ROTOR CLIP PRODUCT CATALOG & ENGINEERING MANUAL 2002

ROTOR CLIP®

PRODUCT CATALOG

Price: $2.00 U.S.

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TABLE OF CONTENTS

PRODUCT INDEX

ROTOR CLIP INCH TAPERED SECTION RETAINING RINGS

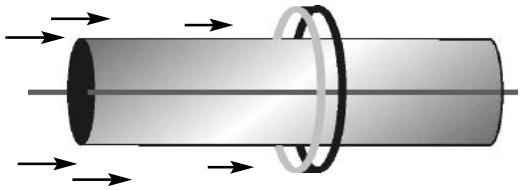
AXIALLY ASSEMBLED, INTERNAL INCH RETAINING RINGS (See pages 26-27 for detailed descriptions.)

HO
ASME B18.27.1 NA2
(Replaces MS 16625)
Page 28-33

HOI
ASME B18.27.4 NA11
(Replaces MS 16627)
Page 40-41

BHO
ASME B18.27.3 NA8
(Replaces MS 16629)
Page 48-49

VHO
ASME B18.27.4 NA13
(Replaces MS 16631)
Page 52-55



Axially Installed

AXIALLY ASSEMBLED, EXTERNAL INCH RETAINING RINGS (See pages 26-27 for detailed descriptions.)

SH
ASME B18.27.1 NA1
(Replaces MS 16624)
Page 34-39

SHI
ASME B18.27.4 NA10
(Replaces MS 16626)
Page 42-43

SHR
ASME B18.27.2 NA4
(Replaces MS 3217)
Page 44-45

SHM
Page 46-47

BSH
ASME B18.27.3 NA7
(Replaces MS 16628)
Page 50-51

VSH
ASME B18.27.4 NA12
(Replaces MS 16630)
Page 56-59

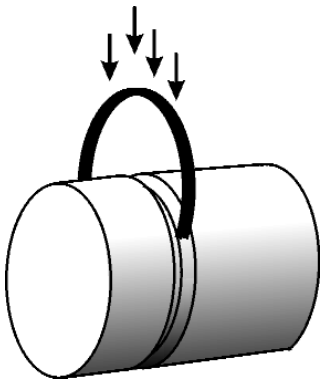
RADIALLY ASSEMBLED, EXTERNAL INCH RETAINING RINGS (See pages 60-61 for detailed descriptions.)

E/SE/YE/ZE
ASME B18.27.1 NA3
(Replaces MS 16633)
Page 62-63

RE
ASME B18.27.2 NA5
(Replaces MS 3215)
Page 64-65

BE
ASME B18.27.3 NA9
(Replaces MS 16634)
Page 72-73

C
ASME B18.27.2 NA6
(Replaces MS 16632)
Page 66-67



Radially Installed

LC
ASME B18.27.5 NA 15
(Replaces MS 90708)
Page 68-69

PO/POL
Page 70-71

EL
ASME B18.27.5 NA16
(Replaces MS 3216)
Page 74-75

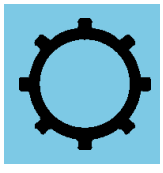
SELF-LOCKING INTERNAL/EXTERNAL INCH RETAINING RINGS (See pages 76-77 for detailed descriptions.)

SHF (External)
ASME B18.27.5 NA14
(Replaces MS 90707)
Page 78-79

RG (External)
Page 80

TX (External)
Page 81

TY (External)
Page 81



TI (Internal)
Page 82

ROTOR CLIP JIS RETAINING RINGS

JE
JIS B 2805
Page 102

PRODUCT INDEX (CONT.)

ROTOR CLIP METRIC TAPERED SECTION RETAINING RINGS

AXIALLY ASSEMBLED, INTERNAL METRIC RETAINING RINGS

DHO
DIN 472
Page 84-87

DHI
Page 88

DHT
DIN 984
Page 89

DHR
Page 90

(See page 83 for detailed descriptions of all metric retaining rings.)

