179.16	547.3	3.96	7.11	7	0.81	9.53	174
MST-807	205.0	184.16	560.7	3.96	7.37	7	0.81	9.53	161
MST-827	210.0	189.16	578.5	3.96	7.87	7	0.81	9.53	149
MST-847	215.0	194.16	591.8	3.96	8.38	7	0.81	9.53	138
MST-866	220.0	199.16	605.2	3.96	8.64	7	0.81	9.53	128
MST-886	225.0	204.16	618.5	3.96	7.11	8	0.81	9.53	203
MST-906	230.0	209.16	631.9	3.96	6.10	9	0.81	9.53	303
MST-925	235.0	214.16	645.2	3.96	6.35	9	0.81	9.53	283
MST-945	240.0	219.16	658.6	3.96	6.35	9	0.81	9.53	265
MST-984	250.0	229.16	685.3	3.96	6.86	9	0.81	9.53	232
MST-1024	260.0	239.16	712.0	3.96	7.37	9	0.81	9.53	205
MST-1043	265.0	244.16	725.3	3.96	7.62	9	0.81	9.53	193
MST-1063	270.0	249.16	743.1	3.96	8.13	9	0.81	9.53	182
MST-1102	280.0	259.16	769.8	3.96	8.64	9	0.81	9.53	162
MST-1142	290.0	269.16	796.5	3.96	9.40	9	0.81	9.53	144
MST-1181	300.0	279.16	823.2	3.96	10.41	9	0.81	9.53	129
MST-1221	310.0	289.16	849.9	3.96	7.11	9	1.07	9.53	264
MST-1260	320.0	299.16	876.6	3.96	7.62	9	1.07	9.53	239
MST-1339	340.0	319.16	934.5	3.96	8.64	9	1.07	9.53	198
MST-1378	350.0	329.16	961.1	3.96	9.40	9	1.07	9.53	180
MST-1417	360.0	339.16	987.9	3.96	7.62	10	1.07	9.53	271
MST-1457	370.0	349.16	1014.6	3.96	8.13	10	1.07	9.53	249
MST-1496	380.0	359.16	1041.3	3.96	8.64	10	1.07	9.53	229
MST-1535	390.0	369.16	1072.4	3.96	9.14	10	1.07	9.53	211
MST-1575	400.0	379.16	1099.1	3.96	9.65	10	1.07	9.53	196
MST-1614	410.0	382.82	1125.8	3.96	8.38	10	1.07	12.70	251
MST-1654	420.0	392.82	1152.5	3.96	8.89	10	1.07	12.70	233
MST-1693	430.0	402.82	1179.2	3.96	7.62	11	1.07	12.70	317
MST-1732	440.0	412.82	1205.9	3.96	8.13	11	1.07	12.70	295
MST-1811	460.0	432.82	1263.7	3.96	8.89	11	1.07	12.70	256
MST-1890	480.0	452.82	1317.1	3.96	8.13	12	1.07	12.70	318
MST-1969	500.0	472.82	1370.5	3.96	8.89	12	1.07	12.70	280
MST-2126	540.0	512.82	1481.8	3.96	8.89	13	1.07	12.70	303
MST-2284	580.0	552.82	1593.0	3.96	8.89	14	1.07	12.70	327

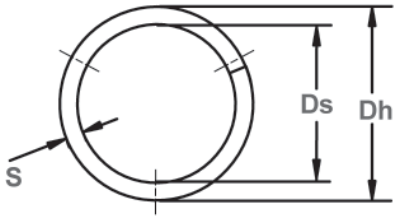
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.

Bearing Interchange Chart

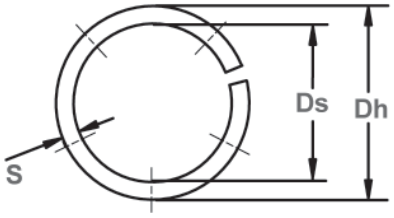
This chart pairs metric single turn wave springs with the appropriate standard bearing number.

TRU WAVE

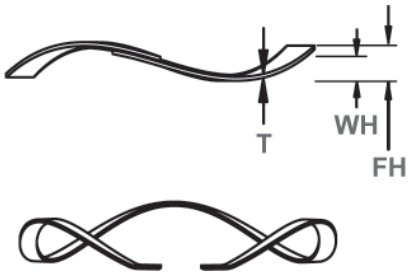
Wave Spring Measurements



Overlap: Sizes -35 to -374
3 Waves



Gap: Sizes -394 & up
*Multiple Waves
(see table)



Optional End Design
(Patent Pending)

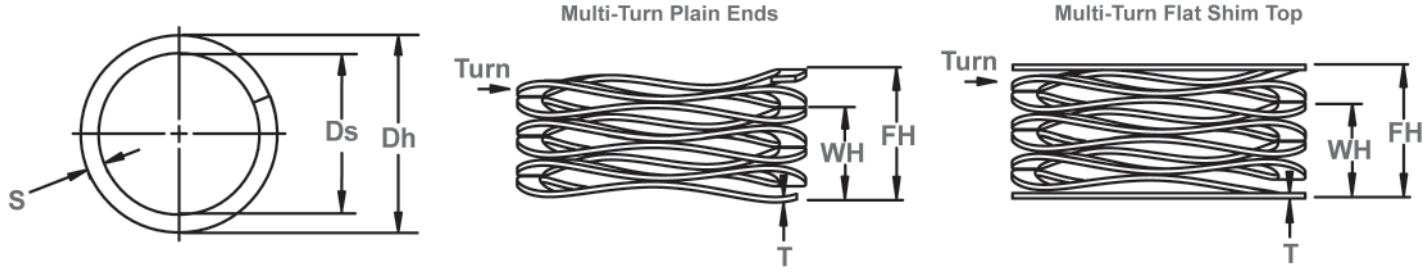
WAVE SPRING NO.	BEARING O.D. (mm)	BEARING NUMBERS						
		EXTRA SMALL	EXTREMELY LIGHT	EXTRA LIGHT	NAR-ROW	LIGHT	MED-IUM	HEAVY
MST-35	9	03,18/4						
MST-39	10	23						
MST-43	11	18/5,19,4						
MST-47	12	4						
MST-51	13	18/6,19/5,24,33						
MST-63	16	34	-	-	-	-	-	-
MST-75	19	35,36	-	-	-	-	-	-
MST-87	22	37,38	00	-	-	-	-	-
MST-95	24	38KV	01	-	-	-	-	-
MST-102	26	39	-	100	-	-	-	-
MST-110	28	-	02	101	-	-	-	-
MST-118	30	-	03	-	-	200	-	-
MST-126	32	-	-	102	02	201	-	-
MST-138	35	-	-	103	-	202	300	-
MST-146	37	-	04	-	03	-	301	-
MST-158	40	-	-	-	-	203	-	-
MST-165	42	-	05	104	04	-	302	-
MST-185	47	-	06	105	-	204	303	-
MST-205	52	-	-	-	05	205	304	-
MST-217	55	-	07	106	-	-	-	-
MST-244	62	-	08	107	06	206	305	403
MST-268	68	-	09	108	-	-	-	-
MST-276	70	-	-	-	07	-	-	-
MST-284	72	-	10	-	-	207	306	404
MST-295	75	-	-	109	-	-	-	-
MST-315	80	-	11	110	08	208	307	405
MST-335	85	-	12	-	09	209	-	-
MST-354	90	-	13	111	10	210	308	406
MST-374	95	-	-	112	-	-	-	-
MST-394	100	-	14	113	11	211	309	407
MST-413	105	-	15	-	12	-	-	-
MST-433	110	-	16	114	-	212	310	408
MST-453	115	-	-	115	13	-	-	-
MST-472	120	-	17	-	14	213	311	409
MST-492	125	-	18	116	-	214	-	-
MST-512	130	-	19	117	15	215	312	410
MST-532	135	-	-	-	16	-	-	-
MST-551	140	-	20	118	-	216	313	411
MST-571	145	-	21	119	17	-	-	-
MST-591	150	-	22	120	18	217	314	412
MST-630	160	-	-	121	19	218	315	413
MST-650	165	-	24	-	20	-	-	-
MST-669	170	-	-	122	-	219	316	-

WAVE SPRING NO.	BEARING O.D. (mm)	BEARING NUMBERS						
		EXTRA SMALL	EXTREMELY LIGHT	EXTRA LIGHT	NAR-ROW	LIGHT	MED-IUM	HEAVY
MST-689	175	-	-	-	22	-	-	-
MST-709	180	-	26	124	21	220	317	414
MST-728	185	-	-	-	22	-	-	-
MST-748	190	-	28	-	24	221	318	415
MST-787	200	-	-	126	-	222	319	416
MST-807	205	-	-	-	26	-	-	-
MST-827	210	-	30	128	-	-	-	417
MST-847	215	-	-	-	-	224	320	-
MST-866	220	-	32	-	28	-	-	-
MST-886	225	-	-	130	-	-	321	418
MST-906	230	-	34	-	-	226	-	-
MST-925	235	-	-	-	30	-	-	-
MST-945	240	-	-	132	-	-	322	-
MST-984	250	-	36	-	32	228	-	419
MST-1024	260	-	38	134	-	-	324	-
MST-1043	265	-	-	-	34	-	-	420
MST-1063	270	-	-	-	-	230	-	-
MST-1102	280	-	40	136	36	-	326	-
MST-1142	290	-	-	138	-	232	-	421
MST-1181	300	-	-	-	38	-	328	-
MST-1221	310	-	-	140	-	234	-	-
MST-1260	320	-	-	-	40	236	330	422
MST-1339	340	-	-	144	42	238	332	-
MST-1378	350	-	-	-	44	-	-	-
MST-1417	360	-	-	148	-	240	334	-
MST-1457	370	-	-	-	46	-	-	-
MST-1496	380	-	-	-	-	-	336	-
MST-1535	390	-	-	-	48	-	-	-
MST-1575	400	-	-	152	-	244	338	-
MST-1614	410	-	-	-	50	-	-	-
MST-1654	420	-	-	156	-	-	340	-
MST-1693	430	-	-	-	52	-	-	-
MST-1732	440	-	-	-	-	248	342	-
MST-1811	460	-	-	160	56	-	344	-
MST-1890	480	-	-	164	-	252	-	-
MST-1969	500	-	-	-	64	256	348	-
MST-2126	540	-	-	-	-	260	352	-
MST-2284	580	-		-	-	264	356	-

WSL, WSM, WSR Wave Springs

Multi Turn, Inch

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER			SHAFT DIAMETER CLEARANCE	LOAD (lbs.)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. Lb/in.
	Dh DEC	Dh FRAC	Dh mm	Ds		WH	FH			T	S	
WSL-25 A*	.250	1/4	6.4	.150	2	.033	.075	2.5	3	.006	.024	48
WSL-25 B*	.250	1/4	6.4	.150	2	.050	.100	2.5	4	.006	.024	40
WSL-25 C*	.250	1/4	6.4	.150	2	.060	.125	2.5	5	.006	.024	31
WSL-25 D*	.250	1/4	6.4	.150	2	.075	.150	2.5	6	.006	.024	27
WSL-25 E*	.250	1/4	6.4	.150	2	.085	.175	2.5	7	.006	.024	22
WSL-25 F*	.250	1/4	6.4	.150	2	.095	.200	2.5	8	.006	.024	19
WSL-25 G*	.250	1/4	6.4	.150	2	.120	.225	2.5	9	.006	.024	19
WSL-25 H*	.250	1/4	6.4	.150	2	.140	.275	2.5	11	.006	.024	15
WSL-25 I*	.250	1/4	6.4	.150	2	.170	.325	2.5	13	.006	.024	13
WSM-25 A*	.250	1/4	6.4	.150	5	.037	.075	2.5	3	.008	.024	132
WSM-25 B*	.250	1/4	6.4	.150	5	.048	.100	2.5	4	.008	.024	96
WSM-25 C*	.250	1/4	6.4	.150	5	.065	.125	2.5	5	.008	.024	83
WSM-25 D*	.250	1/4	6.4	.150	5	.075	.150	2.5	6	.008	.024	67
WSM-25 E*	.250	1/4	6.4	.150	5	.090	.175	2.5	7	.008	.024	59
WSM-25 F*	.250	1/4	6.4	.150	5	.100	.200	2.5	8	.008	.024	50
WSM-25 G*	.250	1/4	6.4	.150	5	.120	.225	2.5	9	.008	.024	48
WSM-25 H*	.250	1/4	6.4	.150	5	.148	.275	2.5	11	.008	.024	39
WSM-25 I*	.250	1/4	6.4	.150	5	.175	.325	2.5	13	.008	.024	33
WSL-31 A	.312	5/16	7.9	.200	3	.070	.114	2.5	3	.008	.032	68
WSL-31 B	.312	5/16	7.9	.200	3	.096	.152	2.5	4	.008	.032	54
WSL-31 C	.312	5/16	7.9	.200	3	.118	.190	2.5	5	.008	.032	42
WSL-31 D	.312	5/16	7.9	.200	3	.145	.228	2.5	6	.008	.032	36
WSL-31 E	.312	5/16	7.9	.200	3	.165	.266	2.5	7	.008	.032	30
WSL-31 F	.312	5/16	7.9	.200	3	.195	.304	2.5	8	.008	.032	28
WSL-31 G	.312	5/16	7.9	.200	3	.215	.342	2.5	9	.008	.032	24
WSL-31 H	.312	5/16	7.9	.200	3	.262	.418	2.5	11	.008	.032	19
WSL-31 I	.312	5/16	7.9	.200	3	.309	.494	2.5	13	.008	.032	16
WSM-31 A	.312	5/16	7.9	.200	6	.072	.114	2.5	3	.010	.032	143
WSM-31 B	.312	5/16	7.9	.200	6	.096	.152	2.5	4	.010	.032	107
WSM-31 C	.312	5/16	7.9	.200	6	.123	.190	2.5	5	.010	.032	90
WSM-31 D	.312	5/16	7.9	.200	6	.144	.228	2.5	6	.010	.032	71
WSM-31 E	.312	5/16	7.9	.200	6	.176	.266	2.5	7	.010	.032	67
WSM-31 F	.312	5/16	7.9	.200	6	.197	.304	2.5	8	.010	.032	56
WSM-31 G	.312	5/16	7.9	.200	6	.227	.342	2.5	9	.010	.032	52
WSM-31 H	.312	5/16	7.9	.200	6	.278	.418	2.5	11	.010	.032	43
WSM-31 I	.312	5/16	7.9	.200	6	.336	.494	2.5	13	.010	.032	38

*Not available with shim ends.

PART NUMBERS SHOWN REFLECT MULTI-TURN WAVE SPRINGS WITH PLAIN ENDS.
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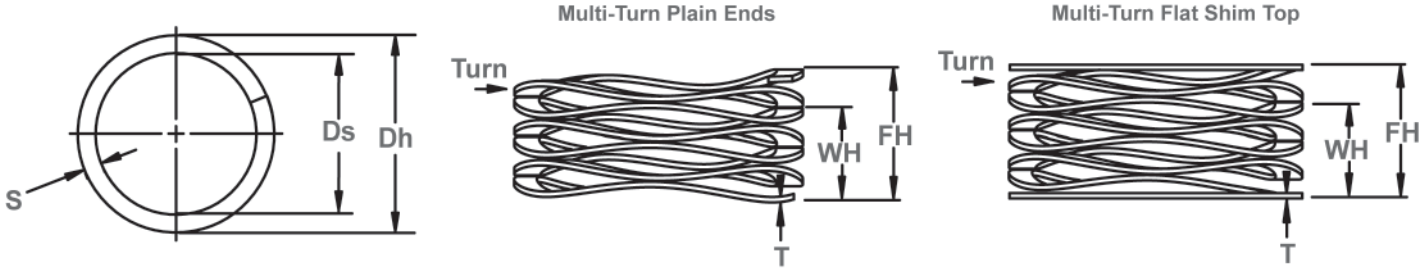

Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER			SHAFT DIAMETER CLEARANCE	LOAD (lbs.)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. Lb/in.
	Dh DEC	Dh FRAC	Dh mm	Ds		WH	FH			T	S	
WSL-37 A	.375	3/8	9.5	.250	4	.062	.150	2.5	3	.008	.032	45
WSL-37 B	.375	3/8	9.5	.250	4	.098	.200	2.5	4	.008	.032	39
WSL-37 C	.375	3/8	9.5	.250	4	.108	.250	2.5	5	.008	.032	28
WSL-37 D	.375	3/8	9.5	.250	4	.135	.300	2.5	6	.008	.032	24
WSL-37 E	.375	3/8	9.5	.250	4	.150	.350	2.5	7	.008	.032	20
WSL-37 F	.375	3/8	9.5	.250	4	.184	.400	2.5	8	.008	.032	19
WSL-37 G	.375	3/8	9.5	.250	4	.195	.450	2.5	9	.008	.032	16
WSL-37 H	.375	3/8	9.5	.250	4	.228	.500	2.5	10	.008	.032	15
WSL-37 I	.375	3/8	9.5	.250	4	.240	.550	2.5	11	.008	.032	13
WSM-37 A	.375	3/8	9.5	.250	7	.081	.150	2.5	3	.011	.032	101
WSM-37 B	.375	3/8	9.5	.250	7	.119	.200	2.5	4	.011	.032	86
WSM-37 C	.375	3/8	9.5	.250	7	.145	.250	2.5	5	.011	.032	67
WSM-37 D	.375	3/8	9.5	.250	7	.180	.300	2.5	6	.011	.032	58
WSM-37 E	.375	3/8	9.5	.250	7	.202	.350	2.5	7	.011	.032	47
WSM-37 F	.375	3/8	9.5	.250	7	.240	.400	2.5	8	.011	.032	44
WSM-37 G	.375	3/8	9.5	.250	7	.262	.450	2.5	9	.011	.032	37
WSM-37 H	.375	3/8	9.5	.250	7	.298	.500	2.5	10	.011	.032	35
WSM-37 I	.375	3/8	9.5	.250	7	.327	.550	2.5	11	.011	.032	31
WSL-43 A	.437	7/16	11.1	.281	4	.063	.165	2.5	3	.008	.040	39
WSL-43 B	.437	7/16	11.1	.281	4	.093	.220	2.5	4	.008	.040	31
WSL-43 C	.437	7/16	11.1	.281	4	.109	.275	2.5	5	.008	.040	24
WSL-43 D	.437	7/16	11.1	.281	4	.143	.330	2.5	6	.008	.040	21
WSL-43 E	.437	7/16	11.1	.281	4	.160	.385	2.5	7	.008	.040	18
WSL-43 F	.437	7/16	11.1	.281	4	.195	.440	2.5	8	.008	.040	16
WSL-43 G	.437	7/16	11.1	.281	4	.210	.495	2.5	9	.008	.040	14
WSL-43 H	.437	7/16	11.1	.281	4	.240	.550	2.5	10	.008	.040	13
WSL-43 I	.437	7/16	11.1	.281	4	.260	.605	2.5	11	.008	.040	12
WSM-43 A	.437	7/16	11.1	.281	8	.082	.165	2.5	3	.011	.046	96
WSM-43 B	.437	7/16	11.1	.281	8	.115	.220	2.5	4	.011	.046	76
WSM-43 C	.437	7/16	11.1	.281	8	.142	.275	2.5	5	.011	.046	60
WSM-43 D	.437	7/16	11.1	.281	8	.179	.330	2.5	6	.011	.046	53
WSM-43 E	.437	7/16	11.1	.281	8	.198	.385	2.5	7	.011	.046	43
WSM-43 F	.437	7/16	11.1	.281	8	.231	.440	2.5	8	.011	.046	38
WSM-43 G	.437	7/16	11.1	.281	8	.255	.495	2.5	9	.011	.046	33
WSM-43 H	.437	7/16	11.1	.281	8	.290	.550	2.5	10	.011	.046	31
WSM-43 I	.437	7/16	11.1	.281	8	.319	.605	2.5	11	.011	.046	28

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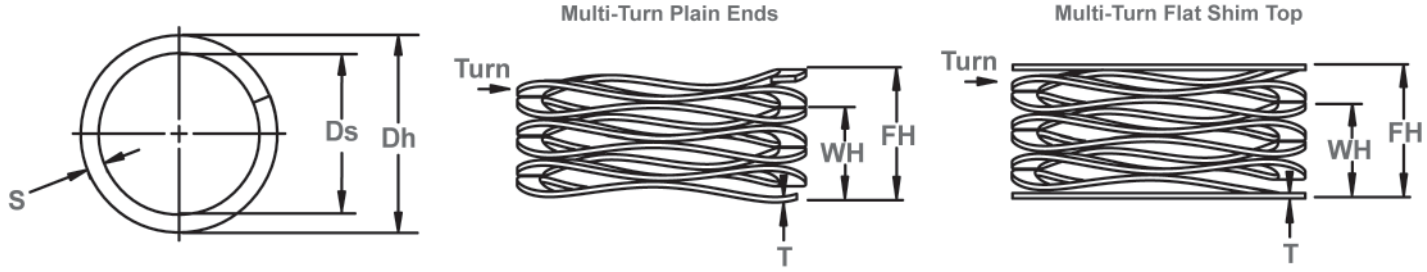
WSL, WSM, WSR Wave Springs

Multi Turn, Inch

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER			SHAFT DIAMETER CLEARANCE	LOAD (lbs.)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. Lb/in.
	Dh DEC	Dh FRAC	Dh mm	Ds		WH	FH			T	S	
WSL-50 A	.500	1/2	12.7	.312	5	.062	.180	2.5	3	.008	.056	42
WSL-50 B	.500	1/2	12.7	.312	5	.090	.240	2.5	4	.008	.056	33
WSL-50 C	.500	1/2	12.7	.312	5	.107	.300	2.5	5	.008	.056	26
WSL-50 D	.500	1/2	12.7	.312	5	.136	.360	2.5	6	.008	.056	22
WSL-50 E	.500	1/2	12.7	.312	5	.150	.420	2.5	7	.008	.056	19
WSL-50 F	.500	1/2	12.7	.312	5	.180	.480	2.5	8	.008	.056	17
WSL-50 G	.500	1/2	12.7	.312	5	.195	.540	2.5	9	.008	.056	14
WSL-50 H	.500	1/2	12.7	.312	5	.220	.600	2.5	10	.008	.056	13
WSL-50 I	.500	1/2	12.7	.312	5	.240	.660	2.5	11	.008	.056	12
WSM-50 A	.500	1/2	12.7	.312	10	.065	.180	2.5	3	.010	.058	87
WSM-50 B	.500	1/2	12.7	.312	10	.092	.240	2.5	4	.010	.058	68
WSM-50 C	.500	1/2	12.7	.312	10	.114	.300	2.5	5	.010	.058	54
WSM-50 D	.500	1/2	12.7	.312	10	.147	.360	2.5	6	.010	.058	47
WSM-50 E	.500	1/2	12.7	.312	10	.162	.420	2.5	7	.010	.058	39
WSM-50 F	.500	1/2	12.7	.312	10	.196	.480	2.5	8	.010	.058	35
WSM-50 G	.500	1/2	12.7	.312	10	.207	.540	2.5	9	.010	.058	30
WSM-50 H	.500	1/2	12.7	.312	10	.246	.600	2.5	10	.010	.058	28
WSM-50 I	.500	1/2	12.7	.312	10	.264	.660	2.5	11	.010	.058	25
WSL-56 A	.562	9/16	14.3	.375	5	.080	.195	2.5	3	.009	.058	43
WSL-56 B	.562	9/16	14.3	.375	5	.125	.260	2.5	4	.009	.058	37
WSL-56 C	.562	9/16	14.3	.375	5	.135	.325	2.5	5	.009	.058	26
WSL-56 D	.562	9/16	14.3	.375	5	.180	.390	2.5	6	.009	.058	24
WSL-56 E	.562	9/16	14.3	.375	5	.190	.455	2.5	7	.009	.058	19
WSL-56 F	.562	9/16	14.3	.375	5	.230	.520	2.5	8	.009	.058	17
WSL-56 G	.562	9/16	14.3	.375	5	.260	.585	2.5	9	.009	.058	15
WSL-56 H	.562	9/16	14.3	.375	5	.285	.650	2.5	10	.009	.058	14
WSL-56 I	.562	9/16	14.3	.375	5	.315	.715	2.5	11	.009	.058	13
WSM-56 A	.562	9/16	14.3	.375	11	.086	.195	2.5	3	.012	.060	101
WSM-56 B	.562	9/16	14.3	.375	11	.123	.260	2.5	4	.012	.060	80
WSM-56 C	.562	9/16	14.3	.375	11	.145	.325	2.5	5	.012	.060	61
WSM-56 D	.562	9/16	14.3	.375	11	.187	.390	2.5	6	.012	.060	54
WSM-56 E	.562	9/16	14.3	.375	11	.209	.455	2.5	7	.012	.060	45
WSM-56 F	.562	9/16	14.3	.375	11	.253	.520	2.5	8	.012	.060	41
WSM-56 G	.562	9/16	14.3	.375	11	.273	.585	2.5	9	.012	.060	35
WSM-56 H	.562	9/16	14.3	.375	11	.318	.650	2.5	10	.012	.060	33
WSM-56 I	.562	9/16	14.3	.375	11	.343	.715	2.5	11	.012	.060	30

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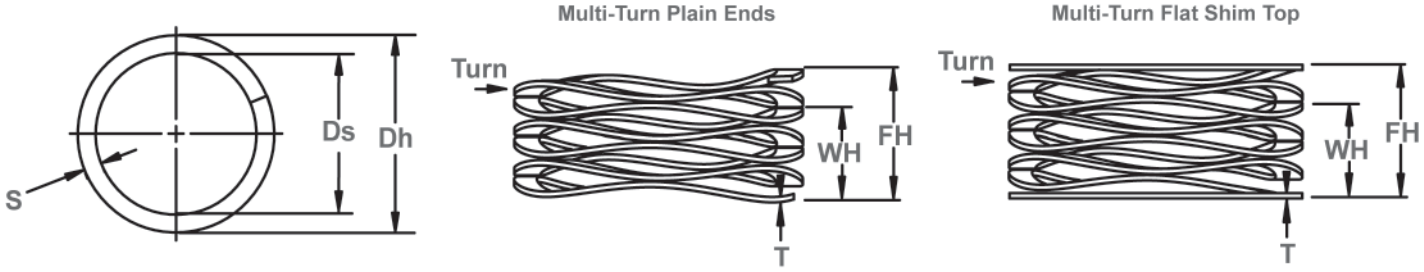

Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER			SHAFT DIAMETER CLEARANCE	LOAD (lbs.)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. Lb/in.
	Dh DEC	Dh FRAC	Dh mm	Ds		WH	FH			T	S	
WSL-62 A	.625	5/8	15.9	.450	6	.055	.180	2.5	3	.010	.058	48
WSL-62 B	.625	5/8	15.9	.450	6	.068	.240	2.5	4	.010	.058	35
WSL-62 C	.625	5/8	15.9	.450	6	.085	.300	2.5	5	.010	.058	28
WSL-62 D	.625	5/8	15.9	.450	6	.106	.360	2.5	6	.010	.058	24
WSL-62 E	.625	5/8	15.9	.450	6	.128	.420	2.5	7	.010	.058	21
WSL-62 F	.625	5/8	15.9	.450	6	.165	.540	2.5	9	.010	.058	16
WSL-62 G	.625	5/8	15.9	.450	6	.202	.660	2.5	11	.010	.058	13
WSL-62 H	.625	5/8	15.9	.450	6	.238	.780	2.5	13	.010	.058	11
WSM-62 A	.625	5/8	15.9	.450	12	.104	.180	3.5	3	.010	.058	158
WSM-62 B	.625	5/8	15.9	.450	12	.130	.240	3.5	4	.010	.058	109
WSM-62 C	.625	5/8	15.9	.450	12	.175	.300	3.5	5	.010	.058	96
WSM-62 D	.625	5/8	15.9	.450	12	.206	.360	3.5	6	.010	.058	78
WSM-62 E	.625	5/8	15.9	.450	12	.246	.420	3.5	7	.010	.058	69
WSM-62 F	.625	5/8	15.9	.450	12	.317	.540	3.5	9	.010	.058	54
WSM-62 G	.625	5/8	15.9	.450	12	.386	.660	3.5	11	.010	.058	44
WSM-62 H	.625	5/8	15.9	.450	12	.454	.780	3.5	13	.010	.058	37
WSL-75 A	.750	3/4	19.0	.550	7	.142	.250	3.5	3	.008	.071	65
WSL-75 B	.750	3/4	19.0	.550	7	.187	.333	3.5	4	.008	.071	48
WSL-75 C	.750	3/4	19.0	.550	7	.246	.417	3.5	5	.008	.071	41
WSL-75 D	.750	3/4	19.0	.550	7	.285	.500	3.5	6	.008	.071	33
WSL-75 E	.750	3/4	19.0	.550	7	.348	.583	3.5	7	.008	.071	30
WSL-75 F	.750	3/4	19.0	.550	7	.446	.750	3.5	9	.008	.071	23
WSL-75 G	.750	3/4	19.0	.550	7	.580	1.000	3.5	12	.008	.071	17
WSM-75 A	.750	3/4	19.0	.550	13	.159	.250	3.5	3	.010	.078	143
WSM-75 B	.750	3/4	19.0	.550	13	.203	.333	3.5	4	.010	.078	100
WSM-75 C	.750	3/4	19.0	.550	13	.270	.417	3.5	5	.010	.078	88
WSM-75 D	.750	3/4	19.0	.550	13	.314	.500	3.5	6	.010	.078	70
WSM-75 E	.750	3/4	19.0	.550	13	.381	.583	3.5	7	.010	.078	64
WSM-75 F	.750	3/4	19.0	.550	13	.489	.750	3.5	9	.010	.078	50
WSM-75 G	.750	3/4	19.0	.550	13	.649	1.000	3.5	12	.010	.078	37
WSR-75 A	.750	3/4	19.0	.550	22	.169	.250	3.5	3	.013	.079	272
WSR-75 B	.750	3/4	19.0	.550	22	.215	.333	3.5	4	.013	.079	186
WSR-75 C	.750	3/4	19.0	.550	22	.291	.417	3.5	5	.013	.079	175
WSR-75 D	.750	3/4	19.0	.550	22	.335	.500	3.5	6	.013	.079	133
WSR-75 E	.750	3/4	19.0	.550	22	.405	.583	3.5	7	.013	.079	124
WSR-75 F	.750	3/4	19.0	.550	22	.526	.750	3.5	9	.013	.079	98
WSR-75 G	.750	3/4	19.0	.550	22	.699	1.000	3.5	12	.013	.079	73

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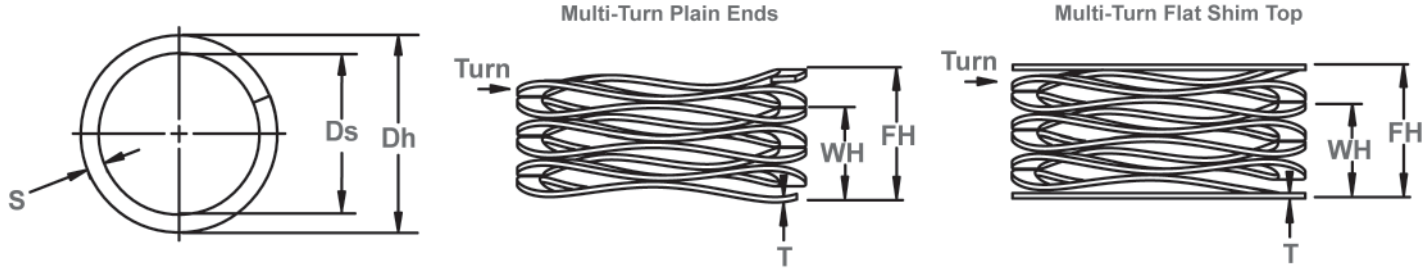
WSL, WSM, WSR Wave Springs

Multi Turn, Inch

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER			SHAFT DIAMETER CLEARANCE	LOAD (lbs.)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. Lb/in.
	Dh DEC	Dh FRAC	Dh mm	Ds		WH	FH			T	S	
WSL-87 A	.875	7/8	22.2	.600	12	.117	.250	3.5	3	.010	.086	90
WSL-87 B	.875	7/8	22.2	.600	12	.158	.333	3.5	4	.010	.086	69
WSL-87 C	.875	7/8	22.2	.600	12	.207	.417	3.5	5	.010	.086	57
WSL-87 D	.875	7/8	22.2	.600	12	.242	.500	3.5	6	.010	.086	47
WSL-87 E	.875	7/8	22.2	.600	12	.287	.583	3.5	7	.010	.086	41
WSL-87 F	.875	7/8	22.2	.600	12	.378	.750	3.5	9	.010	.086	32
WSL-87 G	.875	7/8	22.2	.600	12	.498	1.000	3.5	12	.010	.086	24
WSM-87 A	.875	7/8	22.2	.600	18	.124	.250	3.5	3	.012	.094	148
WSM-87 B	.875	7/8	22.2	.600	18	.164	.333	3.5	4	.012	.094	108
WSM-87 C	.875	7/8	22.2	.600	18	.214	.417	3.5	5	.012	.094	89
WSM-87 D	.875	7/8	22.2	.600	18	.252	.500	3.5	6	.012	.094	76
WSM-87 E	.875	7/8	22.2	.600	18	.296	.583	3.5	7	.012	.094	66
WSM-87 F	.875	7/8	22.2	.600	18	.385	.750	3.5	9	.012	.094	50
WSM-87 G	.875	7/8	22.2	.600	18	.509	1.000	3.5	12	.012	.094	38
WSR-87 A	.875	7/8	22.2	.600	25	.166	.250	3.5	3	.015	.094	298
WSR-87 B	.875	7/8	22.2	.600	25	.214	.333	3.5	4	.015	.094	210
WSR-87 C	.875	7/8	22.2	.600	25	.278	.417	3.5	5	.015	.094	180
WSR-87 D	.875	7/8	22.2	.600	25	.327	.500	3.5	6	.015	.094	145
WSR-87 E	.875	7/8	22.2	.600	25	.395	.583	3.5	7	.015	.094	133
WSR-87 F	.875	7/8	22.2	.600	25	.510	.750	3.5	9	.015	.094	104
WSR-87 G	.875	7/8	22.2	.600	25	.670	1.000	3.5	12	.015	.094	78
WSL-100 A	1.000	1	25.4	.730	12	.084	.250	3.5	3	.010	.086	72
WSL-100 B	1.000	1	25.4	.730	12	.108	.333	3.5	4	.010	.086	53
WSL-100 C	1.000	1	25.4	.730	12	.145	.417	3.5	5	.010	.086	44
WSL-100 D	1.000	1	25.4	.730	12	.165	.500	3.5	6	.010	.086	36
WSL-100 E	1.000	1	25.4	.730	12	.201	.583	3.5	7	.010	.086	31
WSL-100 F	1.000	1	25.4	.730	12	.258	.750	3.5	9	.010	.086	24
WSL-100 G	1.000	1	25.4	.730	12	.342	1.000	3.5	12	.010	.086	18
WSL-100 H	1.000	1	25.4	.730	12	.445	1.250	3.5	15	.010	.086	15
WSL-100 I	1.000	1	25.4	.730	12	.519	1.500	3.5	18	.010	.086	12
WSL-100 J	1.000	1	25.4	.730	12	.633	1.750	3.5	21	.010	.086	11
WSL-100 K	1.000	1	25.4	.730	12	.710	2.000	3.5	24	.010	.086	9