AXIALLY ASSEMBLED, EXTERNAL METRIC RETAINING RINGS

DSH
DIN 471
Page 92-95

DSI
Page 96

DST
DIN 983
Page 97

DSR
Page 91

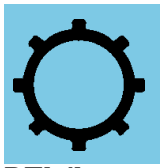
RADIALLY ASSEMBLED, EXTERNAL METRIC RETAINING RINGS

DE
DIN 6799
Page 98

DC
Crescent
Page 99

SELF-LOCKING INTERNAL/EXTERNAL METRIC RETAINING RINGS

DTX (External)
Page 100



DTI (Internal)
Page 101

ROTOR CLIP ANSI METRIC TAPERED SECTION RETAINING RINGS

AXIALLY ASSEMBLED, INTERNAL ANSI METRIC RETAINING RINGS

MHO
Page 104-107

(See page 103 for detailed descriptions of all ANSI metric retaining rings.)

AXIALLY ASSEMBLED, EXTERNAL ANSI METRIC RETAINING RING

MSH
Page 108-111

MSR
Page 112-113

RADIALLY ASSEMBLED, EXTERNAL ANSI METRIC RETAINING RINGS

ME
Page 114-115

MC
Page 116-117

MRE
Page 118-119

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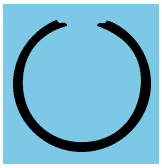
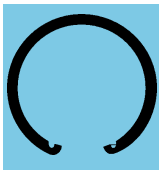
PRODUCT INDEX (CONT.)

ROTOR CLIP INCH CONSTANT SECTION RETAINING RINGS

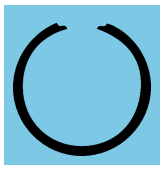
INTERNAL INCH CONSTANT SECTION RETAINING RINGS



HN
Cutoff Style: **E**
Page 125



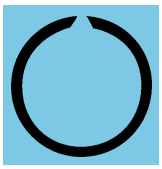
UHO
Cutoff Style: **A**
Page 126-127



UHB
Cutoff Style: **E**
Page 128-129

(See page 120 for detailed descriptions of all constant section retaining rings.)

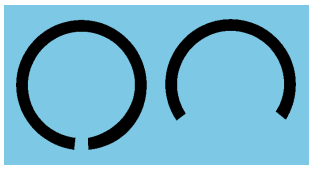
EXTERNAL INCH CONSTANT SECTION RETAINING RINGS



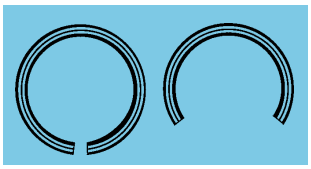
USC
Cutoff Style: **C**
Page 130-131

USH
Cutoff Style: **B**
Page 132

SNL
Cutoff Style: **C**
Page 133



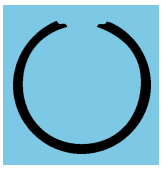
SHC/SLC; SHO/SLO
Cutoff Style: **H**
Page 134



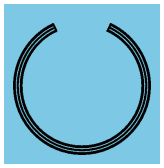
RHC/RLC; RHO/RLO
Cutoff Style: **H**
Page 135

ROTOR CLIP METRIC CONSTANT SECTION RETAINING RINGS

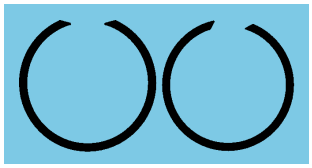
INTERNAL METRIC CONSTANT SECTION RETAINING RINGS



HBL,HBM,HBN
Cutoff Style: **E**
Page 136-137



CRH
Page 147



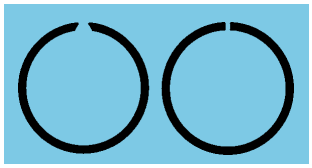
CFH
Cutoff Style: **H**
Page 142-144

(See page 120 for detailed descriptions of all constant section retaining rings.)