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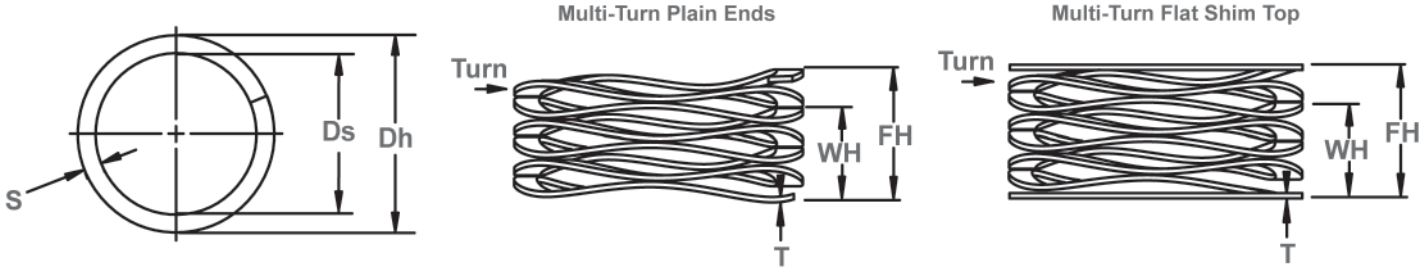

Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER			SHAFT DIAMETER CLEARANCE	LOAD (lbs.)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. Lb/in.
	Dh DEC	Dh FRAC	Dh mm	Ds		WH	FH			T	S	
WSM-100 A	1.000	1	25.4	.730	18	.087	.250	3.5	3	.012	.094	110
WSM-100 B	1.000	1	25.4	.730	18	.113	.333	3.5	4	.012	.094	82
WSM-100 C	1.000	1	25.4	.730	18	.148	.417	3.5	5	.012	.094	67
WSM-100 D	1.000	1	25.4	.730	18	.175	.500	3.5	6	.012	.094	55
WSM-100 E	1.000	1	25.4	.730	18	.212	.583	3.5	7	.012	.094	49
WSM-100 F	1.000	1	25.4	.730	18	.276	.750	3.5	9	.012	.094	38
WSM-100 G	1.000	1	25.4	.730	18	.360	1.000	3.5	12	.012	.094	28
WSM-100 H	1.000	1	25.4	.730	18	.452	1.250	3.5	15	.012	.094	23
WSM-100 I	1.000	1	25.4	.730	18	.549	1.500	3.5	18	.012	.094	19
WSM-100 J	1.000	1	25.4	.730	18	.650	1.750	3.5	21	.012	.094	16
WSM-100 K	1.000	1	25.4	.730	18	.720	2.000	3.5	24	.012	.094	14
WSR-100 A	1.000	1	25.4	.730	25	.131	.250	3.5	3	.015	.094	210
WSR-100 B	1.000	1	25.4	.730	25	.174	.333	3.5	4	.015	.094	157
WSR-100 C	1.000	1	25.4	.730	25	.227	.417	3.5	5	.015	.094	132
WSR-100 D	1.000	1	25.4	.730	25	.266	.500	3.5	6	.015	.094	107
WSR-100 E	1.000	1	25.4	.730	25	.319	.583	3.5	7	.015	.094	95
WSR-100 F	1.000	1	25.4	.730	25	.406	.750	3.5	9	.015	.094	73
WSR-100 G	1.000	1	25.4	.730	25	.541	1.000	3.5	12	.015	.094	54
WSR-100 H	1.000	1	25.4	.730	25	.688	1.250	3.5	15	.015	.094	45
WSR-100 I	1.000	1	25.4	.730	25	.813	1.500	3.5	18	.015	.094	36
WSR-100 J	1.000	1	25.4	.730	25	.957	1.750	3.5	21	.015	.094	32
WSR-100 K	1.000	1	25.4	.730	25	1.083	2.000	3.5	24	.015	.094	27
WSL-112 A	1.125	1-1/8	28.6	.850	12	.146	.300	3.5	3	.012	.094	78
WSL-112 B	1.125	1-1/8	28.6	.850	12	.186	.400	3.5	4	.012	.094	56
WSL-112 C	1.125	1-1/8	28.6	.850	12	.250	.500	3.5	5	.012	.094	48
WSL-112 D	1.125	1-1/8	28.6	.850	12	.295	.600	3.5	6	.012	.094	39
WSL-112 E	1.125	1-1/8	28.6	.850	12	.344	.700	3.5	7	.012	.094	34
WSL-112 F	1.125	1-1/8	28.6	.850	12	.392	.800	3.5	8	.012	.094	29
WSL-112 G	1.125	1-1/8	28.6	.850	12	.488	1.000	3.5	10	.012	.094	23
WSL-112 H	1.125	1-1/8	28.6	.850	12	.659	1.300	3.5	13	.012	.094	19
WSL-112 I	1.125	1-1/8	28.6	.850	12	.807	1.600	3.5	16	.012	.094	15
WSL-112 J	1.125	1-1/8	28.6	.850	12	1.017	2.000	3.5	20	.012	.094	12
WSM-112 A	1.125	1-1/8	28.6	.850	20	.160	.300	3.5	3	.015	.094	143
WSM-112 B	1.125	1-1/8	28.6	.850	20	.202	.400	3.5	4	.015	.094	101
WSM-112 C	1.125	1-1/8	28.6	.850	20	.270	.500	3.5	5	.015	.094	87
WSM-112 D	1.125	1-1/8	28.6	.850	20	.318	.600	3.5	6	.015	.094	71
WSM-112 E	1.125	1-1/8	28.6	.850	20	.381	.700	3.5	7	.015	.094	63
WSM-112 F	1.125	1-1/8	28.6	.850	20	.427	.800	3.5	8	.015	.094	54
WSM-112 G	1.125	1-1/8	28.6	.850	20	.536	1.000	3.5	10	.015	.094	43
WSM-112 H	1.125	1-1/8	28.6	.850	20	.708	1.300	3.5	13	.015	.094	34
WSM-112 I	1.125	1-1/8	28.6	.850	20	.861	1.600	3.5	16	.015	.094	27
WSM-112 J	1.125	1-1/8	28.6	.850	20	1.088	2.000	3.5	20	.015	.094	22

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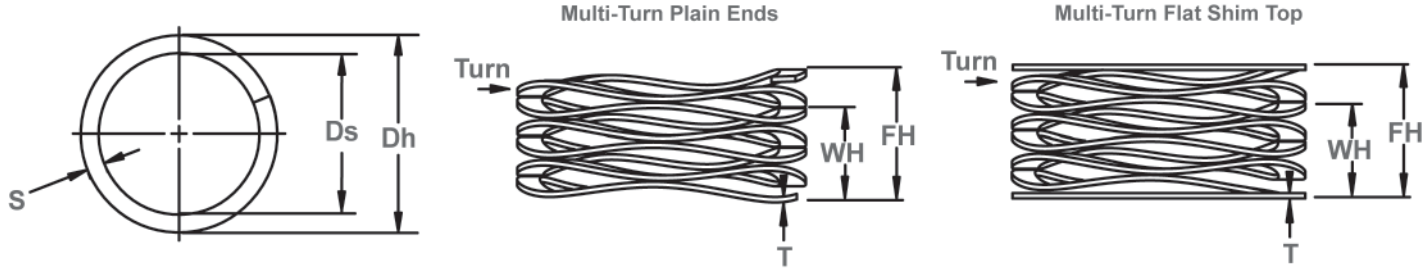

Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER			SHAFT DIAMETER CLEARANCE	LOAD (lbs.)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. Lb/in.
	Dh DEC	Dh FRAC	Dh mm	Ds		WH	FH			T	S	
WSR-112 A	1.125	1-1/8	28.6	.850	30	.178	.300	3.5	3	.018	.094	246
WSR-112 B	1.125	1-1/8	28.6	.850	30	.229	.400	3.5	4	.018	.094	175
WSR-112 C	1.125	1-1/8	28.6	.850	30	.303	.500	3.5	5	.018	.094	152
WSR-112 D	1.125	1-1/8	28.6	.850	30	.350	.600	3.5	6	.018	.094	120
WSR-112 E	1.125	1-1/8	28.6	.850	30	.421	.700	3.5	7	.018	.094	108
WSR-112 F	1.125	1-1/8	28.6	.850	30	.470	.800	3.5	8	.018	.094	91
WSR-112 G	1.125	1-1/8	28.6	.850	30	.593	1.000	3.5	10	.018	.094	74
WSR-112 H	1.125	1-1/8	28.6	.850	30	.787	1.300	3.5	13	.018	.094	58
WSR-112 I	1.125	1-1/8	28.6	.850	30	.956	1.600	3.5	16	.018	.094	47
WSR-112 J	1.125	1-1/8	28.6	.850	30	1.202	2.000	3.5	20	.018	.094	38
WSL-125 A	1.250	1-1/4	31.7	1.000	12	.084	.300	3.5	3	.012	.094	56
WSL-125 B	1.250	1-1/4	31.7	1.000	12	.113	.400	3.5	4	.012	.094	42
WSL-125 C	1.250	1-1/4	31.7	1.000	12	.149	.500	3.5	5	.012	.094	34
WSL-125 D	1.250	1-1/4	31.7	1.000	12	.172	.600	3.5	6	.012	.094	28
WSL-125 E	1.250	1-1/4	31.7	1.000	12	.207	.700	3.5	7	.012	.094	24
WSL-125 F	1.250	1-1/4	31.7	1.000	12	.227	.800	3.5	8	.012	.094	21
WSL-125 G	1.250	1-1/4	31.7	1.000	12	.301	1.000	3.5	10	.012	.094	17
WSL-125 H	1.250	1-1/4	31.7	1.000	12	.395	1.300	3.5	13	.012	.094	13
WSL-125 I	1.250	1-1/4	31.7	1.000	12	.467	1.600	3.5	16	.012	.094	11
WSL-125 J	1.250	1-1/4	31.7	1.000	12	.591	2.000	3.5	20	.012	.094	9
WSM-125 A	1.250	1-1/4	31.7	1.000	20	.124	.300	3.5	3	.015	.094	114
WSM-125 B	1.250	1-1/4	31.7	1.000	20	.165	.400	3.5	4	.015	.094	85
WSM-125 C	1.250	1-1/4	31.7	1.000	20	.215	.500	3.5	5	.015	.094	70
WSM-125 D	1.250	1-1/4	31.7	1.000	20	.253	.600	3.5	6	.015	.094	58
WSM-125 E	1.250	1-1/4	31.7	1.000	20	.303	.700	3.5	7	.015	.094	50
WSM-125 F	1.250	1-1/4	31.7	1.000	20	.341	.800	3.5	8	.015	.094	44
WSM-125 G	1.250	1-1/4	31.7	1.000	20	.427	1.000	3.5	10	.015	.094	35
WSM-125 H	1.250	1-1/4	31.7	1.000	20	.577	1.300	3.5	13	.015	.094	28
WSM-125 I	1.250	1-1/4	31.7	1.000	20	.692	1.600	3.5	16	.015	.094	22
WSM-125 J	1.250	1-1/4	31.7	1.000	20	.866	2.000	3.5	20	.015	.094	18
WSR-125 A	1.250	1-1/4	31.7	1.000	30	.158	.300	3.5	3	.019	.094	210
WSR-125 B	1.250	1-1/4	31.7	1.000	30	.210	.400	3.5	4	.019	.094	158
WSR-125 C	1.250	1-1/4	31.7	1.000	30	.272	.500	3.5	5	.019	.094	132
WSR-125 D	1.250	1-1/4	31.7	1.000	30	.320	.600	3.5	6	.019	.094	107
WSR-125 E	1.250	1-1/4	31.7	1.000	30	.384	.700	3.5	7	.019	.094	95
WSR-125 F	1.250	1-1/4	31.7	1.000	30	.433	.800	3.5	8	.019	.094	82
WSR-125 G	1.250	1-1/4	31.7	1.000	30	.538	1.000	3.5	10	.019	.094	65
WSR-125 H	1.250	1-1/4	31.7	1.000	30	.717	1.300	3.5	13	.019	.094	51
WSR-125 I	1.250	1-1/4	31.7	1.000	30	.878	1.600	3.5	16	.019	.094	42
WSR-125 J	1.250	1-1/4	31.7	1.000	30	1.103	2.000	3.5	20	.019	.094	33

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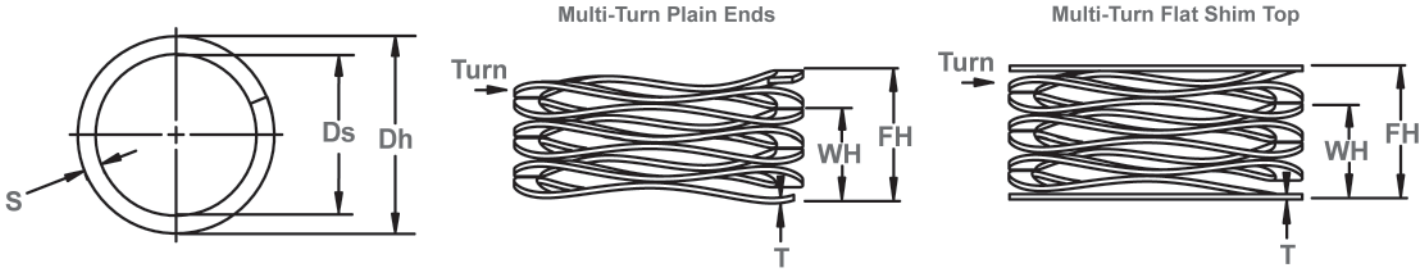
TRU-WAVE



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	Dh DEC	Dh FRAC	Dh mm	Ds		WH	FH			T	S	
WSL-137 A	1.375	1-3/8	34.9	1.030	15	.075	.300	3.5	3	.012	.122	67
WSL-137 B	1.375	1-3/8	34.9	1.030	15	.099	.400	3.5	4	.012	.122	50
WSL-137 C	1.375	1-3/8	34.9	1.030	15	.129	.500	3.5	5	.012	.122	40
WSL-137 D	1.375	1-3/8	34.9	1.030	15	.155	.600	3.5	6	.012	.122	34
WSL-137 E	1.375	1-3/8	34.9	1.030	15	.179	.700	3.5	7	.012	.122	29
WSL-137 F	1.375	1-3/8	34.9	1.030	15	.206	.800	3.5	8	.012	.122	25
WSL-137 G	1.375	1-3/8	34.9	1.030	15	.256	1.000	3.5	10	.012	.122	20
WSL-137 H	1.375	1-3/8	34.9	1.030	15	.341	1.300	3.5	13	.012	.122	16
WSL-137 I	1.375	1-3/8	34.9	1.030	15	.424	1.600	3.5	16	.012	.122	13
WSL-137 J	1.375	1-3/8	34.9	1.030	15	.530	2.000	3.5	20	.012	.122	10
WSM-137 A	1.375	1-3/8	34.9	1.030	25	.142	.300	3.5	3	.016	.133	158
WSM-137 B	1.375	1-3/8	34.9	1.030	25	.186	.400	3.5	4	.016	.133	117
WSM-137 C	1.375	1-3/8	34.9	1.030	25	.240	.500	3.5	5	.016	.133	96
WSM-137 D	1.375	1-3/8	34.9	1.030	25	.281	.600	3.5	6	.016	.133	78
WSM-137 E	1.375	1-3/8	34.9	1.030	25	.340	.700	3.5	7	.016	.133	69
WSM-137 F	1.375	1-3/8	34.9	1.030	25	.384	.800	3.5	8	.016	.133	60
WSM-137 G	1.375	1-3/8	34.9	1.030	25	.486	1.000	3.5	10	.016	.133	49
WSM-137 H	1.375	1-3/8	34.9	1.030	25	.632	1.300	3.5	13	.016	.133	37
WSM-137 I	1.375	1-3/8	34.9	1.030	25	.788	1.600	3.5	16	.016	.133	31
WSM-137 J	1.375	1-3/8	34.9	1.030	25	.982	2.000	3.5	20	.016	.133	25
WSR-137 A	1.375	1-3/8	34.9	1.030	35	.149	.300	3.5	3	.018	.133	232
WSR-137 B	1.375	1-3/8	34.9	1.030	35	.189	.400	3.5	4	.018	.133	166
WSR-137 C	1.375	1-3/8	34.9	1.030	35	.247	.500	3.5	5	.018	.133	138
WSR-137 D	1.375	1-3/8	34.9	1.030	35	.287	.600	3.5	6	.018	.133	112
WSR-137 E	1.375	1-3/8	34.9	1.030	35	.343	.700	3.5	7	.018	.133	98
WSR-137 F	1.375	1-3/8	34.9	1.030	35	.390	.800	3.5	8	.018	.133	85
WSR-137 G	1.375	1-3/8	34.9	1.030	35	.490	1.000	3.5	10	.018	.133	69
WSR-137 H	1.375	1-3/8	34.9	1.030	35	.646	1.300	3.5	13	.018	.133	54
WSR-137 I	1.375	1-3/8	34.9	1.030	35	.793	1.600	3.5	16	.018	.133	43
WSR-137 J	1.375	1-3/8	34.9	1.030	35	1.000	2.000	3.5	20	.018	.133	35
WSL-150 A	1.500	1-1/2	38.1	1.140	20	.129	.300	3.5	3	.016	.133	117
WSL-150 B	1.500	1-1/2	38.1	1.140	20	.164	.400	3.5	4	.016	.133	85
WSL-150 C	1.500	1-1/2	38.1	1.140	20	.213	.500	3.5	5	.016	.133	70
WSL-150 D	1.500	1-1/2	38.1	1.140	20	.247	.600	3.5	6	.016	.133	57
WSL-150 E	1.500	1-1/2	38.1	1.140	20	.301	.700	3.5	7	.016	.133	50
WSL-150 F	1.500	1-1/2	38.1	1.140	20	.337	.800	3.5	8	.016	.133	43
WSL-150 G	1.500	1-1/2	38.1	1.140	20	.430	1.000	3.5	10	.016	.133	35
WSL-150 H	1.500	1-1/2	38.1	1.140	20	.565	1.300	3.5	13	.016	.133	27
WSL-150 I	1.500	1-1/2	38.1	1.140	20	.694	1.600	3.5	16	.016	.133	22
WSL-150 J	1.500	1-1/2	38.1	1.140	20	.866	2.000	3.5	20	.016	.133	18

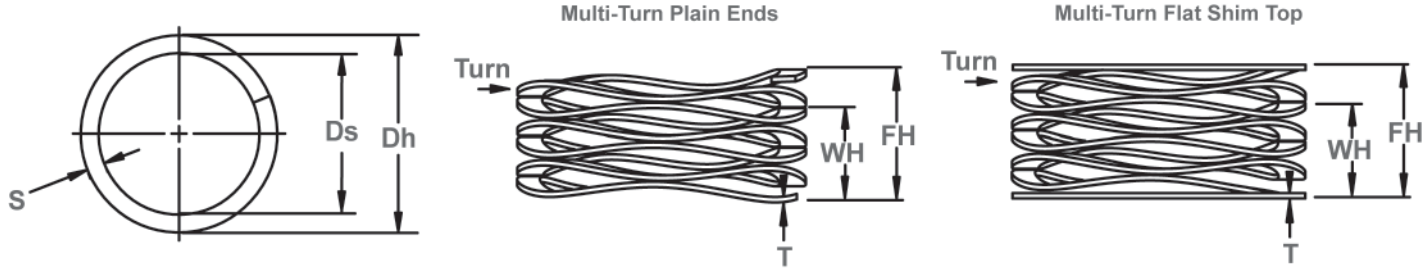
PART NUMBERS SHOWN REFLECT MULTI-TURN WAVE SPRINGS WITH PLAIN ENDS.
THE LETTERS SHOWN AFTER THE PART NUMBERS REPRESENT THE NUMBER OF TURNS. WHEN ORDERING, PARTS SHOULD BE PRESENTED WITH THE PART NUMBER, FOLLOWED BY THE MATERIAL, AND THEN THE NUMBER OF TURNS (i.e. WSL-37ST A, WSM-50ST B, WSR-75ST C, ETC.)
FOR FLAT SHIM TOP WAVE SPRINGS, ADD AN 'F' TO THE END OF THE PART NUMBER (i.e. WSL-37ST AF, WSM-50ST BF, WSR-75ST CF, ETC.)

MATERIAL CODES: ST = CARBON STEEL. SQ = 17-7 PH/C STAINLESS STEEL. SPECIAL ALLOYS AVAILABLE UPON REQUEST.

WSL, WSM, WSR Wave Springs

Multi Turn, Inch

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER			SHAFT DIAMETER CLEARANCE	LOAD (lbs.)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. Lb/in.
	Dh DEC	Dh FRAC	Dh mm	Ds		WH	FH			T	S	
WSM-150 A	1.500	1-1/2	38.1	1.140	35	.122	.300	3.5	3	.018	.133	197
WSM-150 B	1.500	1-1/2	38.1	1.140	35	.158	.400	3.5	4	.018	.133	145
WSM-150 C	1.500	1-1/2	38.1	1.140	35	.206	.500	3.5	5	.018	.133	119
WSM-150 D	1.500	1-1/2	38.1	1.140	35	.241	.600	3.5	6	.018	.133	97
WSM-150 E	1.500	1-1/2	38.1	1.140	35	.291	.700	3.5	7	.018	.133	86
WSM-150 F	1.500	1-1/2	38.1	1.140	35	.324	.800	3.5	8	.018	.133	74
WSM-150 G	1.500	1-1/2	38.1	1.140	35	.409	1.000	3.5	10	.018	.133	59
WSM-150 H	1.500	1-1/2	38.1	1.140	35	.540	1.300	3.5	13	.018	.133	46
WSM-150 I	1.500	1-1/2	38.1	1.140	35	.657	1.600	3.5	16	.018	.133	37
WSM-150 J	1.500	1-1/2	38.1	1.140	35	.835	2.000	3.5	20	.018	.133	30
WSR-150 A	1.500	1-1/2	38.1	1.140	60	.166	.300	4.5	3	.018	.133	448
WSR-150 B	1.500	1-1/2	38.1	1.140	60	.216	.400	4.5	4	.018	.133	326
WSR-150 C	1.500	1-1/2	38.1	1.140	60	.278	.500	4.5	5	.018	.133	270
WSR-150 D	1.500	1-1/2	38.1	1.140	60	.329	.600	4.5	6	.018	.133	221
WSR-150 E	1.500	1-1/2	38.1	1.140	60	.390	.700	4.5	7	.018	.133	194
WSR-150 F	1.500	1-1/2	38.1	1.140	60	.443	.800	4.5	8	.018	.133	168
WSR-150 G	1.500	1-1/2	38.1	1.140	60	.555	1.000	4.5	10	.018	.133	135
WSR-150 H	1.500	1-1/2	38.1	1.140	60	.726	1.300	4.5	13	.018	.133	105
WSR-150 I	1.500	1-1/2	38.1	1.140	60	.890	1.600	4.5	16	.018	.133	85
WSR-150 J	1.500	1-1/2	38.1	1.140	60	1.119	2.000	4.5	20	.018	.133	68
WSL-175 A	1.750	1-3/4	44.4	1.340	25	.155	.375	3.5	3	.018	.143	114
WSL-175 B	1.750	1-3/4	44.4	1.340	25	.200	.500	3.5	4	.018	.143	83
WSL-175 C	1.750	1-3/4	44.4	1.340	25	.265	.625	3.5	5	.018	.143	69
WSL-175 D	1.750	1-3/4	44.4	1.340	25	.310	.750	3.5	6	.018	.143	57
WSL-175 E	1.750	1-3/4	44.4	1.340	25	.367	.870	3.5	7	.018	.143	50
WSL-175 F	1.750	1-3/4	44.4	1.340	25	.415	1.000	3.5	8	.018	.143	43
WSL-175 G	1.750	1-3/4	44.4	1.340	25	.523	1.250	3.5	10	.018	.143	34
WSL-175 H	1.750	1-3/4	44.4	1.340	25	.638	1.500	3.5	12	.018	.143	29
WSL-175 I	1.750	1-3/4	44.4	1.340	25	.737	1.750	3.5	14	.018	.143	25
WSL-175 J	1.750	1-3/4	44.4	1.340	25	.844	2.000	3.5	16	.018	.143	22
WSM-175 A	1.750	1-3/4	44.4	1.340	50	.188	.375	4.5	3	.018	.143	267
WSM-175 B	1.750	1-3/4	44.4	1.340	50	.244	.500	4.5	4	.018	.143	195
WSM-175 C	1.750	1-3/4	44.4	1.340	50	.315	.625	4.5	5	.018	.143	161
WSM-175 D	1.750	1-3/4	44.4	1.340	50	.374	.750	4.5	6	.018	.143	133
WSM-175 E	1.750	1-3/4	44.4	1.340	50	.452	.870	4.5	7	.018	.143	120
WSM-175 F	1.750	1-3/4	44.4	1.340	50	.505	1.000	4.5	8	.018	.143	101
WSM-175 G	1.750	1-3/4	44.4	1.340	50	.629	1.250	4.5	10	.018	.143	81
WSM-175 H	1.750	1-3/4	44.4	1.340	50	.768	1.500	4.5	12	.018	.143	68
WSM-175 I	1.750	1-3/4	44.4	1.340	50	.899	1.750	4.5	14	.018	.143	59
WSM-175 J	1.750	1-3/4	44.4	1.340	50	1.026	2.000	4.5	16	.018	.143	51

PART NUMBERS SHOWN REFLECT MULTI-TURN WAVE SPRINGS WITH PLAIN ENDS.
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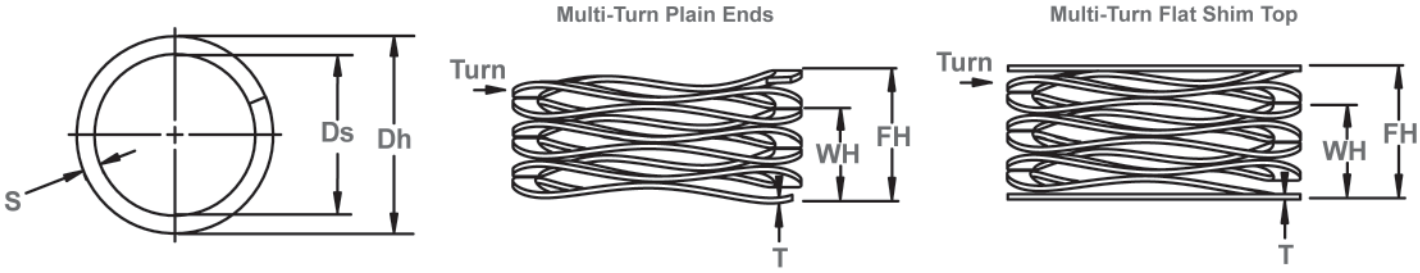
MATERIAL CODES: ST = CARBON STEEL. SQ = 17-7 PH/C STAINLESS STEEL. SPECIAL ALLOYS AVAILABLE UPON REQUEST.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER			SHAFT DIAMETER CLEARANCE	LOAD (lbs.)	WORK HEIGHT	FREE HEIGHT Ref.	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS	SECTION	SPRING RATE Ref. Lb/in.
	Dh DEC	Dh FRAC	Dh mm	Ds		WH	FH			T	S	
WSR-175 A	1.750	1-3/4	44.4	1.340	90	.232	.375	4.5	3	.024	.148	629
WSR-175 B	1.750	1-3/4	44.4	1.340	90	.314	.500	4.5	4	.024	.148	484
WSR-175 C	1.750	1-3/4	44.4	1.340	90	.409	.625	4.5	5	.024	.148	417
WSR-175 D	1.750	1-3/4	44.4	1.340	90	.482	.750	4.5	6	.024	.148	336
WSR-175 E	1.750	1-3/4	44.4	1.340	90	.577	.870	4.5	7	.024	.148	307
WSR-175 F	1.750	1-3/4	44.4	1.340	90	.651	1.000	4.5	8	.024	.148	258
WSR-175 G	1.750	1-3/4	44.4	1.340	90	.813	1.250	4.5	10	.024	.148	206
WSR-175 H	1.750	1-3/4	44.4	1.340	90	.980	1.500	4.5	12	.024	.148	173
WSR-175 I	1.750	1-3/4	44.4	1.340	90	1.147	1.750	4.5	14	.024	.148	149
WSR-175 J	1.750	1-3/4	44.4	1.340	90	1.317	2.000	4.5	16	.024	.148	132
WSL-200 A	2.000	2	50.8	1.600	25	.094	.375	3.5	3	.018	.143	89
WSL-200 B	2.000	2	50.8	1.600	25	.120	.500	3.5	4	.018	.143	66
WSL-200 C	2.000	2	50.8	1.600	25	.158	.625	3.5	5	.018	.143	54
WSL-200 D	2.000	2	50.8	1.600	25	.179	.750	3.5	6	.018	.143	44
WSL-200 E	2.000	2	50.8	1.600	25	.217	.870	3.5	7	.018	.143	38
WSL-200 F	2.000	2	50.8	1.600	25	.243	1.000	3.5	8	.018	.143	33
WSL-200 G	2.000	2	50.8	1.600	25	.306	1.250	3.5	10	.018	.143	26
WSL-200 H	2.000	2	50.8	1.600	25	.365	1.500	3.5	12	.018	.143	22
WSL-200 I	2.000	2	50.8	1.600	25	.433	1.750	3.5	14	.018	.143	19
WSL-200 J	2.000	2	50.8	1.600	25	.490	2.000	3.5	16	.018	.143	17
WSM-200 A	2.000	2	50.8	1.600	50	.140	.375	4.5	3	.018	.143	213
WSM-200 B	2.000	2	50.8	1.600	50	.184	.500	4.5	4	.018	.143	158
WSM-200 C	2.000	2	50.8	1.600	50	.245	.625	4.5	5	.018	.143	132
WSM-200 D	2.000	2	50.8	1.600	50	.278	.750	4.5	6	.018	.143	106
WSM-200 E	2.000	2	50.8	1.600	50	.345	.870	4.5	7	.018	.143	95
WSM-200 F	2.000	2	50.8	1.600	50	.395	1.000	4.5	8	.018	.143	83
WSM-200 G	2.000	2	50.8	1.600	50	.498	1.250	4.5	10	.018	.143	66
WSM-200 H	2.000	2	50.8	1.600	50	.593	1.500	4.5	12	.018	.143	55
WSM-200 I	2.000	2	50.8	1.600	50	.694	1.750	4.5	14	.018	.143	47
WSM-200 J	2.000	2	50.8	1.600	50	.800	2.000	4.5	16	.018	.143	42
WSR-200 A	2.000	2	50.8	1.600	90	.197	.375	4.5	3	.024	.148	506
WSR-200 B	2.000	2	50.8	1.600	90	.258	.500	4.5	4	.024	.148	372
WSR-200 C	2.000	2	50.8	1.600	90	.332	.625	4.5	5	.024	.148	307
WSR-200 D	2.000	2	50.8	1.600	90	.389	.750	4.5	6	.024	.148	249
WSR-200 E	2.000	2	50.8	1.600	90	.465	.870	4.5	7	.024	.148	222
WSR-200 F	2.000	2	50.8	1.600	90	.525	1.000	4.5	8	.024	.148	189
WSR-200 G	2.000	2	50.8	1.600	90	.661	1.250	4.5	10	.024	.148	153
WSR-200 H	2.000	2	50.8	1.600	90	.781	1.500	4.5	12	.024	.148	125
WSR-200 I	2.000	2	50.8	1.600	90	.941	1.750	4.5	14	.024	.148	111
WSR-200 J	2.000	2	50.8	1.600	90	1.069	2.000	4.5	16	.024	.148	97

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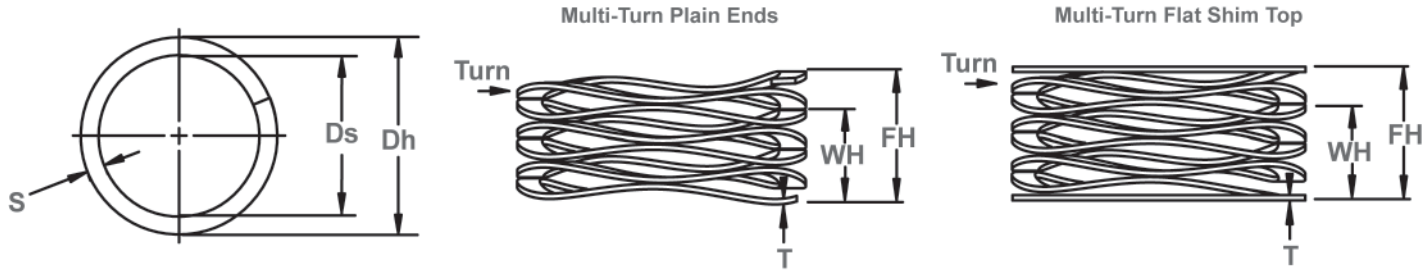
MATERIAL CODES: ST = CARBON STEEL. SQ = 17-7 PH/C STAINLESS STEEL. SPECIAL ALLOYS AVAILABLE UPON REQUEST.

MWL,MWM, MWR Wave Springs

Multi Turn, Metric

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-6 A*	6	4	6	0.61	1.52	2.5	3	0.13	0.51	6.56
MWL-6 B*	6	4	6	0.81	2.03	2.5	4	0.13	0.51	4.92
MWL-6 C*	6	4	6	1.02	2.54	2.5	5	0.13	0.51	3.94
MWL-6 D*	6	4	6	1.22	3.05	2.5	6	0.13	0.51	3.28
MWL-6 E*	6	4	6	1.42	3.56	2.5	7	0.13	0.51	2.81
MWL-6 F*	6	4	6	1.63	4.06	2.5	8	0.13	0.51	2.46
MWL-6 G*	6	4	6	1.83	4.57	2.5	9	0.13	0.51	2.19
MWL-6 H*	6	4	6	2.24	5.59	2.5	11	0.13	0.51	1.79
MWL-6 I*	6	4	6	2.64	6.60	2.5	13	0.13	0.51	1.51
MWM-6 A*	6	4	12	0.74	1.52	2.5	3	0.15	0.61	15.24
MWM-6 B*	6	4	12	0.97	2.03	2.5	4	0.15	0.61	11.25
MWM-6 C*	6	4	12	1.22	2.54	2.5	5	0.15	0.61	9.09
MWM-6 D*	6	4	12	1.47	3.05	2.5	6	0.15	0.61	7.62
MWM-6 E*	6	4	12	1.70	3.56	2.5	7	0.15	0.61	6.47
MWM-6 F*	6	4	12	1.96	4.06	2.5	8	0.15	0.61	5.69
MWM-6 G*	6	4	12	2.18	4.57	2.5	9	0.15	0.61	5.03
MWM-6 H*	6	4	12	2.69	5.59	2.5	11	0.15	0.61	4.14
MWM-6 I*	6	4	12	3.18	6.60	2.5	13	0.15	0.61	3.50
MWL-8 A	8	5	15	1.70	2.82	2.5	3	0.20	0.81	13.42
MWL-8 B	8	5	15	2.39	3.76	2.5	4	0.20	0.81	10.94
MWL-8 C	8	5	15	2.74	4.70	2.5	5	0.20	0.81	7.67
MWL-8 D	8	5	15	3.56	5.64	2.5	6	0.20	0.81	7.20
MWL-8 E	8	5	15	4.01	6.58	2.5	7	0.20	0.81	5.85
MWL-8 F	8	5	15	4.57	7.52	2.5	8	0.20	0.81	5.09
MWL-8 G	8	5	15	5.26	8.46	2.5	9	0.20	0.81	4.69
MWL-8 H	8	5	15	6.35	10.34	2.5	11	0.20	0.81	3.76
MWL-8 I	8	5	15	7.37	12.22	2.5	13	0.20	0.81	3.09
MWM-8 A	8	5	30	1.78	2.82	2.5	3	0.25	0.81	28.81
MWM-8 B	8	5	30	2.54	3.76	2.5	4	0.25	0.81	24.61
MWM-8 C	8	5	30	3.05	4.70	2.5	5	0.25	0.81	18.17
MWM-8 D	8	5	30	3.81	5.64	2.5	6	0.25	0.81	16.40
MWM-8 E	8	5	30	4.32	6.58	2.5	7	0.25	0.81	13.27
MWM-8 F	8	5	30	4.95	7.52	2.5	8	0.25	0.81	11.69
MWM-8 G	8	5	30	5.59	8.46	2.5	9	0.25	0.81	10.45
MWM-8 H	8	5	30	6.86	10.34	2.5	11	0.25	0.81	8.62
MWM-8 I	8	5	30	7.87	12.22	2.5	13	0.25	0.81	6.91

*Not available with shim ends

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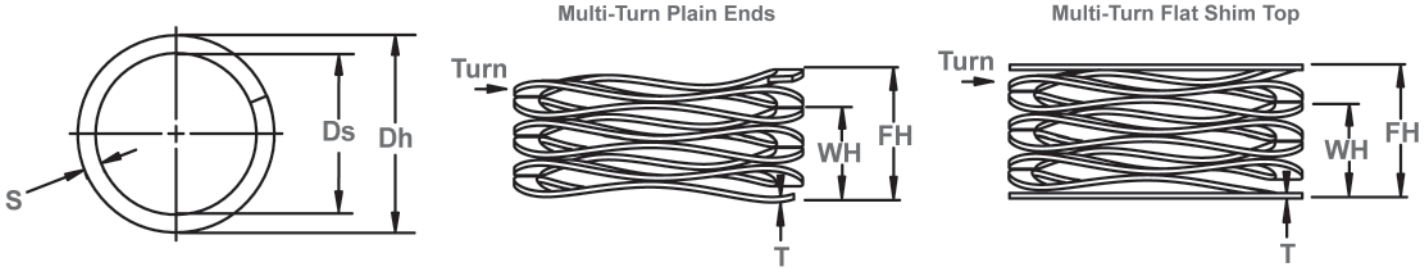

Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-10 A	10	7	18	1.91	3.96	2.5	3	0.20	0.81	8.75
MWL-10 B	10	7	18	2.54	5.28	2.5	4	0.20	0.81	6.56
MWL-10 C	10	7	18	3.15	6.60	2.5	5	0.20	0.81	5.21
MWL-10 D	10	7	18	3.78	7.92	2.5	6	0.20	0.81	4.35
MWL-10 E	10	7	18	4.42	9.25	2.5	7	0.20	0.81	3.73
MWL-10 F	10	7	18	5.05	10.57	2.5	8	0.20	0.81	3.27
MWL-10 G	10	7	18	5.69	11.89	2.5	9	0.20	0.81	2.90
MWL-10 H	10	7	18	6.32	13.21	2.5	10	0.20	0.81	2.61
MWL-10 I	10	7	18	6.96	14.53	2.5	11	0.20	0.81	2.38
MWM-10 A	10	7	35	2.03	3.96	2.5	3	0.28	0.81	18.13
MWM-10 B	10	7	35	2.79	5.28	2.5	4	0.28	0.81	14.06
MWM-10 C	10	7	35	3.56	6.60	2.5	5	0.28	0.81	11.48
MWM-10 D	10	7	35	4.32	7.92	2.5	6	0.28	0.81	9.70
MWM-10 E	10	7	35	5.08	9.25	2.5	7	0.28	0.81	8.40
MWM-10 F	10	7	35	5.84	10.57	2.5	8	0.28	0.81	7.41
MWM-10 G	10	7	35	6.60	11.89	2.5	9	0.28	0.81	6.62
MWM-10 H	10	7	35	7.37	13.21	2.5	10	0.28	0.81	5.99
MWM-10 I	10	7	35	8.13	14.53	2.5	11	0.28	0.81	5.47
MWL-12 A	12	9	20	1.47	4.34	2.5	3	0.20	1.02	6.97
MWL-12 B	12	9	20	1.98	5.79	2.5	4	0.20	1.02	5.25
MWL-12 C	12	9	20	2.46	7.24	2.5	5	0.20	1.02	4.19
MWL-12 D	12	9	20	2.95	8.69	2.5	6	0.20	1.02	3.48
MWL-12 E	12	9	20	3.45	10.13	2.5	7	0.20	1.02	2.99
MWL-12 F	12	9	20	3.94	11.58	2.5	8	0.20	1.02	2.62
MWL-12 G	12	9	20	4.45	13.03	2.5	9	0.20	1.02	2.33
MWL-12 H	12	9	20	4.93	14.48	2.5	10	0.20	1.02	2.09
MWL-12 I	12	9	20	5.44	15.93	2.5	11	0.20	1.02	1.91
MWM-12 A	12	8.5	40	2.36	4.34	2.5	3	0.28	1.17	20.19
MWM-12 B	12	8.5	40	3.18	5.79	2.5	4	0.28	1.17	15.29
MWM-12 C	12	8.5	40	3.96	7.24	2.5	5	0.28	1.17	12.21
MWM-12 D	12	8.5	40	4.75	8.69	2.5	6	0.28	1.17	10.16
MWM-12 E	12	8.5	40	5.54	10.13	2.5	7	0.28	1.17	8.70
MWM-12 F	12	8.5	40	6.32	11.58	2.5	8	0.28	1.17	7.61
MWM-12 G	12	8.5	40	7.11	13.03	2.5	9	0.28	1.17	6.76
MWM-12 H	12	8.5	40	7.92	14.48	2.5	10	0.28	1.17	6.10
MWM-12 I	12	8.5	40	8.71	15.93	2.5	11	0.28	1.17	5.55

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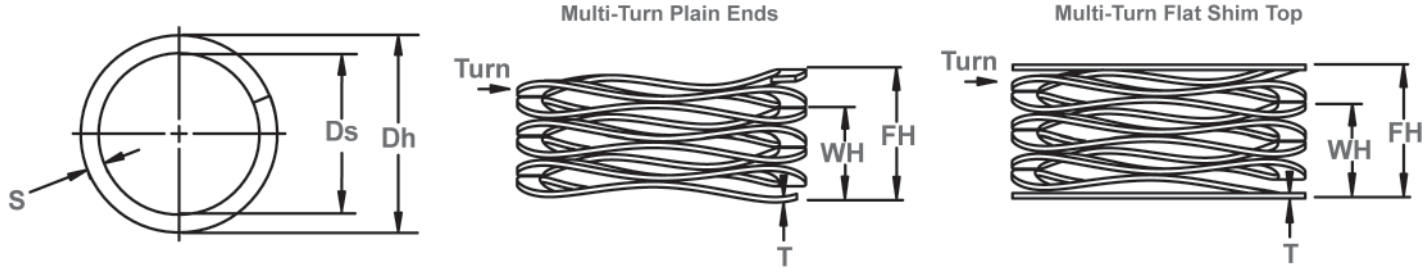
MWL,MWM, MWR Wave Springs

Multi Turn, Metric

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

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MWR-12 A	12	8.5	60	1.98	4.34	2.5	3	0.30	1.14	25.40
MWR-12 B	12	8.5	60	2.64	5.79	2.5	4	0.30	1.14	19.05
MWR-12 C	12	8.5	60	3.30	7.24	2.5	5	0.30	1.14	15.24
MWR-12 D	12	8.5	60	3.99	8.69	2.5	6	0.30	1.14	12.77
MWR-12 E	12	8.5	60	4.65	10.13	2.5	7	0.30	1.14	10.94
MWR-12 F	12	8.5	60	5.31	11.58	2.5	8	0.30	1.14	9.56
MWR-12 G	12	8.5	60	5.97	13.03	2.5	9	0.30	1.14	8.50
MWR-12 H	12	8.5	60	6.63	14.48	2.5	10	0.30	1.14	7.64
MWR-12 I	12	8.5	60	7.29	15.93	2.5	11	0.30	1.14	6.95
MWL-14 A	14	10	22	2.18	4.95	2.5	3	0.23	1.47	7.95
MWL-14 B	14	10	22	2.95	6.60	2.5	4	0.23	1.47	6.01
MWL-14 C	14	10	22	3.71	8.26	2.5	5	0.23	1.47	4.84
MWL-14 D	14	10	22	4.52	9.91	2.5	6	0.23	1.47	4.09
MWL-14 E	14	10	22	5.33	11.56	2.5	7	0.23	1.47	3.54
MWL-14 F	14	10	22	6.17	13.21	2.5	8	0.23	1.47	3.13
MWL-14 G	14	10	22	7.01	14.86	2.5	9	0.23	1.47	2.80
MWL-14 H	14	10	22	7.85	16.51	2.5	10	0.23	1.47	2.54
MWL-14 I	14	10	22	8.71	18.16	2.5	11	0.23	1.47	2.33
MWM-14 A	14	10	50	2.18	4.95	2.5	3	0.30	1.52	18.06
MWM-14 B	14	10	50	2.95	6.60	2.5	4	0.30	1.52	13.67
MWM-14 C	14	10	50	3.71	8.26	2.5	5	0.30	1.52	11.00
MWM-14 D	14	10	50	4.52	9.91	2.5	6	0.30	1.52	9.29
MWM-14 E	14	10	50	5.33	11.56	2.5	7	0.30	1.52	8.03
MWM-14 F	14	10	50	6.17	13.21	2.5	8	0.30	1.52	7.11
MWM-14 G	14	10	50	7.01	14.86	2.5	9	0.30	1.52	6.37
MWM-14 H	14	10	50	7.85	16.51	2.5	10	0.30	1.52	5.77
MWM-14 I	14	10	50	8.71	18.16	2.5	11	0.30	1.52	5.29
MWR-14 A	14	9	80	3.15	4.95	2.5	3	0.38	1.52	44.36
MWR-14 B	14	9	80	4.19	6.60	2.5	4	0.38	1.52	33.15
MWR-14 C	14	9	80	5.26	8.26	2.5	5	0.38	1.52	26.69
MWR-14 D	14	9	80	6.30	9.91	2.5	6	0.38	1.52	22.18
MWR-14 E	14	9	80	7.34	11.56	2.5	7	0.38	1.52	18.97
MWR-14 F	14	9	80	8.41	13.21	2.5	8	0.38	1.52	16.66
MWR-14 G	14	9	80	9.45	14.86	2.5	9	0.38	1.52	14.79
MWR-14 H	14	9	80	10.49	16.51	2.5	10	0.38	1.52	13.29
MWR-14 I	14	9	80	11.56	18.16	2.5	11	0.38	1.52	12.11

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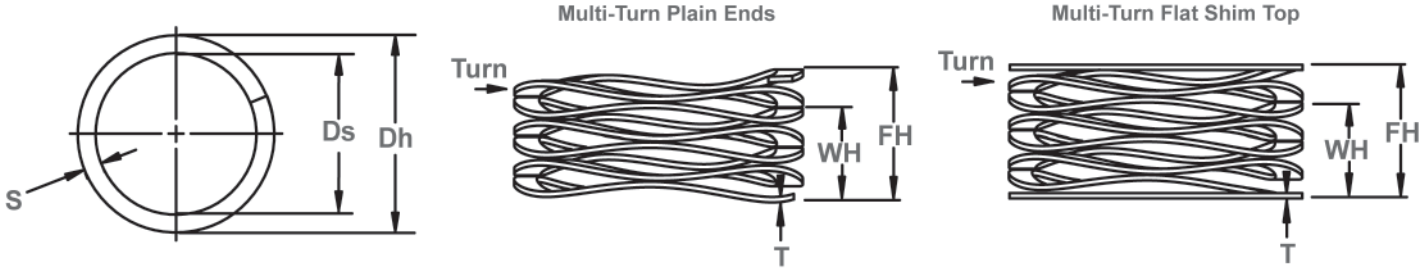

Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-15 A	15	11	25	2.57	5.18	2.5	3	0.25	1.47	9.56
MWL-15 B	15	11	25	3.43	6.91	2.5	4	0.25	1.47	7.18
MWL-15 C	15	11	25	4.27	8.64	2.5	5	0.25	1.47	5.72
MWL-15 D	15	11	25	5.13	10.36	2.5	6	0.25	1.47	4.78
MWL-15 E	15	11	25	5.99	12.09	2.5	7	0.25	1.47	4.10
MWL-15 F	15	11	25	6.83	13.82	2.5	8	0.25	1.47	3.58
MWL-15 G	15	11	25	7.70	15.54	2.5	9	0.25	1.47	3.19
MWL-15 H	15	11	25	8.53	17.27	2.5	10	0.25	1.47	2.86
MWL-15 I	15	11	25	9.40	19.00	2.5	11	0.25	1.47	2.60
MWM-15 A	15	10	50	3.43	5.18	3.5	3	0.23	1.47	28.53
MWM-15 B	15	10	50	4.57	6.91	3.5	4	0.23	1.47	21.40
MWM-15 C	15	10	50	5.72	8.64	3.5	5	0.23	1.47	17.12
MWM-15 D	15	10	50	6.86	10.36	3.5	6	0.23	1.47	14.26
MWM-15 E	15	10	50	8.00	12.09	3.5	7	0.23	1.47	12.23
MWM-15 F	15	10	50	9.14	13.82	3.5	8	0.23	1.47	10.70
MWM-15 G	15	10	50	10.29	15.54	3.5	9	0.23	1.47	9.51
MWM-15 H	15	10	50	11.43	17.27	3.5	10	0.23	1.47	8.56
MWM-15 I	15	10	50	12.57	19.00	3.5	11	0.23	1.47	7.78
MWR-15 A	15	10	80	3.20	5.18	3.5	3	0.25	1.47	40.38
MWR-15 B	15	10	80	4.19	6.91	3.5	4	0.25	1.47	29.44
MWR-15 C	15	10	80	5.23	8.64	3.5	5	0.25	1.47	23.50
MWR-15 D	15	10	80	6.27	10.36	3.5	6	0.25	1.47	19.56
MWR-15 E	15	10	80	7.32	12.09	3.5	7	0.25	1.47	16.75
MWR-15 F	15	10	80	8.36	13.82	3.5	8	0.25	1.47	14.65
MWR-15 G	15	10	80	9.40	15.54	3.5	9	0.25	1.47	13.01
MWR-15 H	15	10	80	10.46	17.27	3.5	10	0.25	1.47	11.75
MWR-15 I	15	10	80	11.51	19.00	3.5	11	0.25	1.47	10.68
MWL-16 A	16	11	25	2.11	5.41	2.5	3	0.25	1.47	7.57
MWL-16 B	16	11	25	2.79	7.21	2.5	4	0.25	1.47	5.66
MWL-16 C	16	11	25	3.51	9.02	2.5	5	0.25	1.47	4.54
MWL-16 D	16	11	25	4.19	10.82	2.5	6	0.25	1.47	3.77
MWL-16 E	16	11	25	4.90	12.62	2.5	7	0.25	1.47	3.24
MWL-16 F	16	11	25	6.30	16.23	2.5	9	0.25	1.47	2.52
MWL-16 G	16	11	25	7.70	19.84	2.5	11	0.25	1.47	2.06
MWL-16 H	16	11	25	9.09	23.44	2.5	13	0.25	1.47	1.74

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MWL,MWM, MWR Wave Springs

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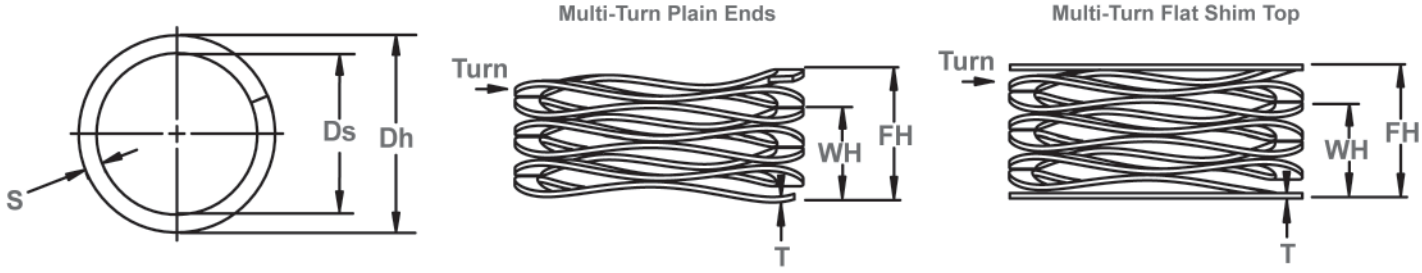

Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWM-16 A	16	11	55	3.63	5.41	3.5	3	0.25	1.47	30.93
MWM-16 B	16	11	55	4.83	7.21	3.5	4	0.25	1.47	23.04
MWM-16 C	16	11	55	6.05	9.02	3.5	5	0.25	1.47	18.51
MWM-16 D	16	11	55	7.24	10.82	3.5	6	0.25	1.47	15.36
MWM-16 E	16	11	55	8.46	12.62	3.5	7	0.25	1.47	13.20
MWM-16 F	16	11	55	10.87	16.23	3.5	9	0.25	1.47	10.26
MWM-16 G	16	11	55	13.28	19.84	3.5	11	0.25	1.47	8.39
MWM-16 H	16	11	55	15.70	23.44	3.5	13	0.25	1.47	7.10
MWR-16 A	16	11	90	3.30	5.41	3.5	3	0.30	1.52	42.69
MWR-16 B	16	11	90	4.57	7.21	3.5	4	0.30	1.52	34.07
MWR-16 C	16	11	90	5.59	9.02	3.5	5	0.30	1.52	26.25
MWR-16 D	16	11	90	6.86	10.82	3.5	6	0.30	1.52	22.71
MWR-16 E	16	11	90	7.87	12.62	3.5	7	0.30	1.52	18.95
MWR-16 F	16	11	90	10.16	16.23	3.5	9	0.30	1.52	14.83
MWR-16 G	16	11	90	12.45	19.84	3.5	11	0.30	1.52	12.18
MWR-16 H	16	11	90	14.73	23.44	3.5	13	0.30	1.52	10.33
MWL-18 A	18	13	30	3.63	5.72	3.5	3	0.20	1.80	14.40
MWL-18 B	18	13	30	4.75	7.62	3.5	4	0.20	1.80	10.45
MWL-18 C	18	13	30	5.94	9.53	3.5	5	0.20	1.80	8.38
MWL-18 D	18	13	30	7.14	11.43	3.5	6	0.20	1.80	6.99
MWL-18 E	18	13	30	8.31	13.34	3.5	7	0.20	1.80	5.97
MWL-18 F	18	13	30	10.69	17.15	3.5	9	0.20	1.80	4.65
MWL-18 G	18	13	30	14.25	22.86	3.5	12	0.20	1.80	3.48
MWM-18 A	18	13	55	3.68	5.72	3.5	3	0.25	1.83	27.07
MWM-18 B	18	13	55	4.98	7.62	3.5	4	0.25	1.83	20.82
MWM-18 C	18	13	55	6.22	9.53	3.5	5	0.25	1.83	16.66
MWM-18 D	18	13	55	7.47	11.43	3.5	6	0.25	1.83	13.88
MWM-18 E	18	13	55	8.74	13.34	3.5	7	0.25	1.83	11.96
MWM-18 F	18	13	55	11.23	17.15	3.5	9	0.25	1.83	9.29
MWM-18 G	18	13	55	14.96	22.86	3.5	12	0.25	1.83	6.96
MWR-18 A	18	13	90	3.84	5.72	3.5	3	0.30	1.83	47.88
MWR-18 B	18	13	90	5.13	7.62	3.5	4	0.30	1.83	36.16
MWR-18 C	18	13	90	6.40	9.53	3.5	5	0.30	1.83	28.81
MWR-18 D	18	13	90	7.70	11.43	3.5	6	0.30	1.83	24.10
MWR-18 E	18	13	90	8.97	13.34	3.5	7	0.30	1.83	20.60
MWR-18 F	18	13	90	11.53	17.15	3.5	9	0.30	1.83	16.03
MWR-18 G	18	13	90	15.37	22.86	3.5	12	0.30	1.83	12.01

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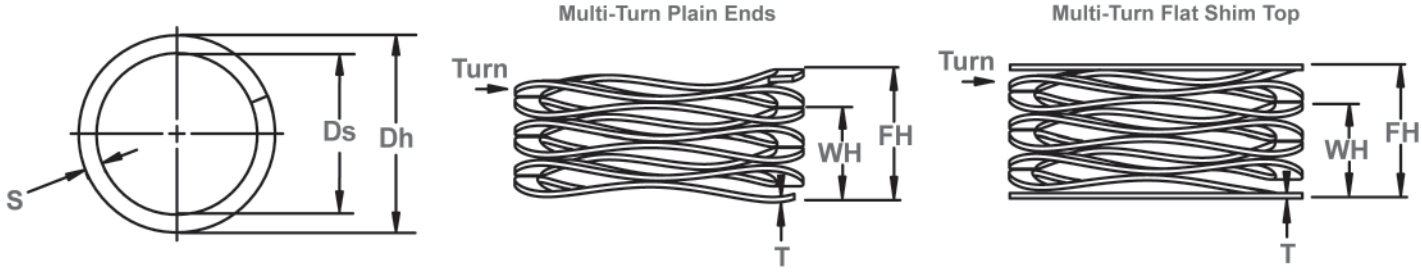
TRU-WAVE®



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-20 A	20	15	35	2.72	6.32	3.5	3	0.20	1.80	9.70
MWL-20 B	20	15	35	3.61	8.43	3.5	4	0.20	1.80	7.25
MWL-20 C	20	15	35	4.52	10.54	3.5	5	0.20	1.80	5.81
MWL-20 D	20	15	35	5.41	12.65	3.5	6	0.20	1.80	4.83
MWL-20 E	20	15	35	6.32	14.76	3.5	7	0.20	1.80	4.15
MWL-20 F	20	15	35	8.13	18.97	3.5	9	0.20	1.80	3.23
MWL-20 G	20	15	35	10.82	25.30	3.5	12	0.20	1.80	2.42
MWM-20 A	20	14	70	3.05	6.32	3.5	3	0.25	1.98	21.36
MWM-20 B	20	14	70	4.06	8.43	3.5	4	0.25	1.98	16.02
MWM-20 C	20	14	70	5.08	10.54	3.5	5	0.25	1.98	12.82
MWM-20 D	20	14	70	6.27	12.65	3.5	6	0.25	1.98	10.98
MWM-20 E	20	14	70	7.32	14.76	3.5	7	0.25	1.98	9.41
MWM-20 F	20	14	70	9.17	18.97	3.5	9	0.25	1.98	7.14
MWM-20 G	20	14	70	12.22	25.30	3.5	12	0.25	1.98	5.35
MWR-20 A	20	14	100	4.24	6.32	3.5	3	0.33	2.01	48.01
MWR-20 B	20	14	100	5.66	8.43	3.5	4	0.33	2.01	36.12
MWR-20 C	20	14	100	7.06	10.54	3.5	5	0.33	2.01	28.74
MWR-20 D	20	14	100	8.48	12.65	3.5	6	0.33	2.01	24.01
MWR-20 E	20	14	100	9.91	14.76	3.5	7	0.33	2.01	20.61
MWR-20 F	20	14	100	12.73	18.97	3.5	9	0.33	2.01	16.00
MWR-20 G	20	14	100	16.97	25.30	3.5	12	0.33	2.01	12.00
MWL-25 A	25	19	50	2.06	6.63	3.5	3	0.25	2.18	10.94
MWL-25 B	25	19	50	2.74	8.84	3.5	4	0.25	2.18	8.20
MWL-25 C	25	19	50	3.43	11.05	3.5	5	0.25	2.18	6.56
MWL-25 D	25	19	50	4.11	13.26	3.5	6	0.25	2.18	5.47
MWL-25 E	25	19	50	4.80	15.47	3.5	7	0.25	2.18	4.69
MWL-25 F	25	19	50	6.20	19.89	3.5	9	0.25	2.18	3.65
MWL-25 G	25	19	50	8.26	26.52	3.5	12	0.25	2.18	2.74
MWM-25 A	25	19	80	2.95	6.63	3.5	3	0.30	2.39	21.72
MWM-25 B	25	19	80	3.94	8.84	3.5	4	0.30	2.39	16.32
MWM-25 C	25	19	80	4.90	11.05	3.5	5	0.30	2.39	13.01
MWM-25 D	25	19	80	5.89	13.26	3.5	6	0.30	2.39	10.86
MWM-25 E	25	19	80	6.88	15.47	3.5	7	0.30	2.39	9.32
MWM-25 F	25	19	80	8.84	19.89	3.5	9	0.30	2.39	7.24
MWM-25 G	25	19	80	11.79	26.52	3.5	12	0.30	2.39	5.43

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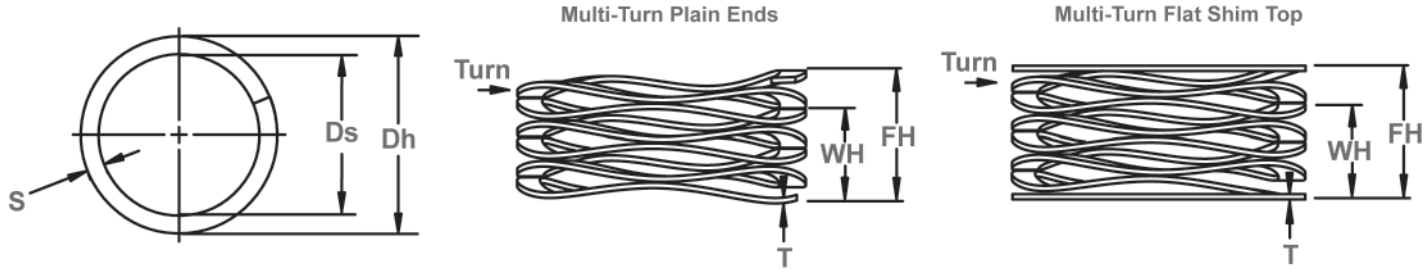
MWL,MWM, MWR Wave Springs

Multi Turn, Metric

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWR-25 A	25	19	110	4.04	6.63	3.5	3	0.38	2.39	42.46
MWR-25 B	25	19	110	5.38	8.84	3.5	4	0.38	2.39	31.84
MWR-25 C	25	19	110	6.73	11.05	3.5	5	0.38	2.39	25.47
MWR-25 D	25	19	110	8.08	13.26	3.5	6	0.38	2.39	21.23
MWR-25 E	25	19	110	9.40	15.47	3.5	7	0.38	2.39	18.12
MWR-25 F	25	19	110	12.12	19.89	3.5	9	0.38	2.39	14.15
MWR-25 G	25	19	110	16.15	26.52	3.5	12	0.38	2.39	10.61
MWL-28 A	28	22	50	3.76	7.24	3.5	3	0.30	2.39	14.37
MWL-28 B	28	22	50	5.00	9.65	3.5	4	0.30	2.39	10.76
MWL-28 C	28	22	50	6.27	12.07	3.5	5	0.30	2.39	8.63
MWL-28 D	28	22	50	7.52	14.48	3.5	6	0.30	2.39	7.18
MWL-28 E	28	22	50	8.79	16.89	3.5	7	0.30	2.39	6.17
MWL-28 F	28	22	50	10.03	19.30	3.5	8	0.30	2.39	5.39
MWL-28 G	28	22	50	11.28	21.72	3.5	9	0.30	2.39	4.79
MWL-28 H	28	22	50	13.79	26.54	3.5	11	0.30	2.39	3.92
MWL-28 I	28	22	50	16.31	31.37	3.5	13	0.30	2.39	3.32
MWM-28 A	28	22	80	4.39	7.24	3.5	3	0.38	2.39	28.12
MWM-28 B	28	22	80	5.84	9.65	3.5	4	0.38	2.39	21.00
MWM-28 C	28	22	80	7.32	12.07	3.5	5	0.38	2.39	16.84
MWM-28 D	28	22	80	8.79	14.48	3.5	6	0.38	2.39	14.06
MWM-28 E	28	22	80	10.24	16.89	3.5	7	0.38	2.39	12.02
MWM-28 F	28	22	80	11.71	19.30	3.5	8	0.38	2.39	10.53
MWM-28 G	28	22	80	13.18	21.72	3.5	9	0.38	2.39	9.37
MWM-28 H	28	22	80	16.10	26.54	3.5	11	0.38	2.39	7.66
MWM-28 I	28	22	80	19.02	31.37	3.5	13	0.38	2.39	6.48
MWR-28 A	28	22	130	4.57	7.24	3.5	3	0.46	2.39	48.74
MWR-28 B	28	22	130	6.07	9.65	3.5	4	0.46	2.39	36.30
MWR-28 C	28	22	130	7.59	12.07	3.5	5	0.46	2.39	29.08
MWR-28 D	28	22	130	9.12	14.48	3.5	6	0.46	2.39	24.26
MWR-28 E	28	22	130	10.64	16.89	3.5	7	0.46	2.39	20.81
MWR-28 F	28	22	130	12.17	19.30	3.5	8	0.46	2.39	18.21
MWR-28 G	28	22	130	13.69	21.72	3.5	9	0.46	2.39	16.20
MWR-28 H	28	22	130	16.71	26.54	3.5	11	0.46	2.39	13.23
MWR-28 I	28	22	130	19.76	31.37	3.5	13	0.46	2.39	11.20

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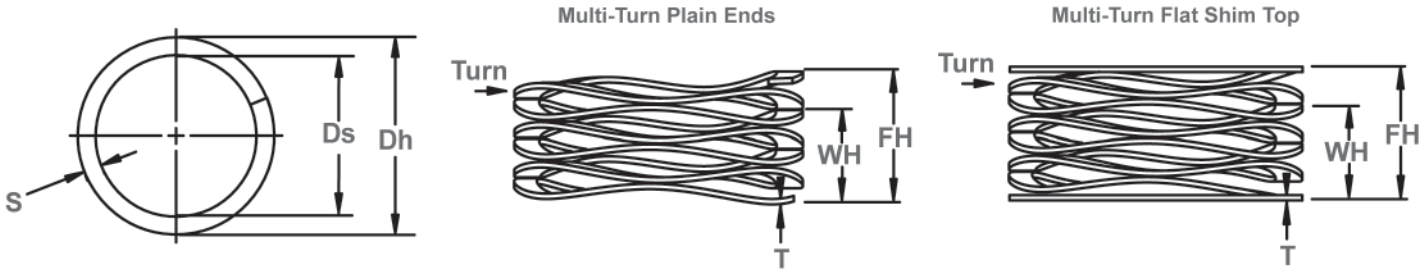
TRU-WAVE



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-30 A	30	24	50	3.18	7.62	3.5	3	0.30	2.39	11.25
MWL-30 B	30	24	50	4.22	10.16	3.5	4	0.30	2.39	8.41
MWL-30 C	30	24	50	5.28	12.70	3.5	5	0.30	2.39	6.74
MWL-30 D	30	24	50	6.32	15.24	3.5	6	0.30	2.39	5.61
MWL-30 E	30	24	50	7.39	17.78	3.5	7	0.30	2.39	4.81
MWL-30 F	30	24	50	8.43	20.32	3.5	8	0.30	2.39	4.21
MWL-30 G	30	24	50	9.50	22.86	3.5	9	0.30	2.39	3.74
MWL-30 H	30	24	50	11.61	27.94	3.5	11	0.30	2.39	3.06
MWL-30 I	30	24	50	13.72	33.02	3.5	13	0.30	2.39	2.59
MWM-30 A	30	24	90	3.51	7.62	3.5	3	0.38	2.39	21.87
MWM-30 B	30	24	90	4.70	10.16	3.5	4	0.38	2.39	16.48
MWM-30 C	30	24	90	5.87	12.70	3.5	5	0.38	2.39	13.17
MWM-30 D	30	24	90	7.04	15.24	3.5	6	0.38	2.39	10.97
MWM-30 E	30	24	90	8.20	17.78	3.5	7	0.38	2.39	9.40
MWM-30 F	30	24	90	9.37	20.32	3.5	8	0.38	2.39	8.22
MWM-30 G	30	24	90	10.54	22.86	3.5	9	0.38	2.39	7.31
MWM-30 H	30	24	90	12.90	27.94	3.5	11	0.38	2.39	5.99
MWM-30 I	30	24	90	15.24	33.02	3.5	13	0.38	2.39	5.06
MWR-30 A	30	24	130	4.19	7.62	3.5	3	0.46	2.39	37.91
MWR-30 B	30	24	130	5.59	10.16	3.5	4	0.46	2.39	28.43
MWR-30 C	30	24	130	6.99	12.70	3.5	5	0.46	2.39	22.75
MWR-30 D	30	24	130	8.38	15.24	3.5	6	0.46	2.39	18.96
MWR-30 E	30	24	130	9.78	17.78	3.5	7	0.46	2.39	16.25
MWR-30 F	30	24	130	11.18	20.32	3.5	8	0.46	2.39	14.22
MWR-30 G	30	24	130	12.57	22.86	3.5	9	0.46	2.39	12.64
MWR-30 H	30	24	130	15.37	27.94	3.5	11	0.46	2.39	10.34
MWR-30 I	30	24	130	18.16	33.02	3.5	13	0.46	2.39	8.75
MWL-35 A	35	27	70	3.94	8.38	3.5	3	0.36	3.18	15.75
MWL-35 B	35	27	70	5.23	11.18	3.5	4	0.36	3.18	11.78
MWL-35 C	35	27	70	6.55	13.97	3.5	5	0.36	3.18	9.44
MWL-35 D	35	27	70	7.87	16.76	3.5	6	0.36	3.18	7.87
MWL-35 E	35	27	70	9.17	19.56	3.5	7	0.36	3.18	6.74
MWL-35 F	35	27	70	10.49	22.35	3.5	8	0.36	3.18	5.90
MWL-35 G	35	27	70	11.81	25.15	3.5	9	0.36	3.18	5.25
MWL-35 H	35	27	70	14.43	30.73	3.5	11	0.36	3.18	4.29
MWL-35 I	35	27	70	17.04	36.32	3.5	13	0.36	3.18	3.63

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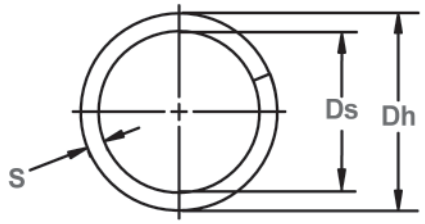
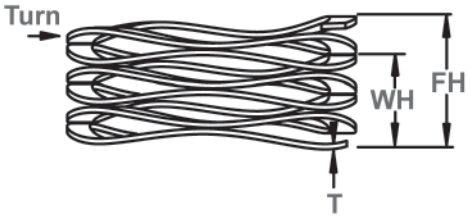
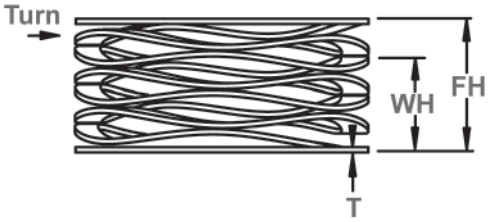