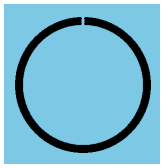
EXTERNAL METRIC CONSTANT SECTION RETAINING RINGS

SR
Cutoff Style: **H**
Page 138

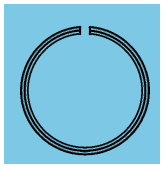
SB
Cutoff Style: **C**
Page 139



CFS
Cutoff Style: **C & H**
Page 140-141



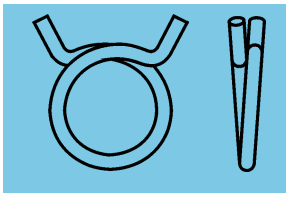
CBS
Cutoff Style: **H**
Page 145



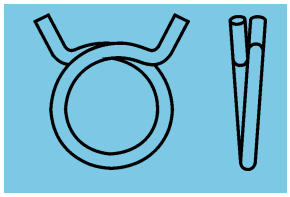
CRS
Page 146

ROTOR CLAMP SELF-COMPENSATING HOSE CLAMPS

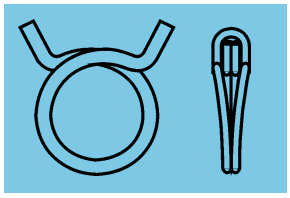
(See page 148 for detailed descriptions of all hose clamps.)



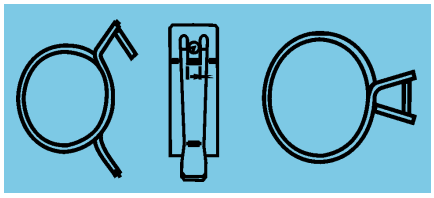
HC-Single Wire
SAE J1508
Page 150



HW-Slim Wire
Page 151



DW-Double Wire
SAE J1508
Page 152



CTB-Constant Tension Band
SAE J1508
Page 153

PART NUMBERS & PACKAGING ®

ROTOR CLIP PART NUMBER

HO-50 ST PAS

Identifies the TYPE of ring

Identifies the SIZE of the ring

Identifies the MATERIAL

Denotes the FINISH

Denotes PACKAGING

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

Materials Code Table (See page 16)

CODE	MATERIAL
ST	Carbon Steel
SS	Stainless Steel (PH15-7, PH17-7)
SA	Stainless Steel Series 420
BC	Beryllium Copper
PF	Copper Alloy C72900
PB	Phosphor Bronze

Packaging Code Table

CODE	PACKAGING
No Code	Bulk
S	Stacked
R01	Plastic Shrink Wrapped

Finishes Code Table (See page 18)

CODE	FINISH
PA	Phosphate
PD	Phos and Oil
HPD	Heavy Phos and Oil
ZD	Zinc Dichromate
ZDL	Zinc Dichromate Sealer
HZDL	Heavy Zinc Dichromate Sealer
ZF	Zinc Bright
Z3	Trivalent Zinc
Z3X	Trivalent Zinc Plus Sealer
ZFF*	Zinc Flash
CF*	Copper Flash

* For identification only. Does not provide corrosion protection.