Multi-Turn Plain Ends



Multi-Turn Flat Shim Top



Wave Spring Measurements

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MWM-35 A	35	27	110	4.14	8.38	3.5	3	0.41	3.38	25.93
MWM-35 B	35	27	110	5.51	11.18	3.5	4	0.41	3.38	19.42
MWM-35 C	35	27	110	6.88	13.97	3.5	5	0.41	3.38	15.52
MWM-35 D	35	27	110	8.26	16.76	3.5	6	0.41	3.38	12.93
MWM-35 E	35	27	110	9.63	19.56	3.5	7	0.41	3.38	11.08
MWM-35 F	35	27	110	11.02	22.35	3.5	8	0.41	3.38	9.71
MWM-35 G	35	27	110	12.40	25.15	3.5	9	0.41	3.38	8.63
MWM-35 H	35	27	110	15.14	30.73	3.5	11	0.41	3.38	7.05
MWM-35 I	35	27	110	17.91	36.32	3.5	13	0.41	3.38	5.97
MWR-35 A	35	27	160	4.04	8.38	3.5	3	0.46	3.38	36.84
MWR-35 B	35	27	160	5.38	11.18	3.5	4	0.46	3.38	27.63
MWR-35 C	35	27	160	6.73	13.97	3.5	5	0.46	3.38	22.10
MWR-35 D	35	27	160	8.08	16.76	3.5	6	0.46	3.38	18.42
MWR-35 E	35	27	160	9.42	19.56	3.5	7	0.46	3.38	15.79
MWR-35 F	35	27	160	10.77	22.35	3.5	8	0.46	3.38	13.81
MWR-35 G	35	27	160	12.12	25.15	3.5	9	0.46	3.38	12.28
MWR-35 H	35	27	160	14.81	30.73	3.5	11	0.46	3.38	10.05
MWR-35 I	35	27	160	17.50	36.32	3.5	13	0.46	3.38	8.50
MWL-40 A	40	30	100	2.90	9.14	3.5	3	0.41	3.38	16.00
MWL-40 B	40	30	100	3.86	12.19	3.5	4	0.41	3.38	12.00
MWL-40 C	40	30	100	4.80	15.24	3.5	5	0.41	3.38	9.58
MWL-40 D	40	30	100	5.77	18.29	3.5	6	0.41	3.38	7.99
MWL-40 E	40	30	100	6.73	21.34	3.5	7	0.41	3.38	6.85
MWL-40 F	40	30	100	7.70	24.38	3.5	8	0.41	3.38	5.99
MWL-40 G	40	30	100	8.66	27.43	3.5	9	0.41	3.38	5.33
MWL-40 H	40	30	100	10.59	33.53	3.5	11	0.41	3.38	4.36
MWL-40 I	40	30	100	12.52	39.62	3.5	13	0.41	3.38	3.69
MWM-40 A	40	30	150	5.44	9.14	3.5	3	0.53	3.63	40.45
MWM-40 B	40	30	150	7.24	12.19	3.5	4	0.53	3.63	30.28
MWM-40 C	40	30	150	9.04	15.24	3.5	5	0.53	3.63	24.20
MWM-40 D	40	30	150	10.85	18.29	3.5	6	0.53	3.63	20.16
MWM-40 E	40	30	150	12.65	21.34	3.5	7	0.53	3.63	17.27
MWM-40 F	40	30	150	14.48	24.38	3.5	8	0.53	3.63	15.14
MWM-40 G	40	30	150	16.28	27.43	3.5	9	0.53	3.63	13.45
MWM-40 H	40	30	150	19.89	33.53	3.5	11	0.53	3.63	11.00
MWM-40 I	40	30	150	23.50	39.62	3.5	13	0.53	3.63	9.30

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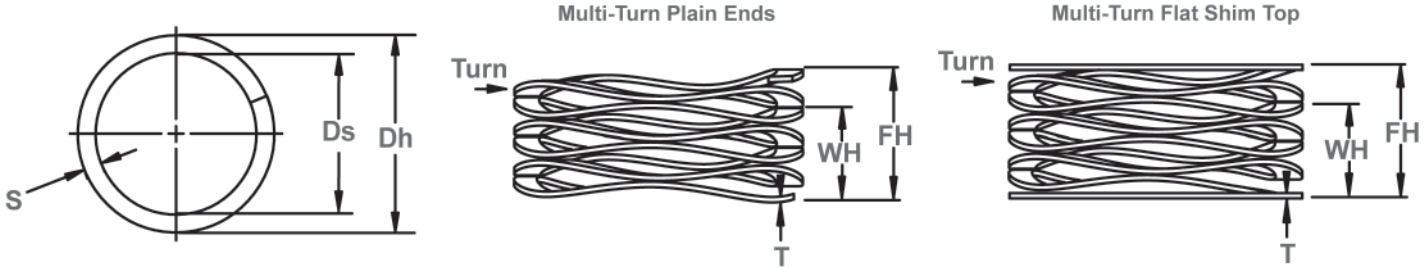

Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWR-40 A	40	30	300	5.66	9.14	4.5	3	0.46	3.38	86.21
MWR-40 B	40	30	300	7.54	12.19	4.5	4	0.46	3.38	64.54
MWR-40 C	40	30	300	9.42	15.24	4.5	5	0.46	3.38	51.58
MWR-40 D	40	30	300	11.33	18.29	4.5	6	0.46	3.38	43.11
MWR-40 E	40	30	300	13.21	21.34	4.5	7	0.46	3.38	36.91
MWR-40 F	40	30	300	15.09	24.38	4.5	8	0.46	3.38	32.27
MWR-40 G	40	30	300	16.97	27.43	4.5	9	0.46	3.38	28.67
MWR-40 H	40	30	300	20.75	33.53	4.5	11	0.46	3.38	23.48
MWR-40 I	40	30	300	24.54	39.62	4.5	13	0.46	3.38	19.88
MWL-45 A	45	35	110	3.38	9.91	3.5	3	0.46	3.63	16.85
MWL-45 B	45	35	110	4.52	13.21	3.5	4	0.46	3.63	12.66
MWL-45 C	45	35	110	5.64	16.51	3.5	5	0.46	3.63	10.12
MWL-45 D	45	35	110	6.76	19.81	3.5	6	0.46	3.63	8.43
MWL-45 E	45	35	110	7.90	23.11	3.5	7	0.46	3.63	7.23
MWL-45 F	45	35	110	9.02	26.42	3.5	8	0.46	3.63	6.32
MWL-45 G	45	35	110	10.16	29.72	3.5	9	0.46	3.63	5.62
MWL-45 H	45	35	110	12.40	36.32	3.5	11	0.46	3.63	4.60
MWL-45 I	45	35	110	14.66	42.93	3.5	13	0.46	3.63	3.89
MWM-45 A	45	35	225	5.33	9.91	4.5	3	0.46	3.63	49.21
MWM-45 B	45	35	225	6.99	13.21	4.5	4	0.46	3.63	36.16
MWM-45 C	45	35	225	9.14	16.51	4.5	5	0.46	3.63	30.55
MWM-45 D	45	35	225	10.80	19.81	4.5	6	0.46	3.63	24.95
MWM-45 E	45	35	225	12.70	23.11	4.5	7	0.46	3.63	21.61
MWM-45 F	45	35	225	14.48	26.42	4.5	8	0.46	3.63	18.85
MWM-45 G	45	35	225	16.26	29.72	4.5	9	0.46	3.63	16.71
MWM-45 H	45	35	225	19.81	36.32	4.5	11	0.46	3.63	13.63
MWM-45 I	45	35	225	23.37	42.93	4.5	13	0.46	3.63	11.50
MWR-45 A	45	35	400	6.43	9.91	4.5	3	0.61	3.76	114.95
MWR-45 B	45	35	400	8.38	13.21	4.5	4	0.61	3.76	82.88
MWR-45 C	45	35	400	11.20	16.51	4.5	5	0.61	3.76	75.35
MWR-45 D	45	35	400	12.95	19.81	4.5	6	0.61	3.76	58.33
MWR-45 E	45	35	400	15.37	23.11	4.5	7	0.61	3.76	51.63
MWR-45 F	45	35	400	17.27	26.42	4.5	8	0.61	3.76	43.74
MWR-45 G	45	35	400	19.68	29.72	4.5	9	0.61	3.76	39.87
MWR-45 H	45	35	400	24.26	36.32	4.5	11	0.61	3.76	33.15
MWR-45 I	45	35	400	28.45	42.93	4.5	13	0.61	3.76	27.63

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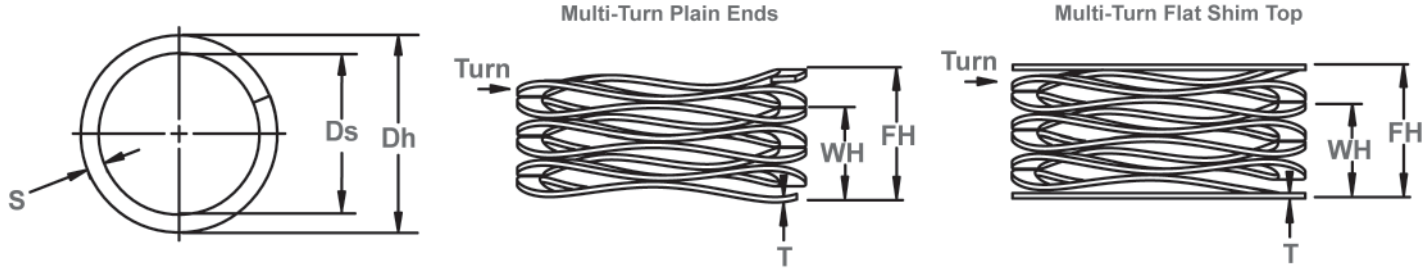
FOR FLAT SHIM TOP WAVE SPRINGS, ADD AN 'F' TO THE END OF THE PART NUMBER (i.e. MWL-8ST AF, MWM-10ST BF, MWR-14ST CF, ETC.)

MWL,MWM, MWR Wave Springs

Multi Turn, Metric

Used for low to medium force applications with greater travel compared to single-turn springs. Utilizes nearly half the space as helical compression springs while producing the same force.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWL-50 A	50	40	110	4.83	10.29	3.5	3	0.53	3.63	20.14
MWL-50 B	50	40	110	6.10	13.72	3.5	4	0.53	3.63	14.44
MWL-50 C	50	40	110	7.87	17.15	3.5	5	0.53	3.63	11.86
MWL-50 D	50	40	110	9.40	20.57	3.5	6	0.53	3.63	9.84
MWL-50 E	50	40	110	11.30	24.00	3.5	7	0.53	3.63	8.66
MWL-50 F	50	40	110	12.70	27.43	3.5	8	0.53	3.63	7.47
MWL-50 G	50	40	110	14.99	30.86	3.5	9	0.53	3.63	6.93
MWL-50 H	50	40	110	18.16	37.72	3.5	11	0.53	3.63	5.62
MWL-50 I	50	40	110	21.34	44.58	3.5	13	0.53	3.63	4.73
MWL-50 J	50	40	110	24.64	51.44	3.5	15	0.53	3.63	4.10
MWM-50 A	50	40	225	4.62	10.29	4.5	3	0.46	3.63	39.72
MWM-50 B	50	40	225	6.35	13.72	4.5	4	0.46	3.63	30.55
MWM-50 C	50	40	225	7.49	17.15	4.5	5	0.46	3.63	23.31
MWM-50 D	50	40	225	8.89	20.57	4.5	6	0.46	3.63	19.26
MWM-50 E	50	40	225	10.54	24.00	4.5	7	0.46	3.63	16.71
MWM-50 F	50	40	225	11.89	27.43	4.5	8	0.46	3.63	14.47
MWM-50 G	50	40	225	13.59	30.86	4.5	9	0.46	3.63	13.03
MWM-50 H	50	40	225	16.71	37.72	4.5	11	0.46	3.63	10.71
MWM-50 I	50	40	225	19.61	44.58	4.5	13	0.46	3.63	9.01
MWM-50 J	50	40	225	22.48	51.44	4.5	15	0.46	3.63	7.77
MWR-50 A	50	40	400	5.92	10.29	4.5	3	0.61	3.76	91.56
MWR-50 B	50	40	400	7.80	13.72	4.5	4	0.61	3.76	67.59
MWR-50 C	50	40	400	10.16	17.15	4.5	5	0.61	3.76	57.27
MWR-50 D	50	40	400	11.79	20.57	4.5	6	0.61	3.76	45.51
MWR-50 E	50	40	400	14.15	24.00	4.5	7	0.61	3.76	40.59
MWR-50 F	50	40	400	15.62	27.43	4.5	8	0.61	3.76	33.87
MWR-50 G	50	40	400	17.91	30.86	4.5	9	0.61	3.76	30.88
MWR-50 H	50	40	400	21.54	37.72	4.5	11	0.61	3.76	24.72
MWR-50 I	50	40	400	25.65	44.58	4.5	13	0.61	3.76	21.14
MWR-50 J	50	40	400	29.21	51.44	4.5	15	0.61	3.76	18.00
MWL-55 A	55	45	125	5.59	11.05	3.5	3	0.61	3.76	22.89
MWL-55 B	55	45	125	7.72	14.73	3.5	4	0.61	3.76	17.83
MWL-55 C	55	45	125	9.68	18.41	3.5	5	0.61	3.76	14.31
MWL-55 D	55	45	125	11.48	22.1	3.5	6	0.61	3.76	11.77
MWL-55 E	55	45	125	13.92	25.78	3.5	7	0.61	3.76	10.54
MWL-55 F	55	45	125	15.52	29.46	3.5	8	0.61	3.76	8.96
MWL-55 G	55	45	125	18.41	33.15	3.5	9	0.61	3.76	8.48
MWL-55 H	55	45	125	21.67	40.51	3.5	11	0.61	3.76	6.63
MWL-55 I	55	45	125	25.65	47.88	3.5	13	0.61	3.76	5.62
MWL-55 J	55	45	125	29.77	55.25	3.5	15	0.61	3.76	4.91
MWM-55 A	55	45	250	3.1	11.05	4.5	3	0.46	3.63	31.45
MWM-55 B	55	45	250	4.11	14.73	4.5	4	0.46	3.63	23.55
MWM-55 C	55	45	250	5.16	18.41	4.5	5	0.46	3.63	18.86
MWM-55 D	55	45	250	6.2	22.1	4.5	6	0.46	3.63	15.72
MWM-55 E	55	45	250	7.21	25.78	4.5	7	0.46	3.63	13.46

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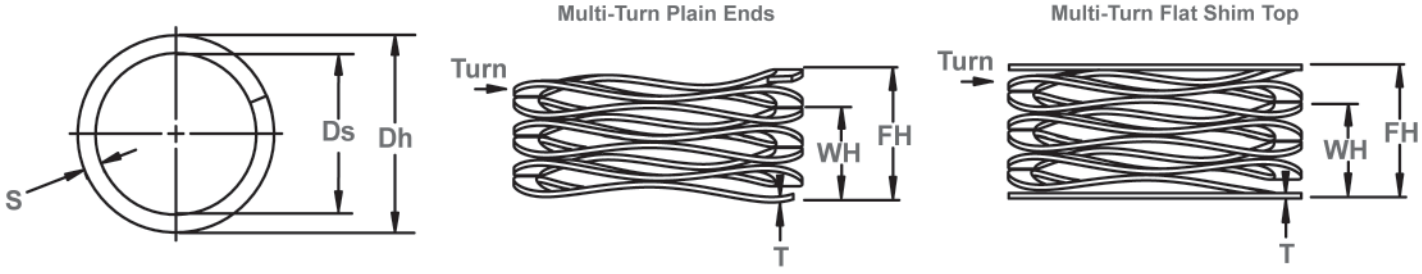
MATERIAL CODES: ST = CARBON STEEL. SQ = 17-7 PH/C STAINLESS STEEL. SPECIAL ALLOYS AVAILABLE UPON REQUEST.



Wave Spring Measurements

WAVE SPRING NO.	PILOTS & OPERATES IN HOUSING DIAMETER Dh mm	SHAFT DIAMETER CLEARANCE Ds	LOAD (N)	WORK HEIGHT WH	FREE HEIGHT Ref. FH	NUMBER OF WAVES	NUMBER OF TURNS	THICKNESS T	SECTION S	SPRING RATE Ref. N/mm
MWM-55 F	55	45	250	8.26	29.46	4.5	8	0.46	3.63	11.79
MWM-55 G	55	45	250	9.27	33.15	4.5	9	0.46	3.63	10.47
MWM-55 H	55	45	250	11.33	40.51	4.5	11	0.46	3.63	8.57
MWM-55 I	55	45	250	13.41	47.88	4.5	13	0.46	3.63	7.25
MWM-55 J	55	45	250	15.47	55.25	4.5	15	0.46	3.63	6.29
MWR-55 A	55	45	400	5.31	11.05	4.5	3	0.61	3.76	69.68
MWR-55 B	55	45	400	7.24	14.73	4.5	4	0.61	3.76	53.38
MWR-55 C	55	45	400	9.09	18.41	4.5	5	0.61	3.76	42.91
MWR-55 D	55	45	400	10.64	22.1	4.5	6	0.61	3.76	34.92
MWR-55 E	55	45	400	12.24	25.78	4.5	7	0.61	3.76	29.55
MWR-55 F	55	45	400	14.1	29.46	4.5	8	0.61	3.76	26.03
MWR-55 G	55	45	400	15.82	33.15	4.5	9	0.61	3.76	23.09
MWR-55 H	55	45	400	19.3	40.51	4.5	11	0.61	3.76	18.86
MWR-55 I	55	45	400	23.11	47.88	4.5	13	0.61	3.76	16.15
MWR-55 J	55	45	400	26.54	55.25	4.5	15	0.61	3.76	13.94
MWL-60 A	60	50	135	5.59	11.43	4.5	3	0.46	3.63	23.11
MWL-60 B	60	50	135	7.47	15.24	4.5	4	0.46	3.63	17.37
MWL-60 C	60	50	135	9.32	19.05	4.5	5	0.46	3.63	13.88
MWL-60 D	60	50	135	11.2	22.86	4.5	6	0.46	3.63	11.58
MWL-60 E	60	50	135	13.06	26.67	4.5	7	0.46	3.63	9.92
MWL-60 F	60	50	135	14.94	30.48	4.5	8	0.46	3.63	8.68
MWL-60 G	60	50	135	16.79	34.29	4.5	9	0.46	3.63	7.71
MWL-60 H	60	50	135	20.52	41.91	4.5	11	0.46	3.63	6.31
MWL-60 I	60	50	135	24.26	49.53	4.5	13	0.46	3.63	5.34
MWL-60 J	60	50	135	27.99	57.15	4.5	15	0.46	3.63	4.63
MWM-60 A	60	50	275	6.65	11.43	4.5	3	0.61	3.76	57.59
MWM-60 B	60	50	275	8.86	15.24	4.5	4	0.61	3.76	43.13
MWM-60 C	60	50	275	11.07	19.05	4.5	5	0.61	3.76	34.48
MWM-60 D	60	50	275	13.28	22.86	4.5	6	0.61	3.76	28.72
MWM-60 E	60	50	275	15.49	26.67	4.5	7	0.61	3.76	24.61
MWM-60 F	60	50	275	17.7	30.48	4.5	8	0.61	3.76	21.52
MWM-60 G	60	50	275	19.94	34.29	4.5	9	0.61	3.76	19.16
MWM-60 H	60	50	275	24.36	41.91	4.5	11	0.61	3.76	15.67
MWM-60 I	60	50	275	28.78	49.53	4.5	13	0.61	3.76	13.25
MWM-60 J	60	50	275	33.22	57.15	4.5	15	0.61	3.76	11.49
MWR-60 A	60	50	450	7.75	11.43	4.5	3	0.76	4.01	122.18
MWR-60 B	60	50	450	10.31	15.24	4.5	4	0.76	4.01	91.32
MWR-60 C	60	50	450	12.9	19.05	4.5	5	0.76	4.01	73.21
MWR-60 D	60	50	450	15.47	22.86	4.5	6	0.76	4.01	60.88
MWR-60 E	60	50	450	18.06	26.67	4.5	7	0.76	4.01	52.26
MWR-60 F	60	50	450	20.62	30.48	4.5	8	0.76	4.01	45.66
MWR-60 G	60	50	450	23.22	34.29	4.5	9	0.76	4.01	40.63
MWR-60 H	60	50	450	28.37	41.91	4.5	11	0.76	4.01	33.24
MWR-60 I	60	50	450	33.53	49.53	4.5	13	0.76	4.01	28.12
MWR-60 J	60	50	450	38.68	57.15	4.5	15	0.76	4.01	24.37

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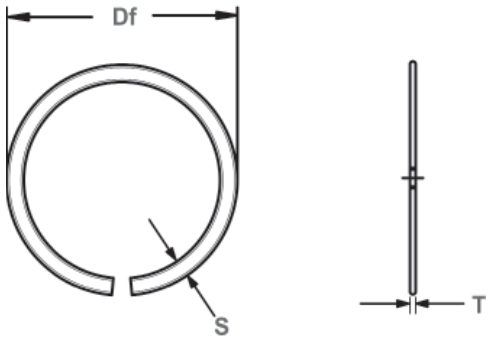
KMS Shims

Shims

Shims are typically used in order to support, adjust for better fit, or provide a level surface. Shims may also be used as spacers to fill gaps between parts subject to wear.



Shim Measurements

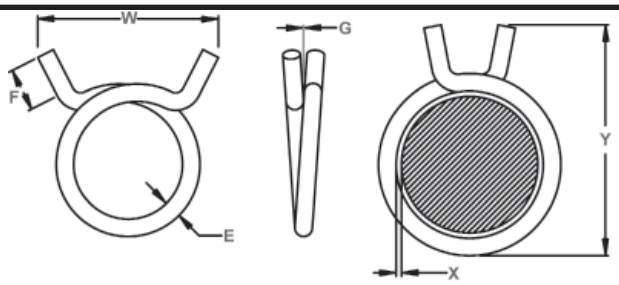
RING NO.	RING SIZE			
	FREE DIAMETER		THICKNESS	SECTION
	Df	Tol.	T	S
KMS-75	0.750		.024	.093
KMS-87	0.875		.024	.093
KMS-100	1.000	+.000	.024	.103
KMS-112	1.125	-.015	.024	.138
KMS-125	1.250		.024	.138
KMS-137	1.375		.024	.138
KMS-150	1.500		.024	.150
KMS-162	1.625		.024	.150
KMS-175	1.750	+.000	.024	.150
KMS-187	1.875	-.020	.024	.150
KMS-200	2.000		.024	.150
KMS-212	2.125		.024	.150
KMS-225	2.250		.024	.150
KMS-237	2.375		.024	.178
KMS-250	2.500		.024	.178
KMS-262	2.625	+.000	.024	.178
KMS-275	2.750	-.025	.030	.188
KMS-287	2.875		.030	.188
KMS-300	3.000		.030	.188
KMS-312	3.125		.030	.188
KMS-325	3.250		.030	.233
KMS-337	3.375		.030	.233
KMS-350	3.500		.030	.233
KMS-362	3.625	+.000	.030	.233
KMS-375	3.750	-.030	.030	.233
KMS-387	3.875		.030	.233
KMS-400	4.000		.030	.233
KMS-412	4.125		.030	.233
KMS-425	4.250		.030	.233
KMS-437	4.375		.030	.233
KMS-450	4.500		.030	.233
KMS-462	4.625	+.000	.030	.233
KMS-475	4.750	-.035	.030	.233
KMS-487	4.875		.030	.233
KMS-500	5.000		.030	.233

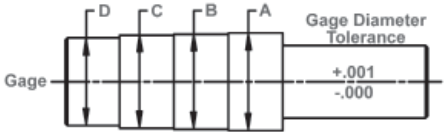
RING NO.	RING SIZE			
	FREE DIAMETER		THICKNESS	SECTION
	Df	Tol.	T	S
KMS-512	5.125	+.000	.030	.233
KMS-525	5.250	-.035	.030	.233
KMS-537	5.375		.030	.233
KMS-550	5.500		.030	.233
KMS-562	5.625		.030	.233
KMS-575	5.750		.030	.233
KMS-587	5.875		.030	.233
KMS-600	6.000	+.000	.030	.233
KMS-612	6.125	-.045	.030	.233
KMS-625	6.250		.030	.233
KMS-637	6.375		.030	.233
KMS-650	6.500		.030	.233
KMS-675	6.750		.030	.233
KMS-700	7.000		.032	.375
KMS-725	7.250		.032	.375
KMS-750	7.500		.032	.375
KMS-775	7.750		.032	.375
KMS-800	8.000	+.000	.032	.375
KMS-825	8.250	-.060	.032	.375
KMS-850	8.500		.032	.375
KMS-900	9.000		.032	.375
KMS-950	9.500		.032	.375
KMS-1000	10.000	+.000	.032	.375
KMS-1050	10.500	-.070	.032	.375
KMS-1100	11.000		.032	.375
KMS-1150	11.500		.032	.375
KMS-1200	12.000		.032	.375
KMS-1250	12.500	+.000	.032	.375
KMS-1300	13.000	-.080	.032	.375
KMS-1350	13.500		.032	.375
KMS-1400	14.000		.032	.375
KMS-1450	14.500		.032	.375
KMS-1500	15.000	+.000	.032	.375
KMS-1550	15.500	-.090	.032	.375
KMS-1600	16.000		.032	.375

Single Wire, Self-Compensating Hose Clamp

Single wire clamps have the most effective holding force and clamping strength. The single wire concentrates the clamping force in one specific area around the hose.

HC Hose Clamps





NOTE: Safety glasses should be worn when installing parts.

EFFECTIVE CLAMPING RANGE: After expanding to no greater than "A" diameter of the gage, the clamp in relaxed condition shall not pass over "D" diameter. When clamp is assembled on "A", "B" or "C" diameter of gage, a wire of "X" diameter shall not pass between gage and clamp when inserted in a direction parallel to the axis of the gage.
FINISH: Peen-Plate Zinc (non-electrolytic process) .0002 minimum thickness plus dichromate treatment. (See color codes below.)
MATERIAL: SAE 1060-1075, *material code ST*. Specially processed premium grade spring wire, hardened and austempered to meet the performance requirements specified.

Note: All Dimensions are in Inches. Conforms to SAE spec. J1508.

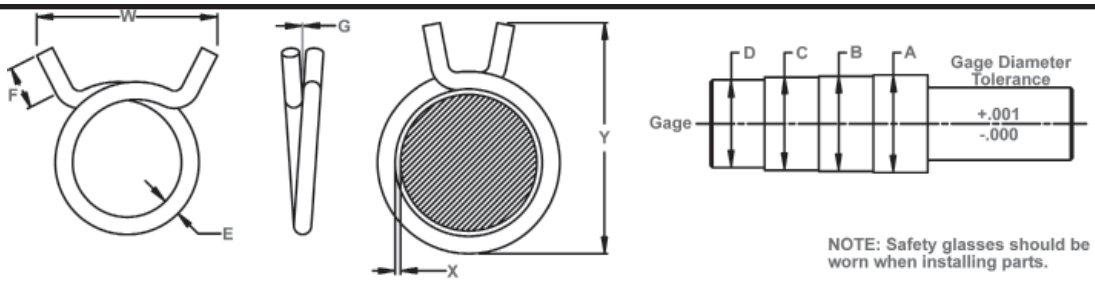
	ROTOR CLAMP HC NO.	Case Quantity Min. 1 case	Approx. Case Weight (lbs.)	EFFECTIVE CLAMPING RANGE A Max. Dia.	B Nom. Dia.	C Min. Dia.	D No-Go Gage Dia.	E Nom. Wire Dia.	F Length of Tangs		G Clearance at overlap Max.	W Width over Tangs Max.	X Gaging Wire Max.	Y Overall Height (Ref. Only)	Color Code *	Pneumatic Installation Tool
19N	HC-4	15000	25.7	.253	.250	.247	.233	.062	3/8		.010	.75	.003	.88	G	PWS-4
	HC-5	10000	18.6	.315	.312	.309	.286	.062	3/8		.010	.75	.003	1.00	R	PWS-5
	HC-5.5	10000	19.8	.345	.342	.339	.320	.062	3/8		.010	.75	.003	1.00	G	PWS-5.5
35N	HC-6	10000	37.9	.380	.375	.370	.350	.082	3/8		.015	.88	.004	1.06	D	PWS-6
	HC-7	8000	38.9	.442	.437	.432	.405	.087	3/8		.015	.94	.004	1.12	G	PWS-7
	HC-7.5	7500	37.5	.473	.468	.463	.430	.087	3/8		.015	1.00	.005	1.12	D	PWS-7.5
	HC-8	6000	33.7	.510	.500	.490	.462	.092	3/8		.025	1.00	.005	1.19	R	PWS-8
	HC-8.5	6000	34.8	.541	.531	.521	.492	.092	3/8	+.000	.025	1.00	.005	1.38	G	PWS-8.5
	HC-9	4500	38.0	.573	.562	.551	.520	.107	3/8	-1/32	.025	1.06	.006	1.38	D	PWS-9
	HC-9.5	4500	39.0	.604	.593	.582	.550	.107	3/8		.025	1.06	.006	1.38	R	PWS-9.5
	HC-10	4000	34.8	.640	.625	.610	.580	.107	3/8		.025	1.06	.006	1.38	G	PWS-10
	HC-10.5	4000	37.6	.671	.656	.641	.611	.107	3/8		.025	1.06	.006	1.38	D	PWS-10.5
	HC-11	3500	37.0	.703	.687	.671	.635	.112	3/8		.025	1.12	.006	1.50	R	PWS-11
	HC-12	3000	33.0	.770	.750	.730	.690	.112	3/8		.031	1.19	.008	1.50	D	PWS-12
	HC-13	2500	30.7	.832	.812	.792	.740	.117	3/8		.031	1.25	.008	1.50	G	PWS-13
	HC-14	2000	28.2	.900	.875	.850	.800	.122	3/8		.031	1.25	.008	1.62	R	PWS-14
	HC-15	2000	31.0	.968	.937	.906	.855	.122	3/8		.062	1.25	.008	1.69	D	PWS-15
	HC-16	1750	32.9	1.031	1.000	.969	.915	.132	3/8		.062	1.31	.008	1.75	G	PWS-16
	HC-17	1400	32.6	1.090	1.062	1.034	.960	.142	3/8		.062	1.50	.010	1.88	R	PWS-17
	HC-17.5	1250	32.5	1.124	1.093	1.065	.991	.152	3/8		.062	1.50	.010	1.90	R	PWS-17.5
	HC-18	1000	28.0	1.150	1.125	1.100	1.030	.152	3/8		.062	1.62	.010	2.00	D	PWS-18
	HC-188	1500	26.4	1.150	1.125	1.100	1.030	.122	3/8		.062	1.62	.010	2.00	D	PWS-188
	HC-19	1000	28.3	1.218	1.187	1.156	1.095	.152	3/8		.062	1.62	.010	2.00	G	PWS-19
	HC-19.5	1000	29.3	1.250	1.218	1.187	1.126	.152	3/8	±1/32	.062	1.63	.010	2.00	R	PWS-19.5
	HC-20	1000	30.0	1.280	1.250	1.219	1.145	.152	3/8		.062	1.75	.010	2.00	R	PWS-20
	HC-21	800	28.8	1.344	1.312	1.281	1.210	.162	3/8		.062	1.75	.010	2.31	D	PWS-21
	HC-22	800	29.6	1.406	1.375	1.344	1.250	.162	3/8		.062	1.88	.010	2.31	G	PWS-22
	HC-23	750	25.5	1.468	1.437	1.406	1.300	.162	3/8		.062	1.88	.010	2.31	R	PWS-23
	HC-24	600	23.4	1.531	1.500	1.469	1.350	.162	3/8		.062	1.88	.010	2.38	D	PWS-24
1/2 Keg	HC-25	600	23.6	1.592	1.561	1.530	1.411	.162	3/8		.062	1.88	.010	2.53	D	PWS-25
	HC-26	600	28.8	1.672	1.625	1.578	1.455	.172	3/8		.062	2.00	.010	2.69	D	PWS-26
	HC-28	500	25.0	1.797	1.750	1.703	1.550	.172	3/8		.062	2.12	.010	2.75	D	PWS-28
	HC-30	500	29.0	1.937	1.875	1.812	1.675	.177	3/8		.093	2.25	.010	2.88	D	PWS-30
	HC-31	500	29.5	2.000	1.937	1.875	1.720	.177	3/8		.093	2.25	.010	3.00	D	PWS-31
	HC-32	500	30.0	2.061	2.000	1.939	1.750	.177	3/8		.093	2.31	.010	3.00	D	PWS-32
	HC-34	500	31.9	2.187	2.125	2.062	1.860	.182	3/8	+1/16	.093	2.31	.010	3.19	D	PWS-34
	HC-35	500	34.2	2.250	2.187	2.125	1.925	.182	3/8	-.000	.093	2.31	.010	3.25	D	PWS-35
	HC-36	500	34.5	2.312	2.250	2.187	2.000	.182	3/8		.093	2.38	.010	3.25	D	PWS-36
	HC-38	500	39.5	2.437	2.375	2.312	2.100	.192	3/8		.093	2.38	.010	3.44	D	PWS-38
	HC-40	500	41.5	2.561	2.500	2.439	2.187	.192	3/8		.093	2.38	.010	3.62	D	PWS-40
	HC-42	400	39.2	2.688	2.625	2.562	2.320	.202	3/8		.093	2.38	.010	3.75	D	PWS-42
	HC-46	400	41.9	2.938	2.875	2.812	2.625	.220	3/8		.093	2.63	.012	3.88	D	PWS-46
	HC-50	400	53.8	3.218	3.125	3.032	2.844	.220	3/8		.125	3.12	.013	4.00	D	PWS-50

* GREEN, R-RED, D-DICHROMATE(YELLOW), NOTE: SELECTED SIZES AVAILABLE IN STAINLESS STEEL. INQUIRE FOR AVAILABILITY.

HW Hose Clamps

Slim Wire, Self-Compensating Hose Clamp

A slimmer version of the Single Wire Hose clamp. The single wire concentrates the clamping force in one specific area around the hose.



EFFECTIVE CLAMPING RANGE: After expanding to no greater than "A" diameter of the gage, the clamp in relaxed condition shall not pass over "D" diameter. When clamp is assembled on "A", "B" or "C" diameter of gage, a wire of "X" diameter shall not pass between gage and clamp when inserted in a direction parallel to the axis of the gage.

FINISH: Peen-Plate Zinc (non-electrolytic process) .0002 minimum thickness plus dichromate treatment. (See color codes below.)

MATERIAL: SAE 1060-1075, *material code ST*. Specially processed premium grade spring wire, hardened and austempered to meet the performance requirements specified.

Note: All Dimensions are in inches.

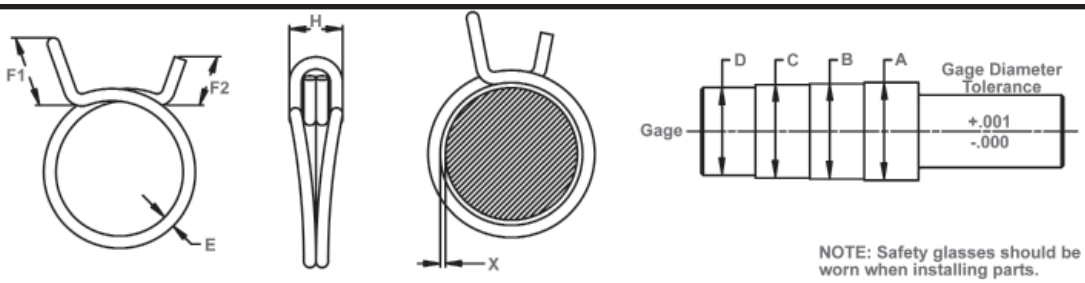
ROTOR CLAMP HW NO.	Case Quantity Min. 1 case	Approx. Case Weight (lbs.)	E Nom. Wire Dia.	EFFECTIVE CLAMPING RANGE A Max. Dia.	B Nom. Dia.	C Min. Dia.	D No-Go Gage Dia.	X Dia. Gaging Wire	G Clearance at overlap Max.	F Length of Tangs		W Width over Tangs Max.	Z Width over Tangs when on a Dia.		Y Overall Height (Ref. Only)	Color Code *	Pneumatic installation Tool
HW-9	8000	39	.082	.573	.562	.551	.520	.006	.025	1/4	+.000-1/32	1-1/16	.415	+.020-.000	1.25	ZD	PWS-9
HW-11	6000	33	.087	.703	.688	.671	.635	.006	.025	1/4	+.000-1/32	1-1/8	.425	+.020-.000	1.38	R	PWS-11
HW-12	5000	30	.087	.770	.750	.730	.690	.008	.031	1/4	+.000-1/32	1-3/16	.425	+.020-.000	1.38	ZD	PWS-12
HW-13	4000	28	.092	.832	.812	.792	.740	.008	.031	1/4	+.000-1/32	1-1/4	.410	+.020-.000	1.38	G	PWS-13
HW-14	3000	26	.092	.900	.875	.850	.800	.008	.031	1/4	+.000-1/32	1-1/4	.410	+.020-.000	1.49	R	PWS-14
HW-16	2500	29	.107	1.031	1.000	.969	.915	.008	.062	1/4	±1/32	1-1/2	.510	+.020-.000	1.75	G	PWS-16
HW-18	1700	28	.122	1.150	1.125	1.100	1.030	.010	.062	1/4	±1/32	1-5/8	.525	+.020-.000	1.88	ZD	PWS-18
HW-19	1400	24	.122	1.218	1.187	1.152	1.095	.010	.062	1/4	±1/32	1-5/8	.510	+.020-.000	1.88	G	PWS-19
HW-20	1400	23	.122	1.280	1.250	1.219	1.145	.010	.062	1/4	±1/32	1-3/4	.525	+.030-.000	1.88	R	PWS-20
HW-21	1300	28	.132	1.344	1.312	1.281	1.210	.010	.062	1/4	±1/32	1-3/4	.540	+.030-.000	2.19	ZD	PWS-21
HW-22	1000	22	.132	1.406	1.375	1.344	1.250	.010	.062	1/4	±1/32	1-7/8	.540	+.030-.000	2.19	G	PWS-22
HW-23	1000	23	.132	1.468	1.437	1.406	1.300	.010	.062	1/4	±1/32	1-7/8	.525	+.030-.000	2.19	R	PWS-23
HW-24	1000	24	.132	1.531	1.500	1.469	1.350	.010	.062	1/4	+1/16-.000	1-7/8	.540	+.030-.000	2.25	ZD	PWS-24
HW-26	900	27	.142	1.672	1.625	1.578	1.455	.010	.062	1/4	±1/16	2	.580	+.030-.000	2.56	ZD	PWS-26

*** GREEN, R-RED, ZD-DICHROMATE (YELLOW)**

Double Wire, Self-Compensating Hose Clamp

Double wire clamps are used where a lower clamping force than offered by single wire clamps is sufficient and aesthetics are important. The double wound wire spreads out the clamping force around the hose, and are more cost effective than single wire clamps.

DW Hose Clamps



NOTE: Safety glasses should be worn when installing parts.

EFFECTIVE CLAMPING RANGE: After expanding to no greater than "A" diameter of the gage, the clamp in relaxed condition shall not pass over "D" diameter. When clamp is assembled on "A", "B" or "C" diameter of gage, a wire of "X" diameter shall not pass between gage and clamp when inserted in a direction parallel to the axis of the gage.

FINISH: Peen-Plate Zinc (non-electrolytic process) .0002 minimum thickness plus dichromate treatment. (See color codes below.)

MATERIAL: SAE 1060-1075, *material code ST*. Specially processed premium grade spring wire, hardened and austempered to meet the performance requirements specified.

Note: All Dimensions are in Inches. Conforms to SAE spec. J1508.

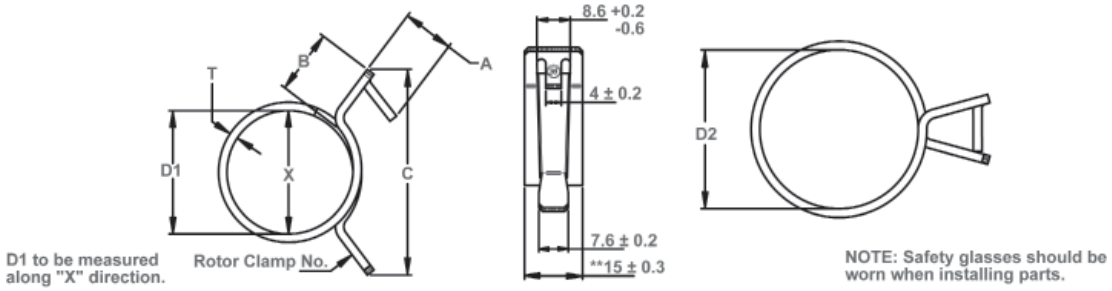
ROTOR CLAMP DW No.	Case Quantity Min. 1 case	Approx. Case Weight (lbs.)	A MAX. Dia.	B NOM. Dia.	C MIN Dia.	D NO-GO GAGE Dia.	E NOM. WIRE Dia.	Ref. Dimensions F1 max.	Ref. Dimensions F2 min.	H OVER-ALL WIDTH	X GAGING WIRE	Color Code *	PNEUMATIC INSTALLATION TOOL
DW-4.5	10000	11	.294	.286	.274	.265	.039	.250	.190	.250	.004	D	PWD-4.5
DW-5	10000	11	.306	.301	.285	.280	.039	.250	.190	.250	.004	D	PWD-5
DW-5.5	10000	12	.345	.342	.339	.320	.039	.250	.190	.250	.004	S	PWD-5.5
DW-6	17000	22	.380	.375	.370	.350	.039	.250	.190	.250	.004	S	PWD-6
DW-6.5	8000	28	.416	.409	.401	.381	.059	.380	.250	.280	.006	D	PWD-6.5
DW-7	7000	26	.442	.438	.432	.405	.059	.380	.250	.280	.006	S	PWD-7
DW-8	7000	28	.510	.500	.490	.462	.059	.380	.250	.280	.006	R	PWD-8
DW-8.5	7000	29	.555	.539	.524	.484	.059	.380	.250	.280	.006	D	PWD-8.5
DW-9	6000	38	.573	.562	.551	.520	.070	.425	.250	.325	.006	S	PWD-9
DW-9.5	2500	34	.627	.614	.595	.555	.070	.425	.250	.325	.006	R	PWD-9.5
DW-10	4000	25	.640	.625	.610	.580	.070	.425	.250	.325	.006	G	PWD-10
DW-10.5	3000	20	.662	.646	.627	.586	.070	.425	.250	.325	.006	D	PWD-10.5
DW-11	2500	23	.703	.688	.671	.635	.078	.500	.325	.360	.008	R	PWD-11
DW-11.5	2500	24	.736	.716	.697	.650	.078	.500	.325	.360	.008	D	PWD-11.5
DW-12	2000	20	.770	.750	.730	.690	.078	.500	.325	.360	.008	S	PWD-12
DW-12.5	2000	21	.812	.795	.772	.720	.078	.500	.325	.360	.008	D	PWD-12.5
DW-13	2000	21	.832	.812	.792	.740	.078	.500	.325	.360	.008	G	PWD-13
DW-14	1500	21	.900	.875	.850	.800	.086	.550	.375	.400	.008	D	PWD-14
DW-14.5	1500	21	.928	.909	.882	.826	.086	.550	.375	.400	.008	R	PWD-14.5
DW-15	1200	17	.968	.938	.906	.855	.086	.550	.375	.400	.008	S	PWD-15
DW-16	1100	22	1.031	1.000	.969	.915	.098	.560	.375	.450	.008	D	PWD-16
DW-17	1000	21	1.090	1.062	1.034	.960	.098	.560	.375	.450	.008	R	PWD-17
DW-17.5	1000	21	1.107	1.082	1.050	.984	.098	.560	.375	.450	.008	D	PWD-17.5
DW-18	1700	37	1.150	1.125	1.100	1.030	.098	.560	.375	.450	.008	S	PWD-18
DW-19	1250	37	1.218	1.188	1.156	1.095	.110	.660	.450	.480	.010	G	PWD-19
DW-19.5	1100	33	1.260	1.232	1.196	1.117	.110	.660	.450	.480	.010	D	PWD-19.5
DW-20	1100	34	1.280	1.250	1.219	1.145	.110	.660	.450	.480	.010	R	PWD-20
DW-21	1100	35	1.344	1.312	1.281	1.210	.110	.660	.450	.480	.010	S	PWD-21
DW-22	1000	39	1.405	1.377	1.335	1.260	.118	.750	.500	.540	.010	G	PWD-22
DW-22.5	900	36	1.433	1.401	1.362	1.279	.118	.750	.500	.540	.010	S	PWD-22.5
DW-23	900	36	1.500	1.465	1.425	1.330	.118	.750	.500	.540	.010	D	PWD-23
DW-24	750	35	1.531	1.500	1.469	1.350	.126	.750	.500	.560	.010	S	PWD-24
DW-25	750	37	1.592	1.561	1.530	1.411	.126	.750	.500	.560	.010	S	PWD-25
DW-26	700	35	1.692	1.625	1.578	1.475	.126	.750	.500	.560	.010	D	PWD-26
DW-27	650	34	1.745	1.688	1.640	1.528	.126	.750	.500	.560	.010	R	PWD-27
DW-28	650	34	1.797	1.750	1.703	1.580	.126	.750	.500	.560	.010	S	PWD-28
DW-30	600	34	1.937	1.875	1.812	1.720	.126	.750	.500	.560	.010	S	PWD-30
DW-31	500	34	2.000	1.938	1.875	1.799	.137	.800	.550	.590	.010	S	PWD-31
DW-32	500	35	2.061	2.000	1.939	1.83	.137	.800	.550	.590	.010	D	PWD-32
DW-34	450	33	2.187	2.125	2.062	1.946	.137	.800	.550	.590	.010	S	PWD-34
DW-35	400	30	2.250	2.187	2.125	1.975	.137	.800	.550	.590	.010	S	PWD-35
DW-36	400	31	2.300	2.250	2.187	2.000	.137	.800	.550	.590	.010	S	PWD-36

* G-Green, R-Red, D-Dichromate (Yellow). NOTE: SELECTED SIZES AVAILABLE IN STAINLESS STEEL. INQUIRE FOR AVAILABILITY.
** MANUAL INSTALLATION TOOLS ALSO AVAILABLE.

CTB Hose Clamps

Constant Tension Band, Self-Compensating Hose Clamp

Constant Tension Band clamps are used in applications where a lower clamping force than offered by single wire clamps is sufficient, but a higher clamping force than produced by double wire clamps is needed.



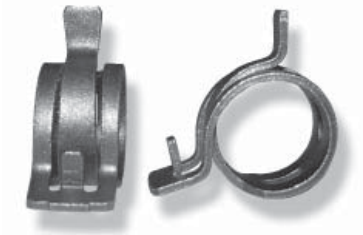
CTB Clamps should be installed/removed using the proper tool.
** Contact manufacturer for availability of additional widths.
Note: Dimensions “D1” and “C” to be measured only after expanding the clamp fully one time.

FINISH: Zinc Rich Paint* up to 700 hour-salt spray.
MATERIAL: SAE 1074 - *material code ST*. (Optional Material: Chrome Vanadium - DIN 17222, JIS G 4802 - *material code CV. Limited availability and at our discretion.)*

Note: All Dimensions are in Millimeters. Conforms to SAE spec. J1508.

ROTOR CLAMP CTB NO. (mm)	CASE QUANTITY min 1 case	WEIGHT PER M (lbs.)	WEIGHT PER CASE (lbs.)	D1 Free Dia. Max. (mm)	D2 FULL OPEN DIA. Min. (mm)	MATERIAL THICKNESS T +0.08 -0.02	REFERENCE DIMENSIONS (All Sizes Listed In mm) A (mm) Tab Height	B (mm) Ear Length	C (mm) Ear Span
CTB-13	2500	8.5	21.250	12.0	14.2	0.70	7.3	11.7	27.0
CTB-14	2500	10.2	25.500	13.5	15.3	0.80	8.0	12.5	30.0
CTB-15	2500	9.35	23.375	13.9	16.8	0.70	7.2	11.9	31.0
CTB-16	2500	12.87	32.175	14.4	17.2	1.00	6.6	10.8	28.5
CTB-17	2500	10.8	27.000	15.2	18.5	0.85	7.3	12.5	32.0
CTB-19	1800	20.3	36.540	17.8	20.0	1.30	10.4	12.0	35.0
CTB-20	1700	21.4	36.380	18.4	21.6	1.30	9.1	12.1	32.0
CTB-22	1500	23.2	34.755	20.5	24.5	1.30	8.5	12.5	36.0
CTB-23	1000	27.5	27.500	21.0	24.7	1.50	8.1	12.9	39.0
CTB-24	1250	24.0	29.975	22.0	26.0	1.30	8.1	12.7	36.0
CTB-25	1000	29.5	29.500	23.5	26.8	1.50	9.3	12.4	34.0
CTB-26	1000	31.9	31.900	24.3	28.0	1.60	10.0	12.6	34.0
CTB-27	1000	33.6	33.570	25.2	28.9	1.60	10.1	12.5	38.0
CTB-29	900	38.9	35.010	27.0	31.5	1.73	10.3	13.3	35.0
CTB-30	900	38.2	34.380	28.0	32.5	1.73	11.4	13.4	41.0
CTB-32	700	38.9	27.230	29.3	34.5	1.73	11.7	12.1	44.0
CTB-35	700	44.2	30.940	31.5	38.0	1.73	11.1	15.0	50.0
CTB-36	700	44.4	31.080	32.5	39.0	1.73	11.3	13.3	48.0
CTB-38	600	47.5	28.500	34.5	41.5	1.73	10.2	15.1	52.0
CTB-40	600	47.9	28.740	35.5	42.5	1.73	11.1	13.0	52.0
CTB-42	500	54.0	27.000	37.2	44.5	1.90	10.6	14.7	52.0
CTB-44	500	56.1	28.050	38.5	46.5	1.90	11.0	14.5	53.0
CTB-46	500	61.4	30.675	40.5	48.5	2.00	11.5	14.4	55.0
CTB-47	450	63.5	28.575	41.4	50.0	2.00	13.2	14.3	59.0
CTB-50	450	67.1	30.195	43.5	53.0	2.00	11.3	14.4	59.0
CTB-51	350	67.4	23.590	44.0	54.0	2.00	11.2	15.6	60.0
CTB-53	300	77.8	23.340	46.0	55.8	2.20	11.1	16.5	61.0
CTB-55	250	79.0	19.750	46.8	58.0	2.20	11.3	15.2	65.0
CTB-58	250	85.1	21.275	50.0	61.0	2.25	10.5	14.8	66.0
CTB-61	200	98.9	19.780	54.0	65.0	2.40	12.2	15.0	69.0
CTB-67	175	108.5	18.988	60.0	72.0	2.40	13.1	16.0	78.0

*** A Magni 511 finish offers 480 hours salt spray protection per ASTM B117. Is is a chrome-free duplex coating system that combines an inorganic zinc-rich basecoat with an organic topcoat.**
Magni 511 meets the following automotive specifications: General Motors: GM7111M, GMW14100; Chrysler: PS-7626; Ford: S441 (WSS-M21P37-A2); Delphi: DX550041.
Mechanical Zinc is also available along with other finishes. Inquire for more information.



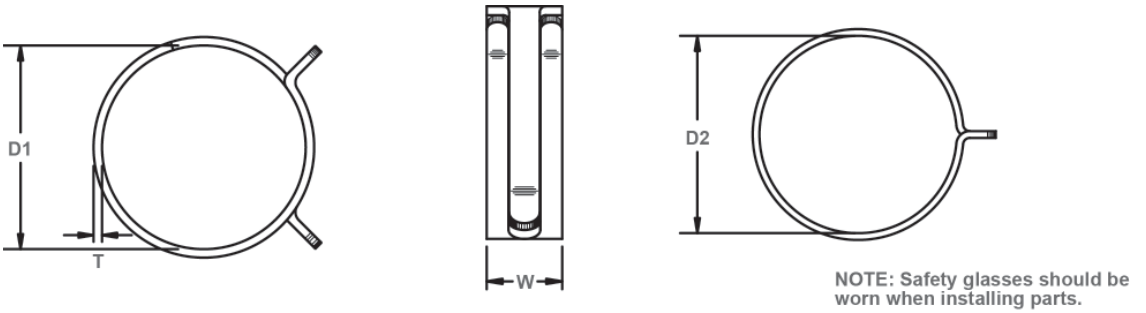
CTN - Constant Tension Band Narrow, Self-Compensating Hose Clamp

CTN’s are available in a width of 12mm, and are typically used in places where a standard width CTB band clamp (15mm) is too wide for the application. CTN clamps are suited for applications that would normally require a CTB clamp. Nominal diameters range from 13mm to 90mm. Contact tech@rotorclip.com for more specifications.

Constant Tension Light Band, Self-Compensating Hose Clamp

These are cost effective alternatives to other types
of band clamps, but do not compromise quality or reliability.

CTL Hose Clamps



NOTE: Safety glasses should be worn when installing parts.

FINISH: Phosphate; Mechanical Zinc Plate
MATERIAL: SAE 1060-1090 Spring Steel, Austempered

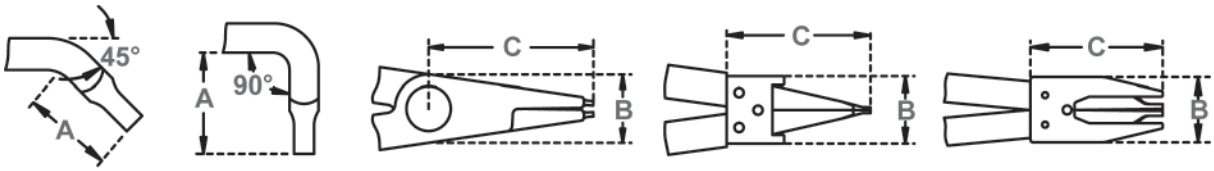
ROTOR CLAMP CTL NO.	NOM. HOSE O.D.		FREE I.D. MAX D1		FULL OPEN DIAMETER MIN D2		W (Ref)		THICKNESS T	
	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
CTL-4	.23	5.9	.210	5.33	.250	6.35	.25	6.3	.020	0.51
CTL-4.5	.28	7.1	.240	6.10	.300	7.62	.25	6.3	.015	0.38
CTL-4.5 SP1	.28	7.1	.240	6.10	.300	7.62	.25	6.3	.020	0.51
CTL-5	.31	7.9	.301	7.65	.345	8.76	.31	7.9	.030	0.76
CTL-6	.38	9.5	.321	8.15	.405	10.29	.31	7.9	.020	0.51
CTL-6 SP1	.38	9.5	.335	8.51	.410	10.41	.31	7.9	.020	0.51
CTL-6.5	.41	10.3	.375	9.53	.450	11.43	.31	7.9	.025	0.64
CTL-7	.44	11.1	.405	10.29	.485	12.32	.31	7.9	.025	0.64
CTL-7.5	.47	11.9	.430	10.92	.515	13.08	.31	7.9	.025	0.64
CTL-8	.50	12.7	.460	11.68	.545	13.84	.31	7.9	.030	0.76
CTL-8.5	.53	13.5	.490	12.45	.573	14.55	.31	7.9	.030	0.76
CTL-9	.56	14.3	.500	12.70	.621	15.77	.31	7.9	.030	0.76
CTL-9 SP1	.56	14.3	.520	13.21	.605	15.37	.31	7.9	.030	0.76
CTL-9.5	.59	15.1	.540	13.72	.650	16.51	.31	7.9	.030	0.76
CTL-10	.63	15.9	.583	14.81	.668	16.97	.31	7.9	.030	0.76
CTL-10.5	.66	16.7	.620	15.75	.725	18.42	.31	7.9	.030	0.76
CTL-11	.69	17.5	.583	14.81	.720	18.29	.31	7.9	.030	0.76
CTL-11 SP1	.69	17.5	.639	16.23	.709	18.01	.31	7.9	.045	1.14
CTL-11 SP2	.69	17.5	.655	16.64	.750	19.05	.31	7.9	.030	0.76
CTL-11.5	.72	18.3	.685	17.40	.775	19.69	.38	9.5	.050	1.27
CTL-12	.75	19.1	.645	16.38	.828	21.03	.38	9.5	.030	0.76
CTL-13	.81	20.6	.750	19.05	.900	22.86	.38	9.5	.040	1.02
CTL-14	.88	22.2	.810	20.58	.970	24.64	.38	9.5	.040	1.02
CTL-15	.94	23.8	.860	21.84	1.030	26.16	.38	9.5	.045	1.14
CTL-16	1.00	25.4	.910	23.11	1.080	27.43	.38	9.5	.045	1.14
CTL-16.5	1.03	26.2	.950	24.13	1.130	28.70	.38	9.5	.035	0.89
CTL-17	1.06	27.0	.970	24.64	1.180	29.97	.38	9.5	.045	1.14
CTL-18	1.13	28.6	1.040	26.42	1.240	31.50	.38	9.5	.045	1.14
CTL-19	1.19	30.2	1.100	27.94	1.280	32.51	.38	9.5	.045	1.14
CTL-20	1.25	31.8	1.180	29.97	1.450	36.83	.38	9.5	.045	1.14
CTL-24	1.50	38.1	1.350	34.29	1.670	42.42	.38	9.5	.045	1.14
CTL-26	1.63	41.3	1.450	36.83	1.800	45.72	.38	9.5	.045	1.14

Standard Pliers

Standard Retaining Ring Pliers - Inch & Metric

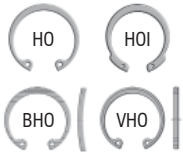
Rotor Clip Standard Retaining Ring Pliers are made of high carbon, heat treated steel and produced to exacting QC specifications. They feature stop and return springs for problem-free installation/removal of retaining rings. This eliminates overspreading of external retaining rings, and speeds the assembly/removal of internal retaining rings by orienting plier to exact location of lug holes. Most Rotor Clip retaining ring pliers have exclusive air-cushioned handles.

Inch Plier Dimensions



Internal Inch

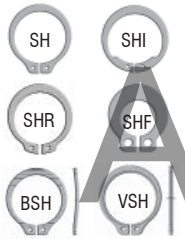
For use with the following inch retaining rings:



INTERNAL STANDARD PLIERS							GENERAL DIMENSIONS (inches)						
Ring Series/Size Range				ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	Weight lbs.	Tip Dia.	Tip Length A	CLOSED POSITION			
HO-BHO-VHO		HOI								Clearance		Length Std. Tip	Width
FROM	THRU	FROM	THRU							B	C		
-25	-31	-62	-	RPS-100	RPS-104	RPS-109	.15	.025	9/32	7/8	1-7/8	5-1/2	1-7/8
-37	-56	-75	-100	RP-100	RP-104	RP-109	.15	.038	9/32	7/8	1-7/8	5-1/2	1-7/8
-62	-102	-106	-137	RPL-100	RPL-104	RPL-109	.15	.047	9/32	7/8	1-7/8	5-1/2	1-7/8
-106	-175	-143	-200	RP-300	RP-304	RP-309	.17	.070	11/32	7/8	2-1/8	6-7/16	2-1/4
-181	-300	-206	-300	RP-500	RP-504	RP-509	.62	.090	7/16	1-1/8	2-3/4	9	2-1/4

External Inch

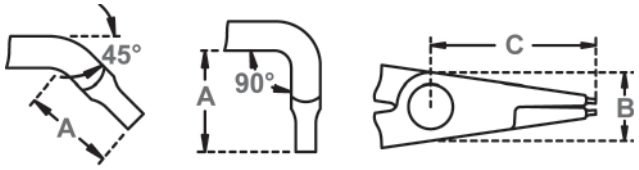
For use with the following inch retaining rings:



EXTERNAL STANDARD PLIERS											GENERAL DIMENSIONS (inches)						
Ring Series/Size Range								ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	Weight lbs.	CLOSED POSITION					
SH-BSH-VSH		SHI		SHR		SHF						Tip Dia.	Tip Length A	Clearance		Length Std. Tip	Width
FROM	THRU	FROM	THRU	FROM	THRU	FROM	THRU							B	C		
-12	-	-	-	-	-	-	-	RP-12	RP-2124	RP-2129	.05	.023	7/32	1/2	1-1/8	5-5/16	1-1/2
-15	-	-	-	-	-	-	-	RP-15	RP-2154	RP-2159	.05	.023	7/32	1/2	1-1/8	5-5/17	1-1/2
-18	-23	-	-	-	-	-	-	RP-18	RP-2184	RP-2189	.05	.023	7/32	1/2	1-1/8	5-5/18	1-1/2
-25	-66	-50	-78	-39	-47	-	-	RP-200	RP-204	RP-209	.15	.038	9/32	1	2	5-1/2	2-1/2
-68	-87	-81	-100	-50	-66	-	-	RPL-200	RPL-204	RPL-209	.15	.047	9/32	1	2	5-1/2	2-1/2
-93	-143	-106	-200	-	-	-	-	RP-400	RP-404	RP-409	.19	.070	11/32	1	2-3/8	7	2-7/8
-150	-350	-215	-325	-	-	-	-	RP-600	RP-604	RP-609	.44	.115	7/16	1-1/4	3-1/16	9-1/8	4-1/4
-	-	-	-	-75	-98	-31	-75	RPA-2	RPA-245	RPA-290	.22	.070	9/16	1	2	7-1/4	2-1/2

External pliers RP-12, RP-15 & RP-18 are available in the standard version with shielded tips. The 45° and 90° versions are unshielded. Both are equipped with fixed stops to prevent overspreading of the external retaining rings during installation or removal.

Metric Plier Dimensions



Please wear protective eyewear while installing and removing retaining rings & hose clamps.

Internal Metric

For use with the following metric retaining rings:

METRIC INTERNAL PLIERS (All Dimensions in mm)								FULLY COMPRESSED (TIPS BUTTING) CONDITION			
Ring Series/Size Range		ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	Weight Kg	Tip Dia.	Tip Length A	Tip Clearance		Overall Length Straight Tip	Max Width Across Handle
DHO (DIN 472), DHT (DIN 984)											
FROM	THRU							B	C		
-8	-13	RPN-J0*	-	RPN-J01*	-	0.9	-	-	-	-	-
-12	-25	RPN-J1*	-	RPN-J11*	-	1.2	-	-	-	-	-
-18	-30	RPI-2	RPI-245	RPI-290	0.1	1.8	10	25	55	165	60
-31	-83	RPI-3	RPI-345	RPI-390	0.23	2.3	14	30	70	230	65
-85	-100	RPI-4	RPI-445	RPI-490	0.42	3.2	20	45	70	300	55

*See page 244 : Heavy Duty Retaining Ring Pliers.

External Metric

For use with the following metric retaining rings:

METRIC EXTERNAL PLIERS (All Dimensions in mm)								FREE (UNEXPANDED) CONDITION			
Ring Series/Size Range		ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	Weight Kg	Tip Dia.	Tip Length A	Tip Clearance		Overall Length Straight Tip	Max Width Across Handle
DSH (DIN 471), DST (DIN 983)											
FROM	THRU							B	C		
-3	-9	RPA-0	RPA-045	RPA-090	0.07	0.9	8	22	38	140	75
-10	-17	RPA-1	RPA-145	RPA-190	0.07	1.3	8	22	38	140	75
-18	-30	RPA-2	RPA-245	RPA-290	0.1	1.8	14	25	50	185	100
-19	-60	RPN-A2*	-	RPN-A21*	-	1.8	-	-	-	-	-
-40	-82	RPN-A3*	-	RPN-A31*	-	2.3	-	-	-	-	-
-85	-100	RPA-4	RPA-445	RPA-490	0.46	3.2	20	45	80	300	175

*See page 244 : Heavy Duty Retaining Ring Pliers.

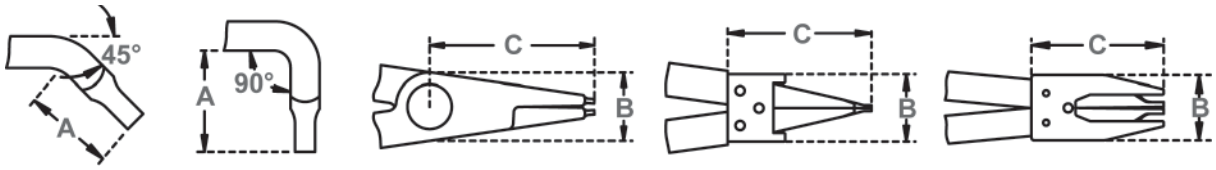
For the most up-to-date specifications, online ordering, quotations & sample orders, visit **www.rotorclip.com**

Ratchet & Grip Ring Pliers

Ratchet Retaining Ring Pliers

Assemble large retaining rings up to 10" in diameter with ease and comfort using Rotor Clip Ratchet Pliers. Spring loaded mechanisms compress or expand large rings through gradual "steps." Plier locks at the desired size without continued pressure on the handles.

(Note: Ratchet Pliers do not include plier tips, which must be purchased separately.)

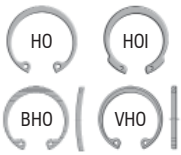


RATCHET PLIERS INTERNAL**									GENERAL DIMENSIONS (inches)							
Ring Series/Size Range				PLIERS W/OUT TIPS	STD. TIPS	45° TIPS	90° TIPS	TIP COLOR CODE	Weight lbs.	Tip Dia.	Tip Length A	CLOSED POSITION			
HO-BHO-VHO		HOI										Clearance		Length Std. Tip	
FROM	THRU	FROM	THRU									B	C		Width
-181	-237	-206	-250	RP-27R	RP-5021R	RP-5023R	RP-5024R	GOLD	.70	.093	15/32	1-3/8	3-13/32	10-5/8	3
-244	-300	-262	-300	RP-27R	RP-5005R	RP-5007R	RP-5008R	BLACK	.70	.108	15/32	1-3/8	3-13/32	10-5/8	3
-306	-400	-315	-400	RP-27R	RP-5009R	RP-5012R	RP-5013R	SILVER	.70	.120	15/32	1-3/8	3-13/32	10-5/8	3
-306	-600	-315	-400	RP-900	RP-7801R	RP-7845R	RP-7890R	BLACK	1.9	.120	1/2	1-3/4	3-1/2	16	3-7/8
-625	-1000	-	-	RP-1100	RP-71001R	RP-71451R	RP-71901R	BLACK	5.0	.150	1-5/32	1-3/4	4-5/16	28	6-1/2

**PLIERS AND PLIER TIPS MUST BE ORDERED TOGETHER TO BE USABLE. TIPS ARE INTERCHANGEABLE FOR INTERNAL AND EXTERNAL USE.

Internal

For use with the following retaining rings:

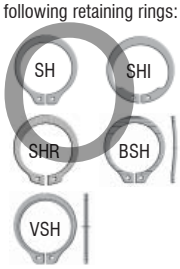


RATCHET PLIERS EXTERNAL**										GENERAL DIMENSIONS (inches)						
Ring Series/Size Range						PLIERS W/OUT TIPS	STD. TIPS	45° TIPS	90° TIPS	TIP COLOR CODE	Weight lbs.	Tip Dia.	Tip Length A	CLOSED POSITION			
SH-BSH-VSH		SHI		SHR										Clearance		Length Std. Tip	
FROM	THRU	FROM	THRU	FROM	THRU									B	C		Width
-	-	-	-	-106	-137	RP-28R	RP-5021R	RP-5023R	RP-5024R	GOLD	.70	.093	15/32	1-3/8	3-3/8	10-5/8	4-11/32
-150	-375	-215	-325	-	-	RP-28R	RP-5009R	RP-5012R	RP-5013R	SILVER	.70	.120	15/32	1-3/8	3-3/8	10-5/8	4-11/32
-	-	-	-	-150	-175	RP-1000	RP-8002R	RP-8452R	RP-8902R	BLACK	1.9	.108	5/8	2-1/2	3-5/8	14-1/2	13
-354	-650	-350	-393	-193	-200	RP-1000	RP-7801R	RP-7845R	RP-7890R	BLACK	1.9	.120	5/8	2-1/2	3-5/8	14-1/2	13
-675	-950	-	-	-	-	RP-1200	RP-68001R	RP-68451R	RP-68901R	BLACK	2.2	.170	1-5/32	2-1/2	4-7/8	18-1/4	14

**PLIERS AND PLIER TIPS MUST BE ORDERED TOGETHER TO BE USABLE. TIPS ARE INTERCHANGEABLE FOR INTERNAL AND EXTERNAL USE.

External

For use with the following retaining rings:



Grip Ring Retaining Ring Pliers

Rotor Clip Grip Ring Pliers are designed for SHF & DSF external (shaft) friction rings. The pliers are made of forged Chrome Vanadium steel with non-slip solid tips, and the handles have a non-slip plastic coating.

Please wear protective eyewear while installing and removing retaining rings & hose clamps.

HEAVY DUTY PLIERS - EXTERNAL (Inch & Metric)				
Ring Series/Size Range				ROTOR CLIP PLIERS
SHF (in.)		DSF (mm)		
FROM	THRU	FROM	THRU	
-6	-12	-1.5	-4	RPN-G0
-15	-15	-4	-7	RPN-G1
-18	-25	-5	-13	RPN-G2
-31	-75	-14	-18	RPN-G3

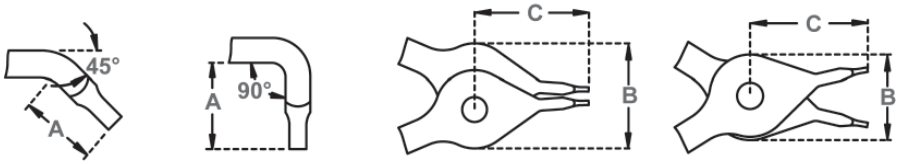
External

For use with the following retaining rings:

Convertible & Heavy-Duty Pliers

Convertible Retaining Ring Pliers

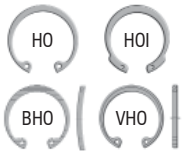
Convert quickly and easily from internal to external pliers and back again.This two-in-one capability is cost effective and ideal for handling a variety of applications with a minimum number of tools. Simply move the screw to the other hole and tighten with finger pressure to convert quickly to an internal/external plier.



Please wear protective eyewear while installing and removing retaining rings & hose clamps.

Internal

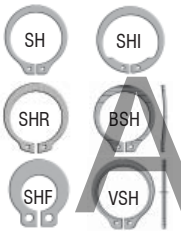
For use with the following retaining rings:



CONVERTIBLE PLIERS, INTERNAL RING SERIES							GENERAL DIMENSIONS (inches)						
Ring Series/Size Range				ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	Weight lbs.	Tip Dia.	Tip Length A	CLOSED POSITION Clearance		Length Std. Tip	Width
HO-BHO-VHO		HOI											
FROM	THRU	FROM	THRU							B	C		
-37	-43	-75	-100	RP-120	RP-124	RP-129	.19	.038	9/32	1-3/16	1-5/8	5-5/8	1-3/4
-45	-102	-106	-137	RP-320	RP-324	RP-329	.19	.047	9/32	1-3/16	1-5/8	5-5/8	1-3/4
-106	-175	-143	-200	RP-340	RP-344	RP-349	.45	.070	11/32	1-7/16	1-7/8	7-7/8	3-5/16
-181	-206	-206	-212	RP-560	RP-564	RP-569	.55	.090	5/8	1-3/4	3	9-1/4	4-1/2

External

For use with the following retaining rings:



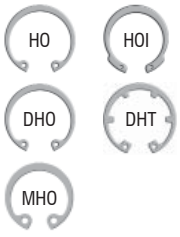
CONVERTIBLE PLIERS, EXTERNAL RING SERIES											GENERAL DIMENSIONS (inches)						
Ring Series/Size Range								ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	Weight lbs.	Tip Dia.	Tip Length A	CLOSED POSITION Clearance		Length	Width
SH-BSH-VSH		SHI		SHR		SHF											
FROM	THRU	FROM	THRU	FROM	THRU	FROM	THRU							B	C		
-25	-60	-50	-78	-39	-47	-12	-25	RP-120	RP-124	RP-129	.19	.038	9/32	1-3/8	1-5/8	5-5/8	2-9/16
-68	-87	-81	-100	-50	-66	-31	-37	RP-320	RP-324	RP-329	.19	.047	9/32	1-3/8	1-5/8	5-5/8	2-9/16'
-93	-143	-106	-200	-75	-98	-43	-75	RP-340	RP-344	RP-349	.45	.070	11/32	1-11/16	1-7/8	7-7/8	3-15/16
-150	-200	-	-	-	-	-	-	RP-560	RP-564	RP-569	.55	.090	5/8	1-7/8	3	9-1/4	4-1/2

Heavy-Duty Retaining Ring Pliers

Rotor Clip Heavy-Duty Retaining Ring Pliers are designed to perform with excessive use - up to 10 times longer than standard retaining ring pliers. The pliers are made of forged Chrome Vanadium steel, and the handles have a non-slip plastic coating. They feature inserted tips of high density drawn spring wire and a precise, smooth operating screw joint. Large contact faces on the tips helps to eliminate distortion of the ring, and the slim head style allows for use in confined areas.