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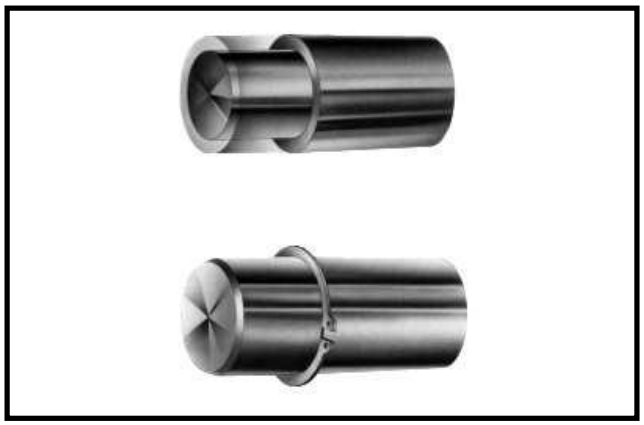
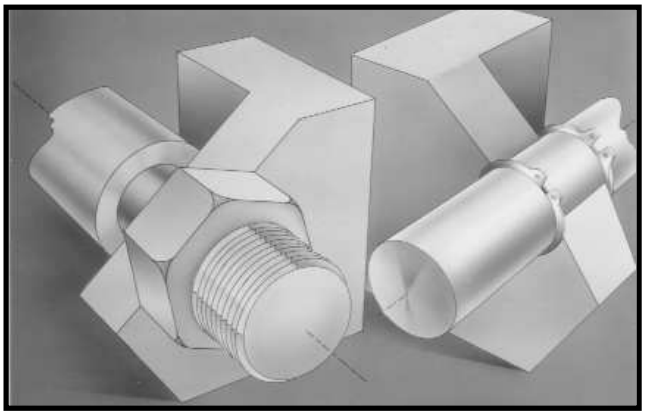
A COST SAVINGS PROPOSAL

Retaining rings simplify designs and lower installation costs. They are particularly effective for replacing the more traditional fasteners like machined shoulders, screws, nuts, cotter pins and cover plates

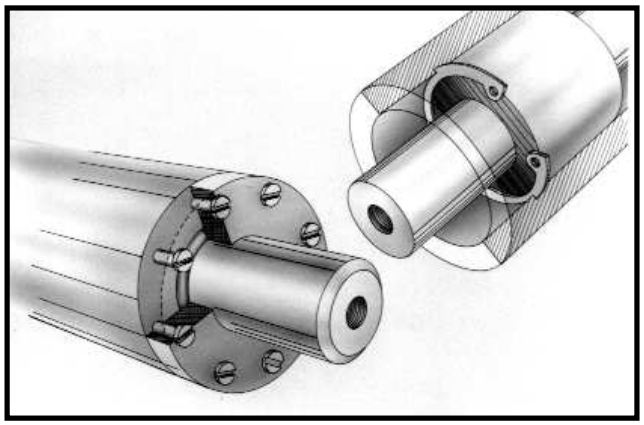
Rotor Clip can help you identify these cost-savings opportunities in your applications with an overall goal of improving how you order, handle and install retaining rings. To accomplish this a Rotor Clip engineer would visit your plant and help you identify these cost improvement areas. We would then follow-up with a proposal that would list the suggested improvements in writing with a projected cost savings to you for implementing each.



The "ghosted" area in the figure above shows the wasted material resulting from machining a shoulder onto a shaft. This can be eliminated by using a retaining ring (figure below).



Rotor Clip external retaining ring (top, right) replaces machined shoulder; nut and thread is replaced by a bowed RotorClip® providing resilient end-play take up.



Rotor Clip HO retaining rings (top, right) replace costly cover plate and screws for effective bearing retention.

A RotorClip® (right) is designed to replace a traditional cotter pin and washer.

That is our open cost savings proposal to you. To get the process started, call or e-mail us today:

1-800-55-ROTOR
tech@rotorclip.com

MORE THAN A RETAINING RING, IT'S A ROTORCLIP®

WELCOME . . . TO OUR GLOBAL CUSTOMERS

Log on to rotorclip.com (retaining rings) or rotorclamp.com (self-compensating hose clamps) and get the information you need now from anywhere in the world. Our global homepage will take you to our multinational sites including the U.S., U.K., and Germany. From here you'll have access to a variety of information and services that will streamline your dealings with Rotor Clip/Rotor Clamp. Here's what you'll find:

REQUEST FOR QUOTATIONS (48 HOUR TURNAROUND)

Our on line quotation service gets your "Request for Quotation" to you faster than ever before. Simply visit www.rotorclip.com, (retaining rings) and www.rotorclamp.com (hose clamps) and complete the form. Click on "Submit Query" and your request will go to our quotation department. Pricing will be assigned and sent to you via e-mail WITHIN 48 HOURS.