Internal

For use with the following retaining rings:



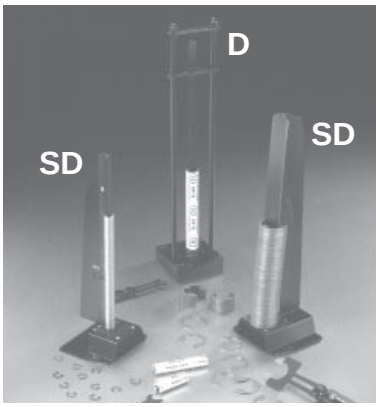
HEAVY DUTY PLIERS - INTERNAL (Inch & Metric)												
Ring Series/Size Range										ROTOR CLIP PLIERS	90° CLIP PLIERS	TIP DIAMETER
HO (in.)		HOI (in.)		DHO (DIN 472) (mm)		DHT (DIN 984) (mm)		MHO (ANSI Metric) (mm)				
FROM	THRU	FROM	THRU	FROM	THRU	FROM	THRU	FROM	THRU			(mm)
-37	-56	-75	-100	-8	-13	-	-	-8	-15	RPN-J0	RPN-J01	0.9
-62	-102	-106	-137	-12	-25	-16	-25	-15	-26	RPN-J1	RPN-J11	1.2
-106	-175	-143	-200	-19	-60	-19	-60	-27	-60	RPN-J2	RPN-J21	1.8
-181	-300	-206	-300	-40	-100	-40	-100	-62	-100	RPN-J3	RPN-J31	2.3

External

For use with the following retaining rings:

HEAVY DUTY PLIERS - EXTERNAL (Inch & Metric)												
Ring Series/Size Range										ROTOR CLIP PLIERS	90° CLIP PLIERS	TIP DIAMETER
SH (in.)		SHI (in.)		SHR (in.)		DSH (DIN 471) DST (DIN 983) (mm)		MSH (ANSI Metric) (mm)				
FROM	THRU	FROM	THRU	FROM	THRU	FROM	THRU	FROM	THRU			(mm)
-25	-66	-50	-78	-39	-47	-3	-10	-4	-12	RPN-A0	RPN-A01	0.9
-68	-87	-81	-100	-50	-66	-10	-25	-13	-23	RPN-A1	RPN-A11	1.2
-93	-143	-106	-220	-75	-98	-19	-60	-24	-36	RPN-A2	RPN-A21	1.8
-150	-350	-215	-350	-	-	-40	-100	-38	-90	RPN-A3	RPN-A31	2.3

Applicators & Dispensers



Retaining Ring Dispensers

Rotor Clip retaining ring dispensers feature "rail" over which a stack of retaining rings can be slipped. Once in position, they can be "dispensed" one at a time using a retaining ring applicator for ease of installation. Two such models are available to meet you particular dispensing needs:

Spring Rail (SD) dispensers are competitively priced and offer significant improvements (like more rail capacity and durable construction) on existing designs.

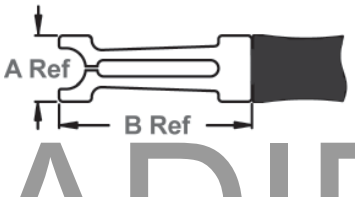
The Heavy Duty (D) is a more permanent version which features replaceable parts and can be permanently affixed to your work station. For use with Rotor Clip **C, E/SE/YE, RE, PO/POL, DE, DC, ME & JE** rings.

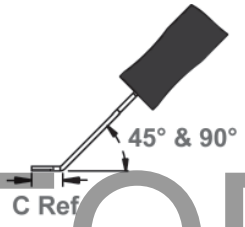
Features:

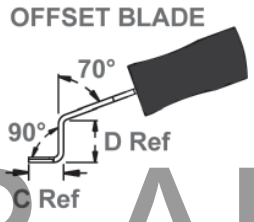
- Sturdy, Industrial-Quality Construction.
- Fast, Easy Loading.
- Accept Tape-Stacked Rings.
- Precise, Single Ring Ejection.
- Longer Rail For More Capacity.
- Part and Tool Number Stamped on Dispenser for Fast, Easy Identification of Tool and Corresponding Ring.
- Powder Metal Coating for a Durable, No-Rust Finish (Spring Rail Dispenser, Only.)

Retaining Ring Applicators

Applicators are designed to install standard inch & metric radial retaining rings on a shaft. Used with Rotor Clip Dispensers, applicators enable operators to install rings quickly and correctly and allows for installation without turning the tool (ring "snaps" when properly seated in groove.) Heat treated for strength. For use with Rotor Clip **C, E/SE/YE, BE, RE, PO/POL, EL, DE, DC, ME and JE** Retaining rings.







Please wear protective eyewear while installing and removing retaining rings & hose clamps.

E Applicators & Dispensers

For use with Rotor Clip "E/SE/YE" Rings.*

RING SIZE	APPLICATORS					DISPENSERS	
	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D	HEAVY DUTY DISP. NO.	SPRING RAIL DISP. NO.
E-4	A-010	.265	1.438	.375	.250	-	-
E-6	A-040	.265	1.438	.375	.375	D-210	SD-210
SE-6	A-020	.265	1.438	.375	.375	D-390	SD-390
YE-6	A-030	.500	1.438	.375	.375	D-460	SD-460
SE-9	A-050	.500	1.438	.375	.375	D-330	SD-395
E-9	A-510	.500	1.438	.375	.375	D-220	SD-220
SE-11	A-060	.500	1.438	.375	.375	D-400	SD-400
SE-12	A-N50	.500	1.438	.375	.375	D-231	-
E-12	A-050	.500	1.438	.375	.375	D-230	SD-230
SE-14	A-080	.500	1.438	.375	.375	D-230	SD-405
YE-14	A-090	.500	1.438	.375	.375	D-465	SD-465
E-14	A-070	.500	1.438	.375	.375	D-240	SD-240
E-15	A-100	.500	1.438	.375	.375	D-250	SD-250
SE-17	A-110	.500	1.438	.375	.375	D-410	SD-410
SE-18	A-130	.500	1.438	.375	.375	D-350	SD-415
E-18	A-120	.500	1.438	.375	.375	D-260	SD-260
SE-21	A-140	.812	2.218	.593	.625	D-360	SD-416
E-25	A-150	.812	2.218	.593	.625	D-270	SD-270
SE-31	A-160	.812	2.218	.593	.625	D-420	SD-420
SE-37	A-290	.812	2.218	.593	.625	D-608	-
E-37	A-170	.812	2.218	.593	.625	D-280	SD-280
E-43	A-180	.812	2.218	.593	.625	D-290	SD-290
SE-43	A-190	.812	2.218	.593	.625	D-430	SD-430
E-50	A-200	1.125	2.390	.765	.625	D-300	SD-300
E-62	A-210	1.125	2.390	.765	.625	D-160	SD-305
SE-74	A-220	1.562	2.625	.969	.625	D-440	SD-440
E-75	A-230	1.562	2.625	.969	.625	D-310	SD-310
E-87	A-240	1.562	2.625	.969	.625	D-320	SD-320
SE-98	A-250	1.875	2.844	1.188	.625	D-450	SD-450
SE-118	A-260	1.875	2.844	1.188	.625	-	-
SE-137	A-491	2.250	3.344	N/A	N/A	-	-

C Applicators & Dispensers

For use with Rotor Clip "C" Rings.*

RING SIZE	APPLICATORS					DISPENSERS	
	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D	HEAVY DUTY DISP. NO.	SPRING RAIL DISP. NO.
C-12	A-300	.264	1.438	.375	.375	D-10	SD-10
C-15	A-080	.500	1.438	.375	.375	D-20	SD-20
C-18	A-090	.500	1.438	.375	.375	D-30	SD-30
C-21	A-310	.350	1.438	.375	.375	D-40	SD-40
C-23	A-320	.500	1.438	.375	.375	D-50	SD-50
C-25	A-330	.500	1.438	.375	.375	D-60	SD-60
C-28	A-340	.500	1.438	.375	.375	D-70	SD-70
C-31	A-350	.500	1.438	.375	.375	D-80	SD-80
C-37	A-360	.812	2.218	.593	.625	D-90	SD-90
C-40	A-370	.812	2.218	.593	.625	D-100	SD-100
C-43	A-380	.812	2.218	.593	.625	D-110	SD-110
C-50	A-290	.812	2.218	.593	.625	D-120	SD-120
C-56	A-390	.812	2.218	.593	.625	D-130	SD-130
C-62	A-400	1.125	2.390	.765	.625	D-140	SD-140
C-68	A-410	1.125	2.390	.765	.625	D-150	SD-150
C-75	A-280	1.125	2.390	.765	.625	D-160	SD-160
C-81	A-420	1.125	2.390	.765	.625	D-170	SD-170
C-87	A-430	1.125	2.390	.765	.625	D-180	SD-180
C-93	A-440	1.562	2.625	.969	.625	-	-
C-100	A-450	1.562	2.625	.969	.625	D-190	SD-190
C-112	A-460	1.562	2.625	.969	.625	D-200	SD-200
C-125	A-470	1.562	2.625	.969	.625	-	-
C-137	A-480	1.562	1.875	1.188	.625	-	-
C-150	A-490	1.562	1.875	1.188	.625	-	-
C-162	A-491	2.250	3.344	N/A	N/A	-	-
C-175	A-492	2.250	3.344	N/A	N/A	-	-

*45°, 90° and Offset applicators for C, E and RE retaining rings - Replace the last "0" of the applicator designation with a "4" (45°), "9" (90°), or "7" (Offset.) (Ex., A-304, A-309, A-307, etc.)

Applicators & Dispensers

PO POL Applicators & Dispensers
For use with Rotor Clip "PO/POL" Rings.**

RING SIZE	APPLICATORS					DISPENSERS	
	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D	HEAVY DUTY DISP. NO.	SPRING RAIL DISP. NO.
PO-15	A-815	.500	1.438	.375	.625	D-800	SD-800
PO-18	A-818	.812	2.218	.593	.625	D-810	SD-810
PO-25	A-825	.812	2.218	.593	.625	D-820	SD-820
PO-31	A-831	.812	2.218	.593	.625	D-830	SD-830
PO-37	A-837	1.125	2.390	.765	.625	D-840	SD-840
PO-43	A-843	1.125	2.390	.765	.625	D-850	SD-850
PO-50	A-850	1.125	2.390	.765	.625	D-860	SD-860
PO-62	A-862	1.125	2.393	0.562	N/A	-	-
PO-75	A-875	1.562	2.625	0.812	N/A	-	-
PO-100	A-810	1.875	2.844	1.000	N/A	-	-
POL-15	A-915	.500	1.438	.375	.625	D-900	SD-900
POL-18	A-918	.812	2.218	.593	.625	D-910	SD-910
POL-25	A-925	.812	2.218	.593	.625	D-820	SD-920
POL-31	A-931	.812	2.218	.593	.625	D-930	SD-930
POL-37	A-937	1.125	2.390	.765	.625	D-840	SD-940
POL-43	A-943	1.125	2.390	.765	.625	D-950	SD-950
POL-50	A-950	1.125	2.390	.765	.625	D-960	SD-960
POL-62	A-962	1.125	2.393	0.562	N/A	-	-
POL-75	A-975	1.562	2.625	0.812	N/A	-	-
POL-100	A-910	1.875	2.844	1.000	N/A	-	-

Applicators for **PO/POL -62 thru -100** are sold as follows:

Heavy Duty Applicator Handles

Install large PO/POL retaining rings (sizes -62 to -100) quickly and safely. Features an applicator blade affixed to a heavy-duty handle. Plastic grip enables you to hold tool steady as you strike the rear of the tool with a hammer/mallet to install the ring. Shield at top prevents injury.

DC Applicators & Dispensers
For use with Rotor Clip "DC" Rings.**

RING SIZE	APPLICATORS	DISPENSERS	RING SIZE	APPLICATORS
	APP. NO.	HEAVY DUTY DISP. NO.		APP. NO.
DC-3	A-545	-	DC-22	A-583
DC-4	A-080	D-502	DC-23	A-584
DC-5	A-547	D-503	DC-24	A-585
DC-6	A-320	-	DC-25	A-586
DC-7	A-120	D-757	DC-26	A-586
DC-8	A-570	D-506	DC-28	A-588
DC-9	A-571	D-507	DC-30	A-589
DC-10	A-572	D-508	DC-32	A-590
DC-11	A-573	D-608	DC-35	A-591
DC-12	A-290	D-515	DC-36	A-592
DC-13	A-190	-	DC-38	A-593
DC-14	A-390	-	DC-40	A-594
DC-15	A-577	-	DC-42	A-595
DC-16	A-400	-	DC-45	A-596
DC-17	A-579	-	DC-48	A-597
DC-18	A-200	-	DC-50	A-598
DC-19	A-280	-	DC-52	A-599
DC-20	A-582	-	DC-55	A-600

Please contact Technical Sales for DC applicator specifications: +1 732.469.7333, tech@rotorclip.com.

RE Applicators & Dispensers
For use with Rotor Clip "RE" Rings.*

RING SIZE	APPLICATORS					DISPENSERS	
	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D	HEAVY DUTY DISP. NO.	SPRING RAIL DISP. NO.
RE-9	A-080	.500	1.438	.375	.375	D-330	SD-330
RE-12	A-520	.500	1.438	.375	.375	D-340	SD-340
RE-15	A-120	.500	1.438	.375	.375	D-350	SD-350
RE-18	A-130	.500	1.438	.375	.375	D-260	SD-355
RE-21	A-140	.812	2.218	.593	.625	D-360	SD-360
RE-25	A-160	.812	2.218	.593	.625	D-270	SD-365
RE-31	A-500	.812	2.218	.593	.625	D-370	SD-370
RE-37	A-170	.812	2.218	.593	.625	D-280	SD-375
RE-43	A-270	1.125	2.390	.765	.625	D-380	SD-380
RE-50	A-200	1.125	2.390	.765	.625	D-300	SD-385
RE-56	A-280	1.125	2.390	.765	.625	D-150	SD-386

ME Applicators & Dispensers
For use with Rotor Clip "ME" Rings.**

RING SIZE	APPLICATORS					DISPENSERS
	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D	HEAVY DUTY DISP. NO.
ME-1	A-010	.265	1.438	.375	.375	-
ME-2	A-040	.265	1.438	.375	.375	D-210
ME-3	A-050	.500	1.438	.375	.375	D-230
ME-4	A-100	.500	1.438	.375	.375	D-250
ME-5	A-120	.500	1.438	.375	.375	D-260
ME-6	A-140	.812	2.218	.593	.625	D-360
ME-7	A-150	.812	2.218	.593	.625	D-270
ME-8	A-290	.812	2.218	.593	.625	D-370
ME-9	A-608	.812	2.218	.593	.625	D-690
ME-10	A-170	.812	2.218	.593	.625	D-280
ME-11	A-180	.812	2.218	.593	.625	D-290
ME-12	A-609	1.125	2.390	.765	.625	D-660
ME-13	A-200	1.125	2.390	.765	.625	D-300
ME-15	A-612	1.125	2.390	.969	.625	D-672
ME-16	A-210	1.125	2.390	.765	.625	D-160
ME-22	A-240	1.125	2.625	.969	.625	D-320

JE Applicators & Dispensers
For use with Rotor Clip "JE" Rings.**

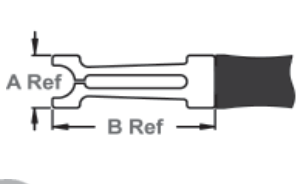
RING SIZE	APPLICATORS					DISPENSERS
	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D	HEAVY DUTY DISP. NO.
JE-2	A-080	.500	1.438	.375	.375	-
JE-2.5	A-050	.500	1.438	.375	.375	D-330
JE-3	A-070	.500	1.438	.375	.375	D-240
JE-4	A-340	.500	1.438	.375	.375	D-757
JE-5	A-605	.812	2.218	.593	.625	D-758
JE-6	A-606	.812	2.218	.593	.625	D-759
JE-7	A-607	.812	2.218	.593	.625	-
JE-8	A-608	.812	2.218	.593	.625	D-761
JE-12	A-612	1.562	2.625	.969	.625	D-730

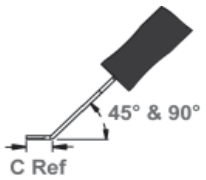
*45°, 90° and Offset applicators for C, E and RE retaining rings - Replace the last "0" of the applicator designation with a "4" (45°), "9" (90°), or "7" (Offset.) (Ex., A-304, A-309, A-307, etc.)

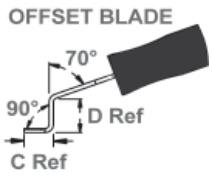
**45°, 90° and Offset applicators for DE, DC, PO/POL, EL, JE and ME retaining rings - To the end of the applicator designation, add a "4" (45°), "9" (90°), or "7" (Offset.) (Ex., A-7084, A-7089, A-7087, etc.)

Please wear protective eyewear while installing and removing retaining rings & hose clamps.

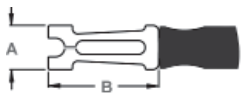
Applicators & Dispensers







For Bowed "E" Rings



Applicators & Dispensers

DE

For use with Rotor Clip **ROD STACKED** "DE" Rings.**

RING SIZE	APPLICATORS					DISPENSERS
	APP. NO.	BLADE WIDTH A (mm)	BLADE LENGTH B (mm)	TIP LENGTH C (mm)	OFFSET D (mm)	ROD STACKED DISP. NO.
DE-0,8	A-708	6.73	36.53	9.53	9.53	-
DE-1,2	A-712N	5.59	36.53	9.53	9.53	RD-712
DE-1,5	A-715N	5.59	36.53	9.53	9.53	RD-715
DE-1,9	A-719N	5.59	36.53	9.53	9.53	RD-719
DE-2,3	A-723N	7.87	36.53	9.53	9.53	RD-723
DE-3,2	A-310N	8.89	36.53	9.53	9.53	RD-732
DE-4	A-340N	11.25	36.53	9.53	9.53	RD-410
DE-5	A-605N	13.06	56.34	15.06	15.88	RD-360
DE-6	A-606N	13.92	56.34	15.06	15.88	RD-360
DE-7	A-607N	17.22	56.34	15.06	15.88	RD-607
DE-8	A-608N	18.80	56.34	15.06	15.88	RD-608
DE-9	A-609N	21.50	60.71	19.43	15.88	RD-610
DE-10	A-610N	21.59	60.71	19.43	15.88	RD-610
DE-12	A-612	39.68	66.68	24.61	15.88	-
DE-15	A-615	39.67	66.68	24.61	15.88	-
DE-19	A-619	47.63	72.24	30.18	15.88	-

Rod-Stacked Dispensers *(RD)*

Rotor Clip has developed a dispenser specifically for metric (DIN 6799) DE rings that are packaged stacked on rods (shown below.) The ends of the rod are secured to the back and top of the dispenser, and once in position, rings are dispensed one part at a time using an applicator. The compact design can be mounted on a work surface, and the corresponding ring number is stamped on the dispenser for easy identification.

Rod stacked rings and dispenser are purchased separately.

RD

Applicator

BE BSE

For use with Rotor Clip "BE/BSE" Rings.

RING SIZE	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D
BSE-11	A-550	.500	1.375	.375	.375
BE-12	A-551	.500	1.375	.375	.375
BE-14	A-552	.500	1.375	.375	.375
BSE-14	A-553	.500	1.375	.375	.375
BE-15	A-554	.500	1.375	.375	.375
BSE-17	A-555	.500	1.375	.375	.375
BE-18	A-556	.500	1.375	.375	.375
BSE-18	A-557	.500	1.375	.375	.375
BSE-21	A-558	.812	2.156	.625	.625
BE-25	A-559	.812	2.156	.625	.625
BSE-31	A-560	.812	2.156	.625	.625
BE-37	A-561	.812	2.156	.625	.625
BE-43	A-562	.812	2.156	.625	.625
BSE-43	A-563	.812	2.156	.625	.625
BE-50	A-564	1.125	2.250	.750	.875
BE-62	A-565	1.125	2.250	.750	1.000
BSE-74	A-566	1.562	2.469	1.093	1.000
BE-75	A-567	1.562	2.469	1.093	1.000
BE-87	A-568	1.562	2.469	1.093	1.000
BSE-98	A-569	1.875	2.812	1.188	1.188

Applicators & Dispensers

DE

For use with Rotor Clip **TAPE STACKED** "DE" Rings.**

Subject to availability.

RING SIZE	APPLICATORS					DISPENSERS	DISPENSERS
	APP. NO.	BLADE WIDTH A (mm)	BLADE LENGTH B (mm)	TIP LENGTH C (mm)	OFFSET D (mm)	HEAVY DUTY DISP. NO.	SPRING RAIL DISP. NO.
DE-0,8	A-708	6.73	36.53	9.53	9.53	-	-
DE-1,2	A-712	6.73	36.53	9.53	9.53	D-712	-
DE-1,5	A-715	6.73	36.53	9.53	9.53	D-715	SD-715
DE-1,9	A-719	6.73	36.53	9.53	9.53	D-715	SD-719
DE-2,3	A-723	12.70	36.53	9.53	9.53	D-723	SD-723
DE-3,2	A-310	8.89	36.53	9.53	9.53	D-732	SD-732
DE-4	A-340	12.70	36.53	9.53	9.53	D-410	SD-704
DE-5	A-605	20.62	56.34	15.06	15.88	D-360	SD-705
DE-6	A-606	20.62	56.34	15.06	15.88	D-360	SD-706
DE-7	A-607	20.62	56.34	15.06	15.88	D-607	SD-707
DE-8	A-608	20.62	56.34	15.06	15.88	D-608	SD-708
DE-9	A-609	28.58	60.71	19.43	15.88	D-610	SD-709
DE-10	A-610	28.58	60.71	19.43	15.88	D-610	SD-610
DE-12	A-612	39.67	66.68	24.61	15.88	D-612	SD-612
DE-15	A-615	39.67	66.68	24.61	15.88	-	-
DE-19	A-619	47.63	72.24	30.18	15.88	-	-

**45°, 90° and Offset applicators for DE, DC, PO/POL, EL, JE and ME retaining rings - To the end of the applicator designation, add a "4" (45°), "9" (90°), or "7" (Offset.) (Ex., A-7084, A-7089, A-7087, etc.)

Please wear protective eyewear while installing and removing retaining rings & hose clamps.

For "EL" Retaining Rings with Grip (D)

Applicator

EL

For use with Rotor Clip "EL" Rings.**

RING SIZE	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	*** REPLC. GRIPS
EL-9	A-091	.438	2.188	.375	A-091G
EL-12	A-112	.438	2.188	.375	A-112G
EL-18	A-118	.625	2.188	.563	A-118G
EL-25	A-125	.750	2.188	.625	A-125G
EL-31	A-131	1.000	2.625	.750	A-131G
EL-37	A-371	1.125	2.625	.813	A-371G
EL-43	A-143	1.125	2.625	.938	A-143G

*** An EL applicator consists of a tool and a grip. Replacement grips may be purchased without replacing the tool by using these order numbers.

TX Applicator - "Easy Guide"

Designed to comfortably fit in the palm of your hand, the lightweight TX Easy Guide allows you to painlessly install Rotor Clip's TX self-locking retaining rings. The nose is constructed from tool steel, a life extending material. Inside is a spring-loaded magnet. This magnet aggressively holds a retaining ring in place during installation. The spring, along with the magnet, retracts into the handle while the tool forces the retaining ring over the shaft. Each ring is assigned its own Easy Guide, producing maximum tool performance.

RING SIZE	EASY-GUIDE TX TOOL #	FOR SHAFT DIA.
TX-9	RP-21104	3/32"
TX-12	RP-21105	1/8"
TX-15	RP-21106	5/32"
TX-18	RP-21107	3/16"
TX-25	RP-21108	1/4"
TX-31	RP-21109	5/16"
TX-37	RP-21110	3/8"
TX-43	RP-21111	7/16"
TX-50	RP-21112	1/2"

External

For use with the following retaining ring:

TX

Please contact Technical Sales for availablity - tech@rotorclip.com

Automatic Assembly Tools

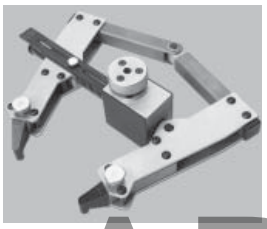
Rotor Kick Jr. (RKJ) Automated Assembly Retaining Ring Tool for RG-31 Rings

External
For use with the following retaining ring:

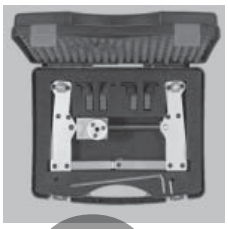
****For RG-31 only****

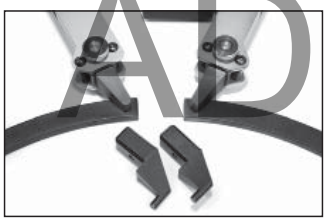
This ergonomic tool from Rotor Clip provides operator convenience and comfort along with efficient automated assembly. No electrical connections required. The tool is operated by air pressure for convenience and safety. And Carpal Tunnel Syndrome (CTS) injuries, caused by repetitive use of a manual tool, are eliminated.This hand-held tool is lightweight, portable and easy to use. A patented feeder mechanism, designed and built by Rotor Clip personnel, assures efficient, trouble-free operation.
Note: RG-31 rings must be purchased stacked for use the with Rotor Clip tool.

XXL Retaining Ring Tool

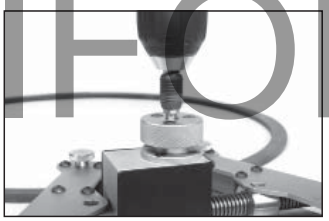


- Usable with any internal or external retaining ring from a diameter of 400 - 1000mm (15” - 40”.)
- Securely opens, closes and holds rings due to a self-locking precision spindle action.
- For fitting and removing retaining rings in one operation.
- Holds rings securely due to short, direct-contact sockets.
- High-strength, hardened and tempered tips.
- Opening width up to 250mm (with scale on request.)
- Can be operated with Allen key (Hexagonal key), ratchet wrench or cordless screwdriver.
- Interchangeable paired tips to cover different diameter ranges.

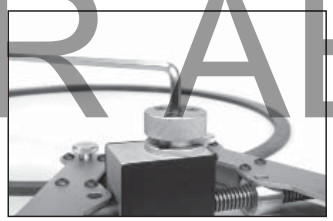




Interchangeable paired tips to cover different diameter ranges.



Automated operation.



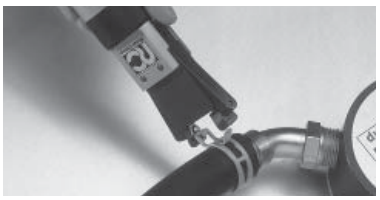
Manual operation.

USABLE FOR ANY APPLICATIONS WHERE LARGE SHAFTS AND BEARINGS TRANSMIT VERY HIGH FORCES AND TORQUES:

- Wind power plants / tidal facilities
- Generator engineering / hydroelectric power facilities
- Heavy plant engineering (rolling mill / press construction)
- Shipbuilding
- Aerospace

Please wear protective eyewear while installing and removing retaining rings & hose clamps.

Hose Clamp Tools Pneumatic



Pneumatic Hose Clamp Tools

Pneumatic Hose Clamp Tools use a compressed air line of 90 psi, and are activated by a simple lever reducing stress on the hand from repeated assembly/disassembly. Tangs of the clamp fit in the jaws of the tool and are compressed for installation or removal on the hose. Helps eliminate carpal tunnel syndrome.

Single Wire (HC/HW) Hose Clamp Pneumatic Tool (PWS). Designations for individual clamp sizes are listed left.

Double Wire (DW) Hose Clamp Pneumatic Tool (PWD). Designations for individual clamp sizes are listed left.

PWS Pneumatic Tool

HC HW

For use with Rotor Clamp Single Wire (HC/HW) hose clamps

Rotor Clamp HC No.	Pneumatic Installation Tool	Rotor Clamp HC No.	Pneumatic Installation Tool
HC-4	PWS-4	**HC-19**	PWS-19
HC-5	PWS-5	**HC-19.5**	PWS-19.5
HC-5.5	PWS-5.5	**HC-20**	PWS-20
HC-6	PWS-6	**HC-21**	PWS-21
HC-7	PWS-7	**HC-22**	PWS-22
HC-7.5	PWS-7.5	**HC-23**	PWS-23
HC-8	PWS-8	**HC-24**	PWS-24
HC-8.5	PWS-8.5	**HC-25**	PWS-25
HC-9	PWS-9	**HC-26**	PWS-26
HC-9.5	PWS-9.5	**HC-28**	PWS-28
HC-10	PWS-10	**HC-30**	PWS-30
HC-10.5	PWS-10.5	**HC-31**	PWS-31
HC-11	PWS-11	**HC-32**	PWS-32
HC-12	PWS-12	**HC-34**	PWS-34
HC-13	PWS-13	**HC-35**	PWS-35
HC-14	PWS-14	**HC-36**	PWS-36
HC-15	PWS-15	**HC-38**	PWS-38
HC-16	PWS-16	**HC-40**	PWS-40
HC-17	PWS-17	**HC-42**	PWS-42
HC-17.5	PWS-17.5	**HC-46**	PWS-46
HC-18	PWS-18	**HC-50**	PWS-50
HC-188	PWS-188		

PWD Pneumatic Tool

DW

For use with Rotor Clamp Double Wire (DW) hose clamps

Rotor Clamp DW No.	Pneumatic Installation Tool	Rotor Clamp DW No.	Pneumatic Installation Tool
DW-4.5	PWD-4.5	**DW-17**	PWD-17
DW-5	PWD-5	**DW-17.5**	PWD-17.5
DW-5.5	PWD-5.5	**DW-18**	PWD-18
DW-6	PWD-6	**DW-19**	PWD-19
DW-6.5	PWD-6.5	**DW-19.5**	PWD-19.5
DW-7	PWD-7	**DW-20**	PWD-20
DW-8	PWD-8	**DW-21**	PWD-21
DW-8.5	PWD-8.5	**DW-22**	PWD-22
DW-9	PWD-9	**DW-22.5**	PWD-22.5
DW-9.5	PWD-9.5	**DW-23**	PWD-23
DW-10	PWD-10	**DW-24**	PWD-24
DW-10.5	PWD-10.5	**DW-25**	PWD-25
DW-11	PWD-11	**DW-26**	PWD-26
DW-11.5	PWD-11.5	**DW-27**	PWD-27
DW-12	PWD-12	**DW-28**	PWD-28
DW-12.5	PWD-12.5	**DW-30**	PWD-30
DW-13	PWD-13	**DW-31**	PWD-31
DW-14	PWD-14	**DW-32**	PWD-32
DW-14.5	PWD-14.5	**DW-34**	PWD-34
DW-15	PWD-15	**DW-35**	PWD-35
DW-16	PWD-16	**DW-36**	PWD-36

PBC-1 Pneumatic Tool

CTB

For use with Rotor Clamp Constant Tension Band (CTB) hose clamps.

Specify **PBC-1** for any Rotor Clamp CTB Hose Clamp you are installing. One size fits all.

Please wear protective eyewear while installing and removing retaining rings & hose clamps.

Hose Clamp Tools Manual

KC-18 Pliers

For use with single wire "HC" hose clamps:

HC

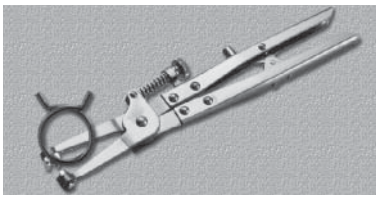
Single Wire Hose Clamp Plier (KC-18)

Install Rotor Clamp Single Wire (HC) hose clamps quickly and easily using this simple hand tool. ONE SIZE FITS ALL. Specify **KC-18** for any Rotor Clamp Single Wire (HC) hose clamp you are installing.

HAZ-2 Pliers

For use with single wire "HC" hose clamps:

HC



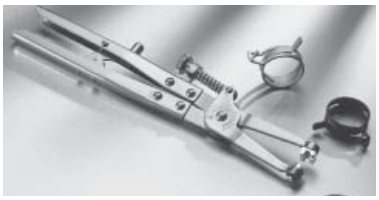
Single Wire Hose Clamp Plier - Heavy Duty (HAZ-2)

A heavy-duty version of the Single Wire Pliers (KC-18). Tool locks into place when clamp is fully compressed, relieving hand pressure when installing/removing. Tips can be adjusted to desired clamp opening to ensure fast, consistent installation or removal. ONE SIZE FITS ALL. Specify **HAZ-2** for any Rotor Clamp Single wire (HC) hose clamp you are installing.

HAZ-1 Pliers

For use with Constant Tension Band "CTB" hose clamps:

CTB



Constant Tension Band Hose Clamp Plier (HAZ-1)

A rugged easy-to-use application tool for CTB hose clamps. Tool locks into place when clamp is fully compressed, relieving hand pressure when installing/removing. Tips can be adjusted to desired clamp opening to ensure fast, consistent installation or removal. ONE SIZE FITS ALL. Specify HAZ-1 for any Rotor Clamp Constant Tension Band (CTB) hose clamp you are installing.

Retaining Ring Plier Kits

Retaining Ring Plier Kits

Stock the tools you use the most with any or all of these four retaining ring plier kits. Rugged carrying cases provide portability and durability in a manufacturing/factory environment. Tools are designed to fit a wide range of sizes from 3/8" to 4" diameter retaining rings, meeting most everyday MRO requirements. Rotor Clip Plier Kits can be easily stored on a bench or in a maintenance cabinet/storage area. Descriptions and specifications follow.

Retaining Ring Plier Kits
For use with the following retaining rings:

** Convertible Plier Kit only

Replaceable Tip Pliers Kit (RPK#1)

Contains one internal and one external plier in a reusable, clear plastic case. Features eight pair of replaceable tips that can be easily affixed to the end of the pliers to cover internal/external retaining rings from 3/8" to 2" . . . Small enough to fit in your pocket!

Ratchet Pliers Kit (RPK#2)

Features two ratchet pliers for internal/external retaining rings. Handles larger retaining rings up to 4". Ratchet mechanism compresses (internal rings) and/or expands (external rings) through gradual steps, minimizing operator fatigue and effort.

Convertible Pliers Kit (RPK#3)

Contains 12 pliers which can be easily converted from internal to external and back again. Includes straight, 45° and 90° tip pliers that will fit retaining rings up to 2" in diameter. Does the work of 24 individual tools!

Mini Convertible Pliers Kit (RPK#6)

This abbreviated version of the RPK#3 features 6 pliers in straight and 90° configurations that will fit retaining rings up to 2" in diameter. Durable plastic case is easily stored in the tightest of spaces.

Retaining Ring Kits

RPK#4 Retaining Ring Kit
Contains the following styles of retaining rings:

Rotor Pack (RPK#4)

Rotor Pack features 1,000 retaining rings in four durable, clear-plastic boxes with easy snap on/off lids. Boxes fit into slots on a plastic holder which folds in half into a convenient, portable carrying case.

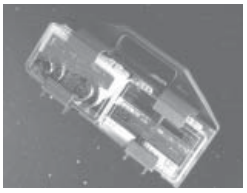
Rotor Pack contains internal ring sizes that will fit housings/bores from 3/8" in diameter to 1-1/8". External rings in the kit will accommodate shaft sizes from 1/4" to 1-1/8". Contains 2 pliers to fit every ring in the kit.

ROTOR PACK - RPK #4

Rotor Clip Number	Housing Dia. (In.)	Qty.	Rotor Clip Number	Shaft Dia. (In.)	Qty.
HO-37	3/8	50	SH-25	1/4	50
HO-43	7/16	50	SH-31	5/16	50
HO-50	1/2	50	SH-37	3/8	50
HO-56	9/16	50	SH-43	7/16	50
HO-62	5/8	50	SH-50	1/2	50
HO-75	3/4	50	SH-56	9/16	50
HO-87	7/8	50	SH-62	5/8	50
HO-100	1	50	SH-75	3/4	50
HO-112	1-1/8	50	SH-87	7/8	50
			SH-100	1	50
			SH-112	1-1/8	50

RPK#5 "E" Retaining Ring Kit
Contains the following styles of retaining rings:

Rotor Pack, Jr. (RPK#5)



Rotor Pack Jr. contains over 1,500 "E" retaining rings in four durable, clear plastic boxes with easy snap on/off lids. Boxes fit into slots on a plastic holder which folds in half into a convenient, portable carrying case.

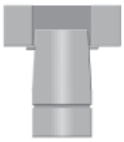
Rotor Pack Jr. contains "E" rings accommodating shaft sizes from 1/16" in diameter to 1-3/16".

ROTOR PACK JR. - RPK#5

Rotor Clip Number	Shaft Dia. (In.)	Qty.	Rotor Clip Number	Shaft Dia. (In.)	Qty.
E-6	1/16	200	E-62	5/8	40
E-9	3/32	150	E-75	3/4	15
E-12	1/8	150	E-87	7/8	15
E-14	9/64	100	SE-9	3/32	150
E-15	5/32	100	SE-11	7/64	150
E-18	3/16	100	SE-17	11/64	100
E-25	1/4	50	SE-21	7/32	50
E-37	3/8	50	SE-31	5/16	50
E-43	7/16	50	SE-98	63/64	15
E-50	1/2	40	SE-118	1-3/16	12

Please wear protective eyewear while installing and removing retaining rings & hose clamps.

Automated Assembly Axial Rings



Automated Assembly is used in the manufacturing process as a cost reduction tool that additionally achieves increased production rate and added quality through repeatability. The same holds true for automated assembly of retaining rings. Parts can be assembled fast, reducing costs without sacrificing quality. Properly designed installation equipment shuttles the ring into the groove without disruption and guards against permanent set (overstretching/over- compressing of ring) to ensure a tight fit.

Design Considerations

Feed equipment should be designed to work with rings meeting standard specifications. Most critical is to design equipment that can accommodate the helix and pitch limitations for the type of ring you are using. If the equipment is sensitive to any of these factors, it will require special processing that will add to your costs. Design guidelines include:

1. Consider use of a tapered mandrel for external retaining rings and a tapered housing for internal retaining rings (see illustrations). It is not recommended to pick up and transfer rings by the lug holes.

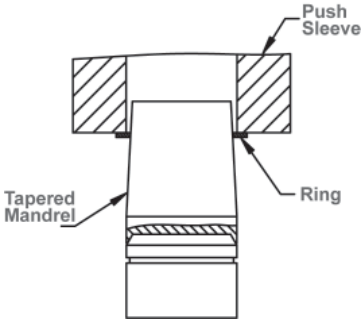
2. Feed parts onto the tapered mandrel or into the tapered housing using a “feed finger” mechanism. Make sure the rings are fed in the proper direction and in the proper manner as depicted to avoid sensitivity to ring pitch.

3. Feed finger thickness should be sized per ring: 80% of the ring minimum thickness. (For example: If ring thickness is .025” +/-.002, feed finger should be .018” thick -- .023 X 80%.)

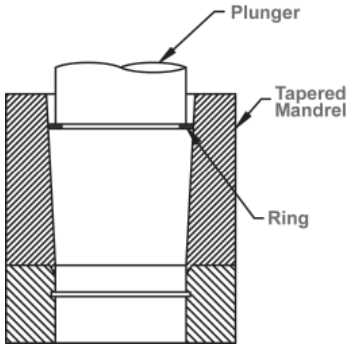
4. Limit shuttle distance to a minimum from feed mandrel to installation on assembly.

5. Do not incorporate extension sleeves to tapered mandrel/ tapered housing. This may exceed the expansion/compression limits of the ring causing it to fail. (Note: extension sleeves are typically used to guard against scratching/marring the finish of the shaft or housing. If this is a concern, please consult Rotor Clip Technical Sales).

6. Incorporate complementary chamfers to the assembly and installation mandrels.



EXTERNAL
Use tapered mandrel to expand ring and install in groove on shaft. ***(Note: angle of inclination of taper should be 3-5 degrees).***



INTERNAL
Use tapered housing to compress ring and install in groove in housing. ***(Note: angle of inclination of taper should be 3-5 degrees).***

Figure A - This is the preferred way to transfer feed an internal ring into a tapered housing by inserting the mechanism between the lugs **(Note: Finger thickness should be 80% of the minimum ring thickness).**

Figure B - This is the preferred way to transfer feed an external ring onto a tapered mandrel by using a slide with a complementary cut out for the lugs. **(Note: Finger thickness should be 80% of the minimum ring thickness).**

Contact Technical Sales for more information:
tech@rotorclip.com
+1 732.469.7333

Static Thrust Loads

1. ALLOWABLE THRUST LOADS - RINGS (P_r or P'_r)

Maximum allowable static thrust capacities for rings normally used with grooves are listed in the data charts for each ring type. The load limits are given for rings (P_r or P'_r) and grooves (P_g).

The values for P_r or P'_r are applicable only when the ring is installed in a housing or on a shaft made of hardened steel where the thrust load capacity of the groove is equal to or greater than that of the ring. When the ring is seated in a groove cut in softer material, and P_g is less than P_r or P'_r, P_g becomes the limiting factor in the assembly.

For maximum thrust capacity in both static and dynamic loading, the abutting face of the retained part should have a square corner. Fit of the retained part in the housing or on a shaft should allow reasonably concentric uniform loading against the ring.

Table 1: Shear Strength of Ring Material

Material	Ring Series	Ring Thickness (in.)	Shear Strength (psi)
Carbon Spring Steel (SAE 1060-1090)	HO, SH, BHO, BSH, VHO, VSH, HOI, SHI, C	Up to and including .035	120,000
		.042 and over	150,000
	SHR	.035 and over	150,000
	SHM	.020 and .025	120,000
		.035 and over	150,000
	LC, RE, PO/POL	All available	150,000
	BE, E	.010 and .015	100,000
		.025	120,000
		.035 and over	150,000
	EL	All available	130,000
Beryllium Copper (Alloy #25 UNS C17200)	SH	.010 and .015 (Sizes -12 thru -23)	110,000
	BSH	.015 (Sizes -18 thru -23)	110,000
	E	.010 (Size -4 only)	95,000

When there is radial play between the retained part and the shaft or housing, such play must be treated as though the retained part had a chamfered corner. The magnitude of the chamfer should be considered equal to the play. Loading data for rings abutted by chamfered parts (P'_r) as shown in the specific ring data charts must be considered. (See CORNER RADII & CHAMFERS, page 257, right column.)

Allowable load capacities for rings (P_r) apply only to standard thickness rings made of standard materials using the shear strength values listed in Table 1, below, left.

When the following special materials are used, multiply the allowable thrust load of the ring by the conversion factor shown below.

Ring Material	Type	Rotor Clip Code	Conversion Factor All Sizes
Stainless Steel	PH 15-7Mo or equivalent AISI 632-AMS 5520	SS	1.0
Beryllium Copper*	Alloy = 25, UNS C17200	BC	0.75

* Except those noted in Table 1.

2. ALLOWABLE THRUST LOADS — GROOVES (P_g)

The allowable thrust loads listed in column Pg of the data charts for rings used in grooves are based upon a housing or shaft material of cold rolled steel with a tensile yield strength of 45,000 psi. In the case of Series VHO and VSH beveled rings, the values given are for minimum contact between ring and groove—i.e., engagement of the beveled edge of the ring with the beveled groove wall at a length equal to half of the groove depth (d/2).

When the following materials are used, multiply the allowable thrust load of the groove by the conversion factor shown below.

Groove Material	Tensile Yield Strength Type	Conversion Factor
Hardened Steel (RC-40)	150,000 psi	3.3
Hardened Steel (RC-50)	200,000 psi	4.45
Aluminum (2024-T4)	40,000 psi	0.89
Brass (Naval)	30,000 psi	0.66
Other	x psi	x psi/45,000

3. CALCULATING EDGE MARGIN

The distance from the groove to the end of the shaft or housing is known as edge margin. Edge margin is a calculated distance based on the relationship between the edge margin (y) and the groove depth (d). When y/d≥3, the groove will withstand the maximum thrust load as indicated in the Rotor Clip catalog specification page for that particular size and type of retaining ring.

Example: SH-50 external retaining ring installed on a cold-rolled steel shaft. The catalog specifications for this ring call; for a minimum edge margin of 0.048" and a groove depth of 0.016." Our formula is as follows:

$$y/d \geq 3 \quad \frac{0.048"}{0.016"} = 3$$

There is sufficient edge margin for the groove to withstand the maximum thrust load of 550lbs. listed in the catalog specifications. If an application requires an edge margin less than the recommended specifications, it is necessary to calculate the thrust load (P_g)-capacity of the groove, to determine if the reduced margin is capable of handling the anticipated thrust load. The following formula applies (Note: see Correction Factors table for Gf value; Yield Strength of Groove Material for σ_y value; Edge Margin Graph for K_1 value; Nomenclature Table for remaining catalog specifications):

$$P_g = \frac{G_f D_s d \pi \sigma_y}{K_1 F_s}$$

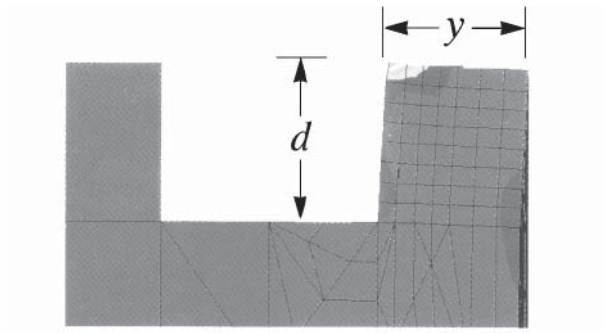
For this example, assume that the edge margin will only be half the listed catalog value or, y/d=1.5. The above equation is as follows:

$$Pg = \frac{(1)\ .5 \times .016 \times 3.14 \times 45{,}000}{2.20\ (2)}$$

$$= \frac{1130.4}{4.40}$$

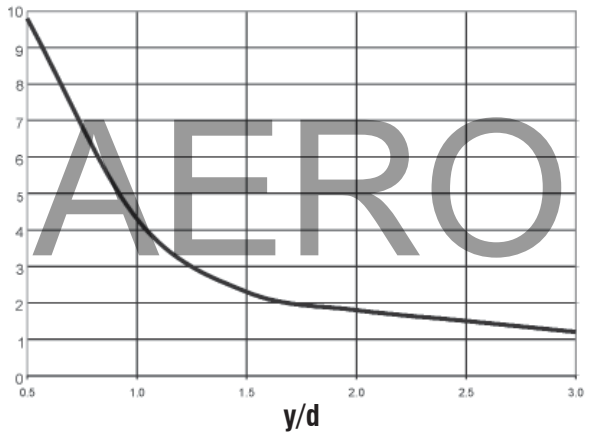
$$= 256.9 \text{ lbs.}$$

Maximum thrust load for reduced edge margin



Finite Element Analysis shows stress gradients for a retaining rings in an application with insufficient edge margin. When loaded, the high stress region extends over the entire groove wall to the end of the shaft (or housing) and the groove wall actually distorts.Under these conditions, the ring would buckle, possibly leading to catastrophic failure.

EDGE MARGIN



Yield Strength of Groove Material	
Groove Material	Yield Strength (psi)
Cold-drawn steel (SAE 1010)	45,000
Steel (SAE 1045, Rc 42)	185,000
Steel (SAE 1045, Rc 48)	220,000
Aluminum (2042-T4, Rb 75)	48,000
Naval Brass (Rb 82)	53,000

Correction Factors	
Ring Series	Correction Factor, G_f
HO, MHO	1.20
SHI, HOI	0.50
SH, MSH	1.00
C, MC	0.50
E, ME	0.33
RE, MRE	0.25
SHR, MSR	2.00
PO	0.50
SHM	1.00

Nomenclature Table
d = Groove depth, in.
D_s = Shaft or housing diameter, in.
F_s = Safety Factor
G_f = Correction Factor
K_1 = Edge Margin
P_g = Thrust Load on Groove, lb.
σ_v = Tensile Yield Strength of groove material, psi

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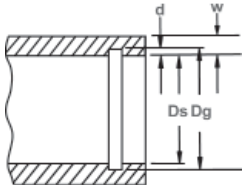
4. THICKNESS OF HOUSINGS AND HOLLOW SHAFTS

The allowable load of a part in which a retaining ring groove is cut depends upon the ultimate tensile strength and tensile yield strength of the material used, and on the bearing area of the ring against the groove wall. For internal rings used in bores and housings — and external rings assembled on hollow shafts — wall thickness dimension w, illustrated below, can be calculated from the formulas:

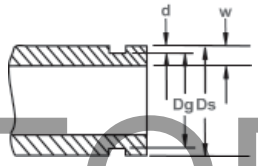
For internal rings:

$$w = \sqrt{\frac{3G_f D_S d\sigma_y}{\sigma_u} + \frac{D_g^2}{4}} - \left[\frac{D_S}{2}\right]$$



For external rings:

$$w = \frac{D_S}{2} - \sqrt{\frac{D_g^2}{4} - \frac{3G_f D_S d\sigma_y}{\sigma_u}}$$



where:

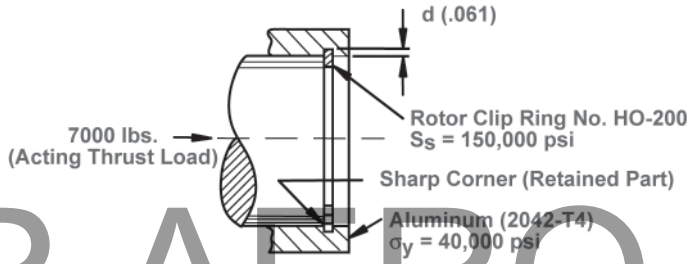
D_S = Shaft or housing dia. (in.)
D_g = Groove dia. (in.)
G_f = Correction Factor [See Table 2, Page 255]
d = Groove depth (in.)
σ_y = Tensile yield strength of groove material (psi) [See Table 3, Page 258]
σ_u = Ultimate tensile strength of groove material (psi)

These formulas provide for a wall thickness that is safe for allowable groove thrust loads (P_g) calculated with the formula at the right. If substantially lighter loads will be encountered and a thinner wall is desired, actual tests are recommended.

5. LOAD LIMIT FORMULAS

Formulas for determining ring and groove load limits — with sample calculations for Series HO internal rings and Series SH external rings — are given below. The loads are calculated for retained parts having sharp corners. Correction factors (G_f) for calculating P_r and P_g are given in Table 2 on right. The correction factors are based upon the load characteristics of the rings.

In these examples assume $y \geq 3d$. Therefore, $K = 1$ (see previous page) and is not shown in formulas for P_g.



Internal Ring (Example: Series HO-200)

ALLOWABLE THRUST LOAD — RING (P_r in lbs.)

$$P_r = \frac{G_f D_h T \pi S_s}{F_s}$$

where:

G_f = Conversion Factor [See Table 2, Page 255]
D_h = Housing dia. (in.)
T = Ring thickness (in.)
S_s = Shear Strength of ring material (psi) [See Table 1, Page 252]
F_s = Safety factor

$$P_r = \frac{(1.2)\ 2.000\ (.062)\ \pi\ 150{,}000}{4}$$

$$= 17{,}500 \text{ lbs.} > 7000 \text{ lbs.}$$

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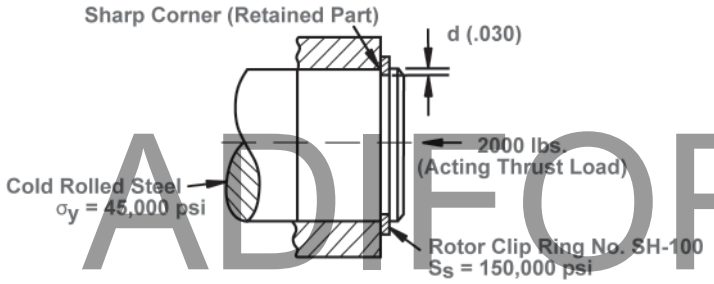
ALLOWABLE THRUST LOAD — GROOVE (P_g in lbs.)

$$P_g = \frac{G_f\, D_h\, d\, \pi\, \sigma_y}{F_s}$$

where:

G_f = Correction Factor [See Table 2, right]
D_h = Housing dia. (in.)
d = Groove depth (in.)
σ_y = Tensile yield strength of groove material (psi) [See Table 3, Page 258]
F_s = Safety factor

$$P_g = \frac{(1.2)\ 2.000\ (.061)\ \pi\ 40,000}{2} = 9200 \text{ lbs.} > 7000 \text{ lbs.}$$



External Ring (Example: Series SH-100)

ALLOWABLE THRUST LOAD — RING (Pr in lbs.)

$$P_r = \frac{G_f\, D_S\, T\, \pi\, S_S}{F_s}$$

where:

G_f = Conversion Factor [See Table 2, right]
D_S = Shaft dia. (in.)
T = Ring thickness (in.)
S_S = Shear Strength of ring material (psi) [See Table 1, Page 252]
F_s = Safety factor

$$P_r = \frac{(1)\ 1.000\ (.042)\ \pi\ 150,000}{4} = 4950 \text{ lbs.} > 2000 \text{ lbs}$$

ALLOWABLE THRUST LOAD — GROOVE (P_g in lbs.)

$$P_g = \frac{G_f\, D_S\, d\, \pi\, \sigma_y}{F_s}$$

Note: For series RE only: Substitue value of groove diameter (D_g) for shaft diameter (D_S)

where:

G_f = Conversion Factor [See Table 2, below]
D_S = Shaft dia. (in.)
d = Groove depth (in.)
σ_y = Tensile yield strength of groove material (psi) [See Table 3, Page 258]
F_s = Safety factor

$$P_g = \frac{(1)\ 1.000\ (.030)\ \pi\ 45,000}{2} = 2100 \text{ lbs.} > 2000 \text{ lbs}$$

Table 2: Correction Factors (G_f) for Calculating P_r and P_g

Ring Series	Correction Factor G_f	
	Ring: P_r	Groove: P_g
HO, BHO, MHO	1.2	1.2
VHO	1.2	1.2 (Use d/2 instead of d)
HOI, SHI	2/3	1/2
SH, BSH, MSH	1	1
VSH	1	1 (Use d/2 instead of d)
C, MC	1/2	1/2
LC	3/4	3/4
BE, E, ME	1/3	1/3
RE, MRE	1/4	1/4
EL	Use listed data chart values	1/2
SHR, MSR	1.3	2
PO	1/2	1/2
SHM	Inquire	1

Dynamic Thrust Loads

Dynamic conditions most often encountered in retaining ring assemblies include sudden loading, impact, vibration, and relative rotation. Very often the loading pattern is cyclical in nature and may induce fatigue in the assembly. Where dynamic loads are likely to exist, it is necessary that actual tests of such applications be made by the ring user to insure proper functioning of the assembly. The following formulas are given for calculating the ring and or groove thrust load capacity for various conditions.

1. SUDDEN LOADING

This can occur when a surge in thrust load is transmitted to a ring installed in a tight assembly, without play between the retained part and the ring. Sudden loads of this nature should not exceed, at their maximum, 50% of the allowable static thrust load (P_r or P_g, whichever is lower).

2. IMPACT LOADING

To calculate the safe impact load capacity of the ring (I_r), the following formula should be used:

$$I_r = \frac{P_r\, t}{2}$$

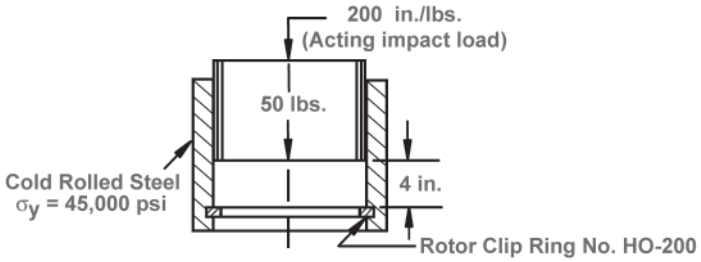
where: I_r = Allowable impact load (in. lbs.)
P_r = Allowable thrust load of ring (lbs.)
t = Ring thickness (in.)

The formula for calculating the safe impact load capacity of the groove (I_g) is:

$$I_g = \frac{P_g d}{2}$$

where: I_g = Allowable impact load (in. lbs.)
P_g = Allowable thrust load of groove (lbs.)
d = Nominal groove depth (in.)

- **Internal Ring (Example: Series HO-200)**



FOR THE RING: $I_r = \frac{P_r t}{2} = \frac{17{,}500\ (.062)}{2}$
$= 540$ in. lbs. $>$ 200 in. lbs.

FOR THE GROOVE: $I_g = \frac{P_g d}{2} = \frac{10{,}400\ (.061)}{2}$
$= 320$ in. lbs. $>$ 200 in. lbs.

3. VIBRATION LOADING

It is possible to calculate the approximate vibration load capacity of a ring and groove if there is a tight fit between the ring and the abutting retained part. (If there is space between the ring and the part, the load capacity must be calculated as impact.)

The formula for calculating the vibration load capacity of the ring is: $wa \leq 540\ P_r$

where: w = Weight of retained parts (lbs.)
a = Acceleration of parts (in./sec.^{2})
P_r = Allowable thrust load of ring (lbs.)

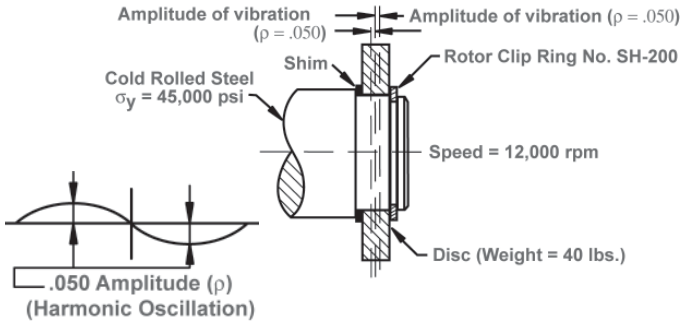
To calculate the vibration load capacity of the groove, the formula is: $wa \leq 400\ P_g$

where: w = Weight of retained parts (lbs.)
a = Acceleration of parts (in. sec.^{2})
P_g = Allowable thrust load of groove (lbs.)

Harmonic oscillation for both ring and groove may be calculated with the following formula: $a \cong 40\ pf^2$

where: a = Acceleration of parts (in./sec.^{2})
p = Amplitude (in.)
f = Frequency (cycles/sec.)

• Sample Calculation (Example: Series SH-200)



FOR THE RING: $wa \leq 540\ P_r$

For harmonic oscillation:

$a \cong 40\ pf^2$

$f = \frac{12{,}000}{60} = 200$ cycles/sec.

$a \cong 40\ (.050)\ 200^2 = 80{,}000$ in./sec.^{2}

$wa = (40)\ (80{,}000) = 3.2 \times 10^6$

$540\ P_r = (540)\ (14{,}600) = 7.9 \times 10^6$

$\therefore wa < 540P_r$ and ring is safe

FOR THE GROOVE:

$wa \leq 400\ P_g$

$wa = 3.2 \times 10^6$

$400\ P_g = (400)\ (8050) = 3.22 \times 10^6$

$\therefore wa < 400\ P_g$ and groove strength is adequate.

Corner Radii and Chamfers - R_{max} and Ch_{max}

All of the formulas above and the values for Pr given in the data charts for each ring type are calculated for assemblies in which the retained parts have square corners. If the abutting face of the retained part has a corner radius or chamfer, the assembly's thrust load capacity will be lower. A Series HO-100 ring which abuts a square-cornered part, for example, has a static thrust capacity of 5,950 lbs. The same ring, seated next to a part having the maximum allowable corner radius or chamfer, has an allowable load of 1,650 lbs.

Maximum allowable corner radii and chamfers for each ring size are listed in the charts with corresponding static thrust capacities. If these thrust capacities are not sufficient for the assembly, a rigid square-cornered flat washer should be inserted between the part and the ring. The thrust capacity of the assembly will then be approximately the same as if a square-cornered retained part had been used.

When the actual corner radius or chamfer is less than the listed maximum, the allowable thrust load of the assembly increases proportionately in accordance with the following formulas:

$$P''_r = P'_r \frac{R_{max.}}{R} \quad \text{(for radius)}$$

$$P''_r = P'_r \frac{Ch_{max.}}{Ch} \quad \text{(for chamfer)}$$

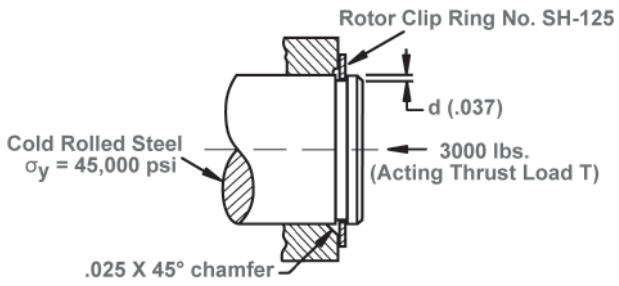
where: P''_r = Allowable assembly load when corner radius or chamfer is less than listed maximum
P'_r = Listed allowable assembly load with maximum corner radius or chamfer
$R_{max.}$ = Listed maximum allowable corner radius
R = Actual corner radius
$Ch_{max.}$ = Listed maximum allowable chamfer
Ch = Actual chamfer

(Continued on next page...)

Corner Radii and Chamfers - R_{max} and Ch_{max}

Continued...

• Sample Calculation (Example: Series SH-125)



ALLOWABLE THRUST LOAD — RING (P''_r in lbs.)

$$P''_r = P'_r \frac{Ch_{max.}}{Ch} = \frac{(1950)\ (.041)}{.025}$$

$P''_r = 3200$ lbs. > 3000 lbs.

ALLOWABLE THRUST LOAD — GROOVE (P_g in lbs.)

$$P_g = \frac{G_f\ D_s\ d\ \pi\ \sigma_y}{Fs}$$ (See formula derivation page 253)

$$P_g = \frac{(1)1.250(.037)\ \pi\ (45{,}000)}{2}$$

$P_g = 3270$ lbs. > 3000 lbs.

NOTE: If the allowable thrust load capacity of the ring (P_r) or the groove (P_g) is less than P''_r, P_r or P_g — whichever is lower — becomes the limiting factor in the assembly.

ELASTIC DEFORMATION WITH CORNER RADII OR CHAMFERS

Elastic deformation of an assembly (retained part, retaining ring and groove wall) where the retained part has a corner radius or chamfer can be calculated with the following formulas:

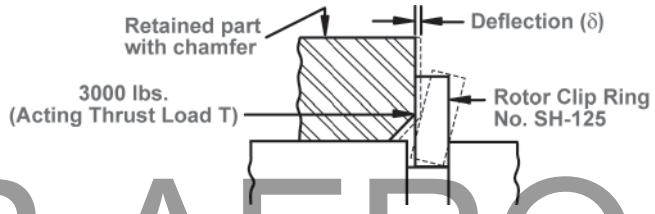
$$\delta = \frac{T\ (.01)\ D_S\ (R + t/4\ )}{(P''_r)\ t}$$ (for radius)

$$\delta = \frac{T\ (.01)\ D_S\ (Ch + t/4\ )}{(P''_r)\ t}$$ (for chamfer)

where: δ = Deflection (in.)
T = Acting thrust load (lbs.)
D_S = Shaft or housing dia. (in.)
R = Actual radius (in.)
Ch = Actual chamfer (in.)
t = Ring thickness (in.)
P''_r = Allowable thrust load of ring when actual corner radius or chamfer is less than listed maximum (lbs.)

NOTE: R and Ch cannot exceed the values for R_{max} and Ch_{max} listed in the data charts for the individual ring types.

• Sample Calculation (Example: Series SH-125)



$$\delta = \frac{T(.01)\ D_S\ (Ch + t/4\ )}{(P''_r)\ t}$$

$$\delta = \frac{(3000)\ (.01)\ (1.250)\ (.025 + .0125)}{(3200)\ (.050)} \cong .0087 \text{ in.}$$

Table 3: Tensile Yield Strength of Groove Material

Groove Material	Tensile Yield Strength (psi)
Cold-drawn steel (SAE 1010)	45,000
Hardened steel (RC-40)	150,000
Hardened steel (RC-50)	200,000
Steel (SAE 1045, Rc 42)	185,000
Steel (SAE 1045, Rc 48)	220,000
Aluminum (2024-T4)	40,000
Aluminum (2042-T4, Rb 75)	48,000
Naval Brass	30,000
Naval Brass (Rb 82)	53,000

Table 4: Maximum Working Stress of Ring During Expansion or Contraction

Ring Material	Rotor Clip Code	Maximum Allowable Working Stress (psi)
Carbon Spring Steel (SAE 1075)	ST	250,000
Stainless Steel (PH 15-7 Mo)	SS	250,000
Beryllium Copper (Alloy #25)	BC	200,000

Relative Rotation

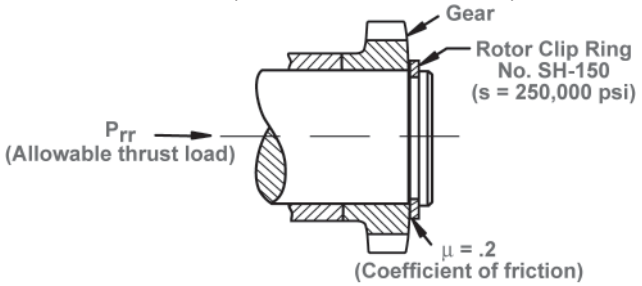
When a retained part rotates relative to and exerts thrust on the ring, frictional forces act on the ring body. Relative rotation can reduce substantially the thrust capacity of the assembly. The use of a keyed washer or other non-rotating device between ring and retained part to eliminate relative rotation should be considered.

To prevent the rings from being "walked out" or otherwise unseated from the groove, maximum allowable rotating thrust loads may be calculated from the following formula:

$$P_{rr} \leq \frac{s\ t\ E^2}{\mu\ 18\ D_S}$$

where: P_{rr} = Allowable thrust load exerted by adjacent part (lbs.)
s = Maximum working stress of ring during expansion or contraction [See Table 4, left]
t = Ring thickness (in.)
E = Largest section of ring (in.)
μ = Coefficient of friction between ring and retained part or groove whichever is higher (consult appropriate references)
D_S = Shaft or housing dia. (in.)

• Sample Calculation (Example: Series SH-150)



$$P_{rr} \leq \frac{s\ t\ E^2}{\mu\ 18\ Ds}$$

$$Prr \leq \frac{250{,}000\ (.050)\ (.168)^2}{.2\ (18)\ (1.500)} = 65 \text{ lbs. max.}$$

NOTE: Relative rotation applies to the following rings made of standard materials when used in grooves: Series HO, BHO, VHO, HOI, SH, BSH, VSH, C,SHI, BE, E, RE, SHR, PO, SHF and SHM. Series LC and EL are not affected.

Deflection

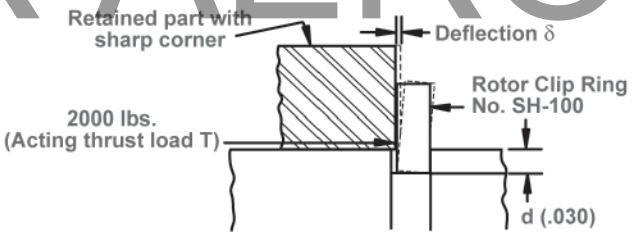
Permanent deflection of ring assemblies (retained part, retaining ring and groove wall), permitting movement of the retained parts, is negligible when loads do not exceed the governing allowable thrust load (static, impact, vibration, etc. — whichever is present).

Elastic deformation, which is a temporary displacement of the retained part under load, can be calculated by the following formula:

$$\delta = \frac{T}{E\ d}$$

where: δ = Deflection (in.)
T = Acting load (lbs.)
E = Modulus of elasticity of groove material
d = Groove depth (in.)

• Sample Calculation (Example: Series SH-100)



$$\delta = \frac{T}{E\ d} = \frac{2000}{3\ X10^7\ (.030)} = .0022"$$

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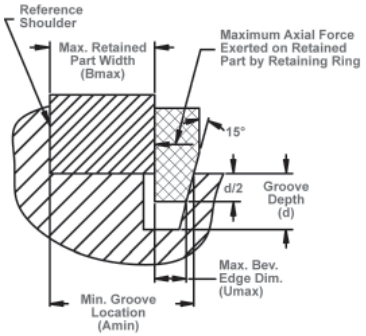
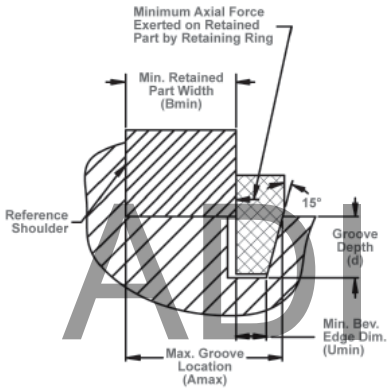
Formulas Beveled Retaining Rings

The purpose of beveled rings, when used within their specified limits, is to assure the user that in all assemblies there will always be an axial force exerted on the retained part by the retaining ring. This concept is illustrated below:



Ring Seated at Minimum Depth



Ring Seated at Maximum Depth (Near Groove Bottom)

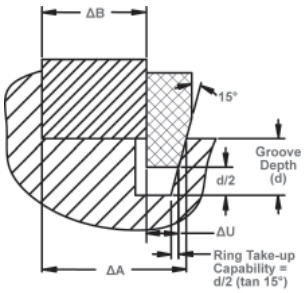
In almost all applications, the ring will seat at depth somewhere in between the limits shown.

The allowable "take-up" capability of a ring is its ability to compensate for the dimensional variation of the components in an assembly. Whether a beveled ring can be used in this way depends on two factors:

1. The summation of the three relevant tolerances which determine the take-up required. As can be seen in the drawing (upper right), these parameters are the variation in retained part width (ΔB), groove location (ΔA), and ring beveled edge (ΔU). For simplicity of analysis, the groove and ring 15° angles are assumed to have no variability.

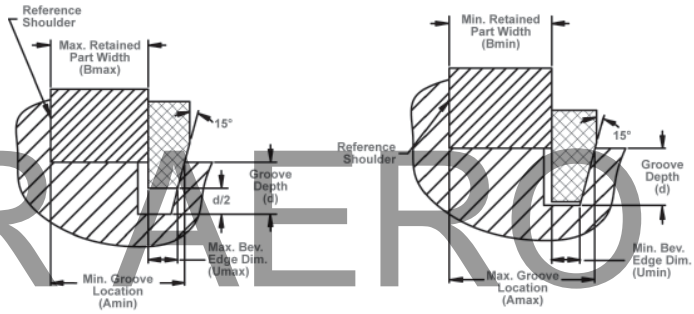
2. The capability of the ring to provide take-up or compensation for the variability of the assembly components listed above. For the ring to provide sufficient take-up to compensate for the variability, and to seat within the limits d/2 to d, the following requirement must be satisfied:

Ring take-up capability $[d/2 (\tan 15°)] \geq \Delta A + \Delta B + \Delta U$



If the take-up requirement is satisfied, the groove location limits (Amin & Amax) can be calculated as follows:

$$Amin = Bmax + Umax + d/2 (\tan 15°)$$
$$Amax = Bmin + Umin + d (\tan 15°)$$



As an example of this technique, assume that a VHO-200 ring is used to retain a part with a width dimension of 1.000 ±.002.

The groove location limits will be as follows:

$$Amin = 1.002 + .045 + .072/2 (\tan 15°) = 1.057$$
$$Amax = .998 + .043 + .072 (\tan 15°) = 1.060$$

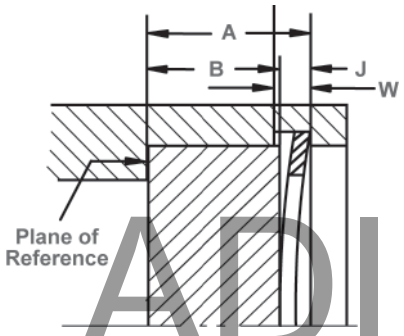
If the user's ability to locate the groove requires less than the .003 allowable tolerance, the maximum seating depth position can be moved up the groove to provide a higher minimum axial force.

Until now, the explanation has focused on a technique which will assure that 100% of the assemblies will have the ring seated within the limits shown. If the user will accept a statistically small number of assemblies (2 out of 1000) with the ring seating slightly outside of these limits, the statistical groove location technique can be used. This will provide slightly more take-up than the technique described above. Please contact the Rotor Clip Engineering Department for information about this concept.

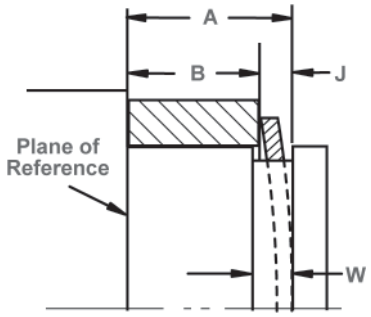
SERIES BHO, BSH, BE and EL RINGS

To obtain the maximum resilient end-play take-up which bowed rings offer, it is necessary to locate grooves carefully. Formulas for calculating the location of the load-bearing wall of the groove with respect to any plane of reference are as follows:

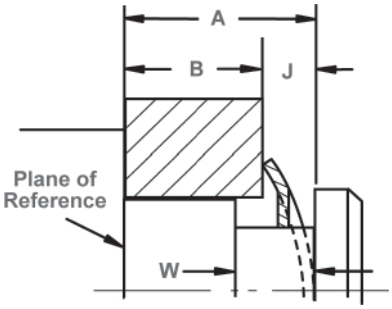
A max = B min + J max
A min = B max + J min
J max - J min. = resilient take-up of tolerances of groove location A and width B of retained part (see drawings below and right.)



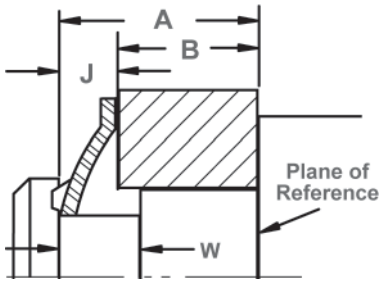
BHO Series
Bowed Internal Rings



BSH Series
Bowed External Ring



BE Series
Bowed E-Ring



EL Series
Bowed Locking Series

The thickness tolerance, residual bow height and minimum bow height of the ring are used to determine the J min and J max spacing dimensions.

In cases where the tolerances of width B of the retained part are large, the tolerances of groove location A will be small. In many cases, groove width W has no effect on ring function provided it is larger than the listed minimum. The groove width may be increased considerably, in fact, with no effect on ring function as long as the rear wall of the groove remains under the retained part.

J min and J max, the dimensions used to control groove location, are set so that the rings will not flatten completely during installation. Even after flattening under the load listed in the data charts as “Force Needed to Flatten,” the rings will retain sufficient bow height to take up end-play resiliently within the limits of J min and J max.

Series BHO, BSH and BE bowed rings will retain their tight grip against the groove bottom even under loads exceeding the “Force Needed to Flatten” and will then provide thrust load capacities equivalent to the corresponding flat standard internal and external rings.

Inspection Procedures

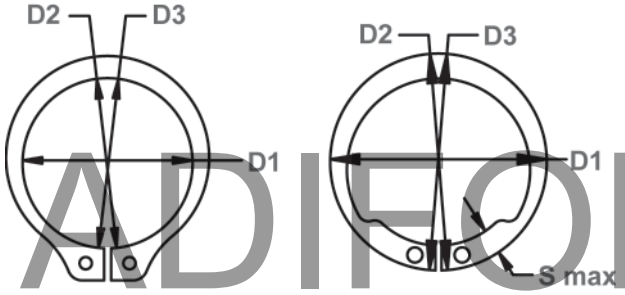
DETERMINING PERMANENT SET LIMITS FOR BASIC EXTERNAL RETAINING RINGS

SH, VSH, SHI

1. Measure thickness (designated as "T" in specification charts) of the ring for adherence to specified tolerances.

2. Using a Rotor Clip retaining ring plier, separate the lugs until the ring barely fits over a shaft 1% larger than the nominal shaft diameter. Repeat this procedure four additional times using the same ring. Examine the ring for cracks.

3. Measure ring diameter (D) in three directions as indicated below.



4. *FOR SH AND VSH RINGS* - Take the results of these three measurements and compute the average. Compare this figure to the minimum groove diameter listed in the specification chart for SH and/or VSH rings. If the average diameter after permanent set is less than the groove diameter, THEN THE RING IS FULLY FUNCTIONAL AND WILL PERFORM ACCORDING TO STATED SPECIFICATIONS:

Average Diameter < Minimum Groove Diameter ("Dg" in Spec Chart)

5. *FOR SHI RINGS* - Take the results of the three diameter measurements described in #3 above and compute the average. Measure the maximum section ("S max" in the spec charts). Compare the average diameter minus 2 times "S max" to the minimum groove diameter listed in the specification chart for SHI rings. If the average diameter minus twice the maximum section after permanent set is less than the groove diameter, THEN THE RING IS FULLY FUNCTIONAL AND WILL PERFORM ACCORDING TO STATED SPECIFICATIONS:

Average Diameter – 2S max < Minimum Groove Diameter ("Dg" in Spec Chart)

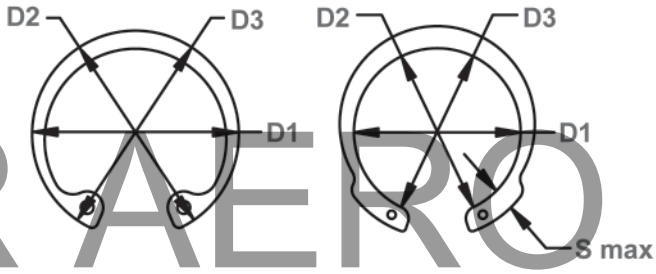
DETERMINING PERMANENT SET LIMITS FOR BASIC INTERNAL RETAINING RINGS

HO, VHO, HOI

1. Measure thickness (designated as "T" in specification charts) of the ring for adherence to specified tolerances.

2. Using a Rotor Clip retaining ring plier, compress the lugs fully until they touch. Repeat this procedure four additional times using the same ring. Examine the ring for cracks.

3. Measure ring diameter (D) in three directions as indicated below.



4. *FOR HO AND VHO RINGS* - Take the results of these three measurements and compute the average. Compare this figure to the maximum groove diameter listed in the specification chart for HO and/or VHO rings. If the average diameter after permanent set is GREATER than the groove diameter, THEN THE RING IS FULLY FUNCTIONAL AND WILL PERFORM ACCORDING TO STATED SPECIFICATIONS:

Average Diameter > Maximum Groove Diameter ("Dg" in Spec Chart)

5. *FOR HOI RINGS* - Take the results of the three diameter measurements described in #3 above and compute the average. Measure the maximum section ("S max" in the spec charts). Compare the average diameter plus 2 times "S max" to the maximum groove diameter listed in the specification chart for HOI rings. If the average diameter plus twice the maximum section after permanent set is GREATER than the groove diameter, THEN THE RING IS FULLY FUNCTIONAL AND WILL PERFORM ACCORDING TO STATED SPECIFICATIONS:

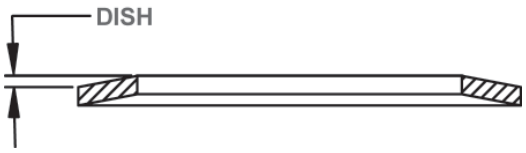
Average Diameter + 2S max > Maximum Groove Diameter ("Dg" in Spec Chart)

LIMITATIONS – DISH, PITCH & BURR

Rotor Clip retaining rings meet accepted industry parameters for limitations of dish and pitch. These characteristics are illustrated below.

1. DISH LIMITATIONS

Dish is any difference in height occurring from the outer edge of the ring to the inner edge. This condition should be considered separate from Pitch (see #2). To determine Dish, a small amount of weight can be applied to the upper surface of the ring to remove pitch from the overall height measurement.

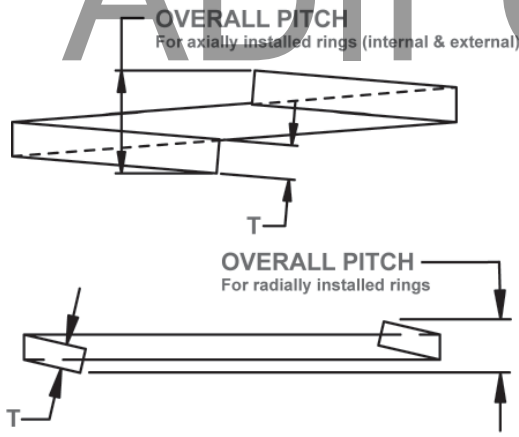


DISH LIMITATIONS-For Internal, External & Radial Rings

Ring Thickness (In.)	Allowable Dish (In.)
0.010-0.015	0.002
0.025-0.035	0.003
0.042-0.093	0.005
0.109-0.125	0.010
0.156-0.187	0.015

2. PITCH LIMITATIONS

Pitch takes into account thickness of the ring including any mismatching of lugs, where applicable.

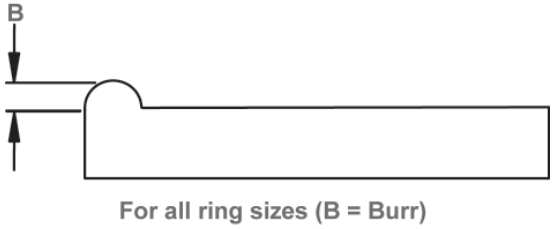


PITCH LIMITATIONS

Ring Size (In.) For Shafts/Bores	Internal & External Retaining Rings Maximum Overall Pitch	Radial Retaining Rings
ALL SIZES	3T	-
UP TO 1/2"	-	1.5T
OVER 1/2"	-	2T

3. BURR LIMITATIONS

A burr results from the metal stamping process. It is a raised edge for which the following parameters apply.



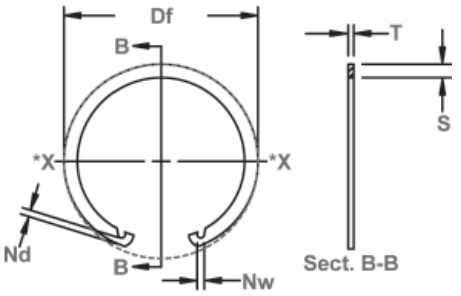
BURR LIMITATIONS

Material Thickness (In.)	Maximum Allowable Burr (In.)
0.010-0.020	0.001
0.025	0.0015
0.035-0.109	0.002
0.125 & Over	0.003

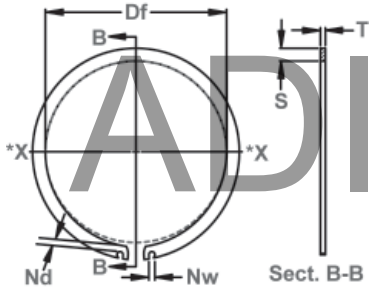
Inspection Procedures

INSPECTION PROCEDURES FOR CONSTANT SECTION RETAINING RINGS

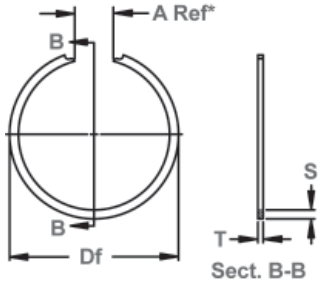
Measure the ring for the parameters indicated and compare them to the dimensions listed in the specification pages for that particular ring. **NOTE: ALL DIMENSIONS ARE TAKEN IN THE FREE STATE EXCEPT FOR THE GAP, WHICH IS MEASURED ONCE THE RING IS INSTALLED.**



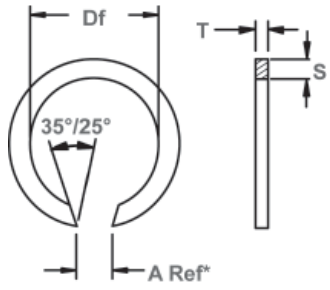
*Df measured in this direction only.



*Df measured in this direction only.



*These dimensions are measured with the ring installed in the groove.



*These dimensions are measured with the ring installed in the groove.

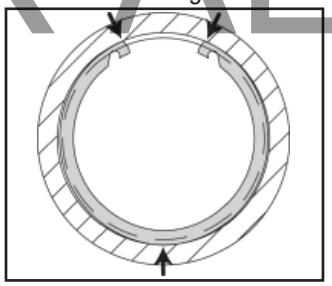
CONSTANT SECTION RING "KICK-IN" FEATURE

Constant Section retaining rings become elliptical when deformed making three-point contact with the groove (see drawing). Two of these contact points are the ends, which seat deeply into the groove making it extremely difficult to install/remove in an application.

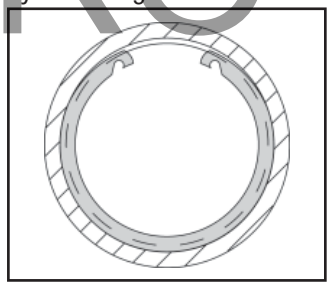
This is particularly troublesome for the standard internal (UHO) and external (USH) rings since they depend upon the accessibility of the notches for installation/removal. In fact, the configuration of the standard ring renders these rings practically unusable in any kind of manual assembly operation.

Rotor Clip's "kick-in/out" feature solves this problem. By kicking in the lugs, installation into a housing/bore (UHO) is much easier since the lugs are more accessible using a manual tool. The same is true for removing the ring.

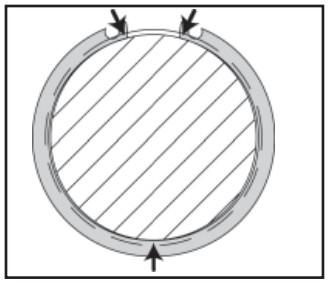
By kicking out the lugs, installation onto a shaft (USH) is also easier due to the greater accessibility of the lugs.



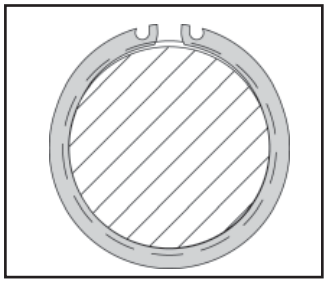
Internal (UHO) ring makes three-point contact with the groove of a housing.



"Kick in" feature renders lugs more accessible for easier installation and removal.



External (USH) ring makes three-point contact with the groove of a shaft.



"Kick out" feature makes lugs more accessible for easier installation and removal.

Retaining Ring **Definitions**

Tapered Retaining Rings—Rotor Clip basic rings have a tapered section which decreases symmetrically from the center to the free ends. As a result, basic internal and external rings remain circular when contracted or expanded within the limits of normal use. This assures contact with the groove along the entire periphery of the ring (a key factor in obtaining high thrust capacity).

Constant Section Retaining Rings—These rings have a uniform section height. When they are contracted or expanded, they take on an oval deformation (rather than circular, like tapered rings). As a result, they contact the groove bottom at three or more isolated points, but never continuously around the periphery.

Spiral Retaining Rings—These make 360 degree contact with the groove in a housing or on a shaft. However, they accommodate less force than a tapered ring and are more difficult to install/remove.

Spiral Retaining Rings.

Inverted Lugs—Allows more clearance on a shaft or in a housing; the lugs also abut the bottom of the groove.

Self-Locking Rings—Rings that can be installed on a shaft or in a housing/bore without using a groove.

Resilient Endplay Take-Up—Refers to "bowed" retaining rings; once installed in a groove they act like springs providing resilient endplay take-up.

Rigid Endplay Take-Up—Refers to "beveled" retaining rings; once installed in a groove they "lock" an assembly into place providing rigid endplay take-up.

Axial retaining rings—Installed in an axial (horizontal) direction in a housing/bore or on a shaft.

Radial Retaining Rings—Installed in a radial (vertical) direction on a shaft.

Radial Installation.

Retaining Ring Pliers—For retaining rings with lug holes—the tips of these special tools are inserted into the lug holes and compressed (internal) for installation in a housing or expanded (external) for installation over a shaft.

Applicators—Used to install radial retaining rings onto a shaft.

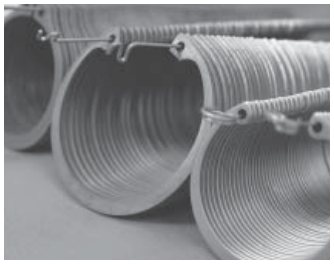
Dispensers—Dispenses stacked radial retaining rings onto an applicator.

Permanent Set— This is a change in ring diameter after compression/expansion which is a non-detrimental charateristic of most of our products. Our designs benefit from this characteristic in a way which enables us to utilize deeper grooves. Please contact the Rotor Clip Engineering Department for additional info.

Thrust Load Capacity—The amount of force a retaining ring will accommodate once installed in a groove.

Edge Margin—The distance from the groove to the end of the shaft or housing.

Rings On Wire—A method of stacking retaining rings by threading a wire into both lug holes of internal and external retaining rings.



Rings On Wire.

Salt Spray—Corrosion test performed in a humidity chamber to simulate seashore conditions, or to accelerate corrosion at a controlled rate.

Design Considerations Retaining Ring

TWO OVERALL RULES FOR SELECTING THE RIGHT RETAINING RING FOR YOUR APPLICATION

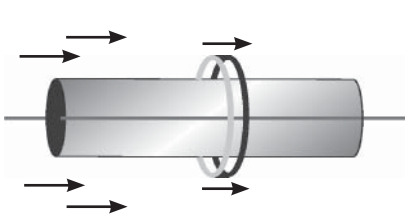
1. Consider the ring as an integral part of your design from original concept through prints and prototypes. If you work this way, chances are you'll be able to use smaller, lighter components for substantial cost savings. And you'll be able to use one of our standard ring designs, which is a lot more economical than finding later you need an expensive, custom-designed fastener.

2. Think ahead to the assembly line: how will the ring be installed - by hand, semi-automatically or with mechanized tools - in relation to other manufacturing operations. This can save you a great deal of time and effort, and avoid problems when you go into production.

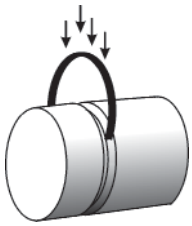
BASIC CONSIDERATIONS

1. Size - Bore, housing and shaft diameters will determine the size of the rings you can use.

2. Axial or Radial assembly - Internal rings are used to position and secure parts in bores and housings. They are always installed in an axial direction. External rings hold parts on shafts, studs and similar devices and can be installed in both axial and radial directions.



Axial Assembly



Radial Assembly

3. Load capacity - Maximum allowable static thrust load capacities for all rings are listed in the catalog pages for all Rotor Clip rings. If a ring is seated in a groove cut in material softer than the ring, the thrust load capacity of the groove ("Pg" in the ring data charts) becomes the limiting factor in the assembly. If the ring is installed in a housing or on a shaft made of hardened steel, the maximum allowable static thrust load capacity of the ring (Pr) may be used.

Importance of load capacity to your design - If you need rings to position and secure bearings in a pump, or lock up components in a car or truck transmission, load capacity can be critically important for function, safety and reliability of the ring application. On the other hand, if you plan to use a ring merely to hold a plastic wheel on the axle of a toy truck, chances are you won't have to worry about loads on the ring. All you really need is a ring that will stay put once you have it positioned. It is pointless to "over design" for high load capacity and pay the price for both rings and grooves when another ring will do the job less expensively. So take a hard look at your load capacity requirements before making any ring selections. As we indicated earlier, you'll find everything you need to know in the Rotor Clip Catalog.

4. Assembly Clearance - Clearance for retaining rings is important for several reasons. You can choose a specific type that meets all your design requirements, but if you haven't got room to install it on the production line, you've got a problem. The same holds true for removing and re-assembling a ring during inspection, field service or repairs.

Axial and radial clearance also must be considered in relation to abutting or adjacent components in the assembly. If the lugs of a Series SH basic external ring get in the way of other parts, for example, you might use an inverted Series SHI. You have the same kind of options with radial rings. A Series E ring, for example, might be replaced with a C ring. The LC two-part interlocking rings also assure maximum clearance.

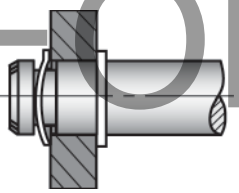
5. Types of Axial/Radial Rings - The basic internal/ and external (HO/SH) rings provide heavy thrust load capacities.

- The inverted versions of these rings have lower thrust load capacity but provide better clearance and form a higher uniform shoulder good for retaining bearings and other components with large corner radii or chamfers.

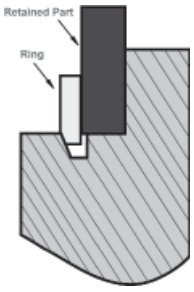
- Radial rings generally have lower thrust load capacity but speed assembly where the parts being retained are more accessible; they also form larger shoulders against the retained parts. These are general rules, however, and there are exceptions; e.g., Series PO and POL retainers are radial rings with substantially greater gripping strength than some axial rings.

- Series LC two-part interlocking rings were designed for high rotational speeds and provide a more attractive appearance than some axial types.

6. End-Play Take-Up Rings - In many products, accumulated tolerances or wear in the retained parts can cause objectionable end-play in the assembly. There are two types of rings you can use to avoid this: Rotor Clip bowed rings are designed to provide resilient take-up by functioning as both spring and fastener. In addition to compensating for end-play, they also can be used to dampen vibration and oscillation. They are available in several different types for axial or radial assembly.



Bowed rings, for resilient end-play take-up, function as both spring and fastener.



Beveled rings take up end-play rigidly, forming "wedge" between part and groove.

Rotor Clip beveled rings provide rigid end-play take-up by functioning as a "wedge" between the retained part and the load-bearing groove wall. Series VHO beveled rings have a 15° bevel on just one side of the outer circumference. Series VSH external rings also have a single bevel which is located on the inner circumference of the ring.

How the Bevel Works - When a beveled retaining ring is assembled in its groove, if there is end-play between components in the assembly, the ring's spring action causes the fastener to seat deeper in the groove, compensating for the end-play. The spring action also exerts an axial force against the retained part which can be calculated with formulas given in the Rotor Clip Catalog. Rotor Clip beveled rings are available only in ring types for axial installation

7. To Groove or Not to Groove - Most retaining rings are designed to be assembled in accurately located grooves which become an integral part of the fastening system. The groove assures proper location of the ring and contributes to its load capacity in the assembly. For many products, however, it isn't practical to cut a groove and in some designs, you don't need one. The groove is unnecessary, for example, in many electronic instruments, small appliances, toys, plastic products and other applications where the required shoulder need not absorb any sizable thrust load but rather must serve merely as a positioning and locking device against small vibrations and impacts.

Rotor Clip self-locking rings do not require any grooves, threads or other preparatory machining. They may be installed quickly and economically even by unskilled labor and - because they may be seated at any point on a shaft or in a housing - automatically compensate for accumulated tolerances in the retained parts. Series SHF retainers may be removed for product adjustment or service; the other rings must be destroyed for disassembly.

8. Assembly and Disassembly - As mentioned earlier, it is helpful for design engineers to "think ahead" about assembly before specifying retaining rings. That way you can choose rings which can be installed quickly and economically with Rotor Clip pliers, applicators and dispensers, or other simple hand tools (see pages 242-250). If you are going to design and build you own automate installation equipment, be sure to check with our technical sales department for guidelines that will help you avoid problems after your equipment is put into service.

Military Retaining Rings

ROTOR CLIP OFFERS 100% MILITARY CERTIFIED RETAINING RINGS

- **DFARS Compliant**
- **CAGE CODE: 07382**
- **MADE IN USA**

Rotor Clip now offers retaining rings certified to military standards in the popular materials and finishes listed below:

Specifications listed within the catalog tables reflect Rotor Clip's standard commercial production dimensions. Published retaining ring standards including Military (MIL-DTL-21248D) / ASME / NAS / ANSI may require parts with alternative geometry. Please contact Rotor Clip Technical Sales Department to clarify conformance to specific requirements.

MATERIAL	FINISH	MS CODE	ROTOR CLIP DESIGNATION
Carbon Steel	Cadmium Plated	1	ST MCD
Carbon Steel	Zinc Dichromate Plated	2	ST MZD
Carbon Steel	Phosphate Coated	3	ST MPD
Stainless Steel	Passivated	4	SS MPS
Beryllium Copper	-	5	BC MTM

Example: Military Part converted to a Rotor Clip Part Number:

MS PART NUMBER → **ROTOR CLIP EQUIVALENT**

MS16624-1025 → **SH-25ST MCD**

Ring Type (SH, HO, E, etc.) | Finish Designation | Size

To cross reference any military retaining ring part number to a Rotor Clip part number, go to the Rotor Clip web site address below and click on the "Parts Interchange" link. Enter the complete military part number in the box shown, then click "submit." **www.rotorclip.com**

You can also request a quote by placing your cursor over the "Online Services" link on the left side of the page and clicking on "Request Quote."

ORDERING INFO FOR ROTOR CLIP MILITARY RETAINING RINGS:

- $100 Minimum Order, 100 piece quantities
- Full certs provided FREE of Charge
- Certificate of Quality FREE of Charge
- DFARS Certification FREE of Charge

NOTE: Truarc LLC, a former producer of retaining rings for military and commercial use, is no longer in business. Rotor Clip purchased Truarc's assets and intellectual property. Truarc military cage code 79136 has been replaced by Rotor Clip cage code 07382.

DFARS (Defense Federal Acquisition Regulation Supplement)

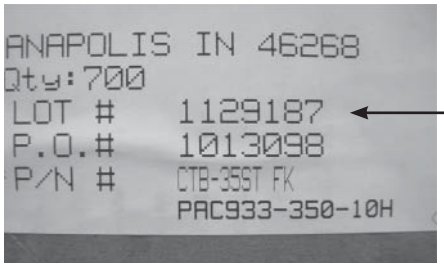
ALL ROTOR CLIP STAINLESS STEEL AND BERYLLIUM COPPER RETAINING RINGS ARE DFARS COMPLIANT. FOR MORE INFORMATION, CONTACT ROTOR CLIP CUSTOMER SERVICE - **SALES@ROTORCLIP.COM** OR VISIT OUR WEB SITE AT **WWW.ROTORCLIP.COM**.

MADE IN AMERICA
MILITARY Express™
MILITARY RETAINING RINGS

Lot Traceability/Quality ®

LOT TRACEABILITY / QUALITY CHECKS FOR RETAINING RINGS

Lot Number - All product sold should reflect this number so that it can be traceable to the material and processes used to make your parts. This protects you if a problem arises that requires records of the manufacturing process. (Note: the same requirement should apply to foreign suppliers as well).



Lot Number

Country of Origin - Like the lot number, this should be displayed prominently on any packages you receive. YOU HAVE A RIGHT TO KNOW WHERE YOUR RINGS WERE MADE.

Country of Origin

Rust - The presence of rust is an indication that the rings have passed their shelf life and should not be used.

Rusty Ring

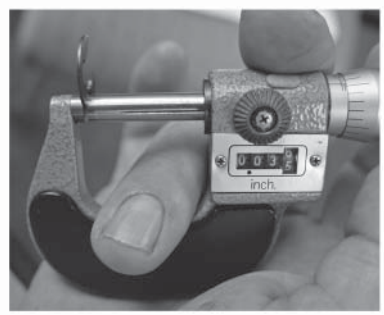
Distortion - In the example below, the minimum section was not properly formed. Use of this ring can lead to a failure. Also, be sure to check for other distortions like bent and/or chipped rings.

Distortion and Chips

Flaking Finish - Look for finish that is flaking off parts. If you see a similar condition on your retaining rings, contact your supplier. Wherever the finish is removed, the parts can potentially rust and fail.

Flaking Finish

Critical Measurements - These include thickness, Min/Max sections, lug height and hardness. Be sure these measurements match the print or the Rotor Clip catalog specifications for that particular part.

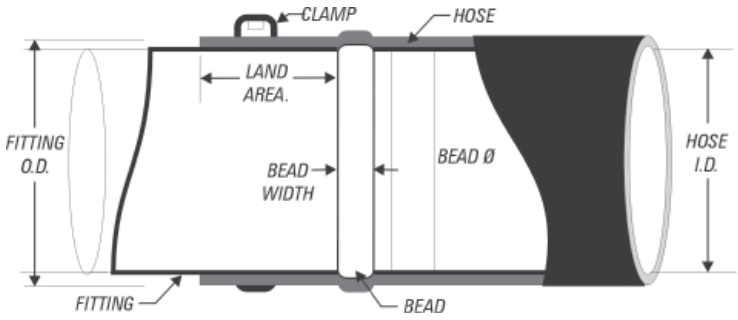


Use a micrometer to measure the thickness dimension of your ring

Note: The retaining rings shown in this section have not been produced by Rotor Clip Company, Inc. Most are imported rings purchased in retail stores.

Joint Design Guide Hose Clamps

Three elements are required in a typical joint design: The hose, the fitting and the clamp. These elements must meet certain performance and material specifications if they are to function successfully in a given application. Here are some points to keep in mind when addressing joint design.



I. HOSE:

There are many types of hose constructions and materials. A common automotive type is EPDM rubber compound with a Shore A hardness of 60 durometer. Other materials of construction are silicone or a combination of EPDM and silicone. Many are reinforced with an inner layer of woven fabric.

A. The hose is named after its nominal, inside diameter. For example, a 1" hose is one with an inside diameter of 1".

B. The outside diameter depends on the wall thickness, which varies depending upon the hose type and construction. It is important to specify a hose with a closely controlled wall thickness, the smaller the tolerance the better. This will aid in sizing the clamp for the application.

C. Constant tension type clamps transmit force more easily through a hose with a thin cross section.

D. A higher hose durometer (hardness) means the hose is less compliant and more difficult to install. Lower durometer hoses allow the clamp to translate its force directly to the sealing surface of the fitting.

E. The straighter the angle of the hose, the easier it is to install.

The Society for Automotive Engineers recognizes two basic types of hoses for heater and radiator applications. They are described below. (For more detailed explanation of these and other hose types, see SAE specification J20.)

A. SAE 20R3 Heater Hose - Used for heater systems in ground transportation vehicles. Wall thickness range: for sizes less than 25.4mm, the OD is the target ID +8mm (total wall), ±0.8mm. For 25.4mm size, the OD is 34mm±1.2mm.

B. SAE 20R4 Radiator Hose, Normal Service Type - Radiator hose for coolant circulating systems of automobile engines. Wall thickness range is 4.3 to 5.6mm for sizes smaller than 50.8mm and 4.3 to 6.4mm for sizes 50.8mm and larger.

II. CLAMP:

Rotor Clamp constant tension type hose clamps will compensate for changes in joint diameter due to compression set in a hose. This feature eliminates leaks and the need to re-torque a clamp.

A. Factors to consider when sizing a clamp:

• *CTB type clamps*: The clamps have a number designation equivalent to the outside diameter of the joint to be clamped, expressed in millimeters (Ex.-CTB-27).

• *HC (SAE Type "E"), HW and DW (SAE type CTW)* - Clamps have a range of recommended application diameters, listed in the catalog as "A", "B" and "C" diameters. The nominal diameter of the clamp is the clamp size divided by 16.

• The joint diameter will equal the fitting outside diameter plus twice the wall thickness, including the tolerances associated with each.

• The clamp must be large enough to fit over the maximum diameter of the joint bead and hose at this point (see illustration above).

B. You can use a smaller clamp on an application to increase force. This can be done by placing the clamp on the fitting, installing the hose and sliding the clamp "backwards" up to the bead.

C. Ideally, a clamp should be sized to fit onto the joint when opened to 90% of full (as a safety factor) and close to no less than the nominal (size) diameter when in the final position.

III. FITTING

The fitting is the portion of the joint over which the hose is installed. To reap the full benefits of a constant tension clamp joint, the fitting should have the following characteristics:

A. The fitting should be round (within .003 inches).

B. There should be interference between the fitting and the hose, typically between 5% and 10% of the hose inner diameter. (Ex. A 1" nominal diameter hose could have a 1.062" diameter fitting for a 6.2% interference fit. All tolerances should be considered when calculating this diameter.)

C. The surface of the fitting should be free of pits, scratches, "dents," parting line mismatches, and any surface defect that might cause a leak.

D. The fitting should contain a bead that will prevent slippage under conditions of pressure where the hose is not constrained.

- The bead diameter should be sized in such a way that the clamp can be installed over the assembled joint yet provide as much interference as possible and still facilitate acceptable assembly push on force.

- The bead width and shape should be as small as possible and still allow for easy insertion of the hose onto the fitting.

- The bead should be symmetric and should not compromise the geometry of the joint (roundness, surface defects, etc.).

E. The fitting must be of the design diameter for a length of approximately 15/16" (23.8mm) after the bead. That is, all dimensional constraints must be followed. This is necessary to seat the clamp. This means any bends, twists, diameter changes or the like can not occur until after the area in which the clamp will seat.

IV. ASSEMBLY

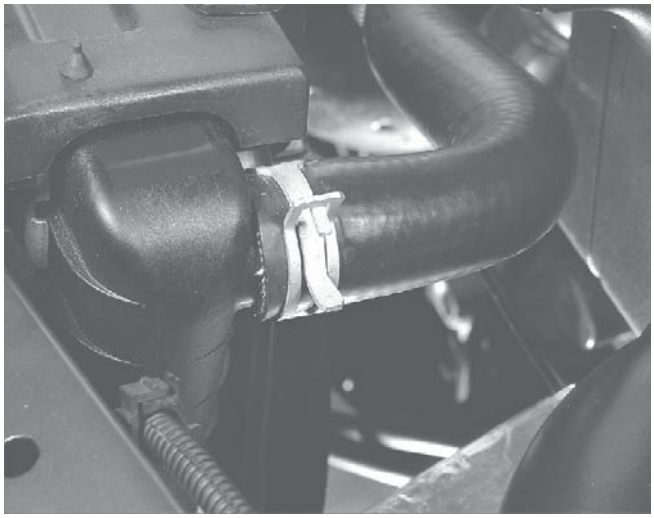
- **Clamps should be installed with specific pliers recommended for the type of clamp being used.**

- **Expansion of the clamp beyond the intended operating diameter will diminish the force that the clamp can apply.**

- **Any lubricating substance used to aid assembly of the hose must never be in contact with the clamp.**

- **Such lubricants in contact with a clamp can enable a mechanism for hydrogen migration, causing failure through material fracture.**

- **Examples of lubricants known to cause clamp failure include acetone, chlorine, flourine, mineral oil, dish detergents, and laundry detergents.**



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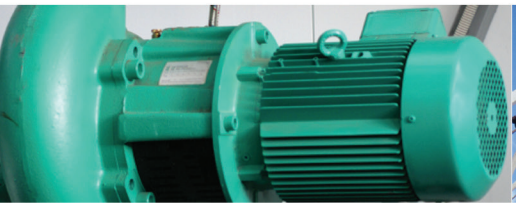

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