REQUEST FOR FREE SAMPLES (24 HOUR TURNAROUND)

Get the retaining ring/hose clamp samples you need for an application you are testing or for a customer you currently service. Click on "Request Samples" and complete the form. Click on "Submit Query" and your request will go to our sample department. Your order will be picked and shipped to you (via U.S. Mail) within 24 hours of receipt of your request.

ON LINE CATALOG SPECIFICATIONS

Complete product catalog specifications for Tapered Section Retaining Rings (Inch, DIN metric, ANSI Metric); Constant Section Retaining Rings (Inch, Metric) and Tools (Applicators, Dispensers, Pliers) are available on our Rotor Clip site. Specifications for our complete line of self-compensating hose clamps are available on our Rotor Clamp site. You can download the page(s) you need now in .pdf file format from either site (link to download Adobe Acrobat reader provided).

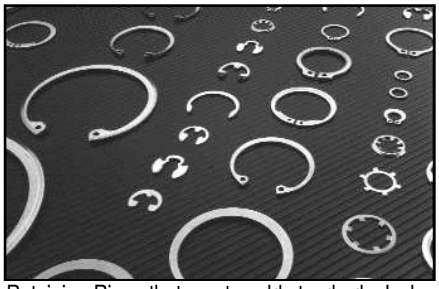
OTHER ON LINE SERVICES

Our Interactive Design Guide will help you find the right retaining ring for your application. Plug in certain basic parameters and the guide will recommend a certain style as well as suggest alternatives based on unique application requirements. You can also go directly to a catalog specification page for that ring or learn more about it, if you choose.

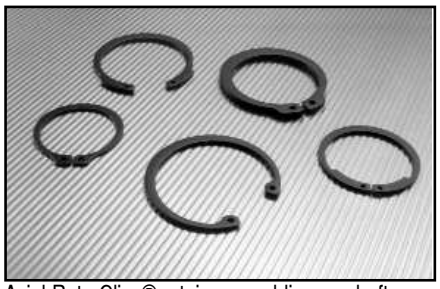
Our Cross Reference Guide will match competitor part numbers to Rotor Clip part numbers.

Rotor Clip's award-winning "Clip Notes" Training Guide gives you complete information on all the retaining rings we sell. Similarly, "Clamp Notes," on our Rotor Clamp site, offers important information about the hose, bead and clamp to help you select the right components for your application.

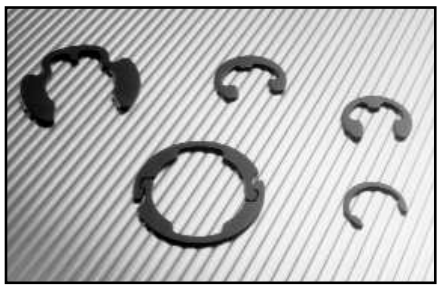
PRODUCTS, FACTS, ELECTRONIC INFORMATION...



Retaining Rings that meet world standards: Inch, DIN Metric, ANSI Metric, JIS (Japanese).

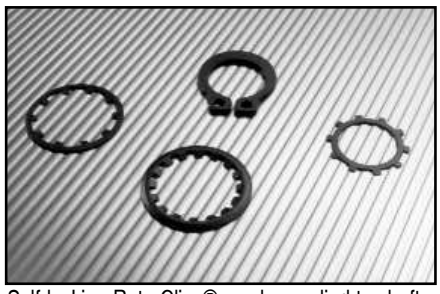


Axial RotorClips® retain assemblies on shafts or in housings/bores.

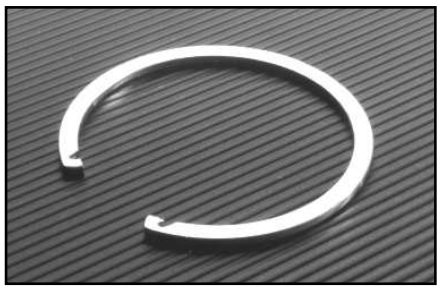


Radial RotorClips® provide shoulders on shafts for effective and efficient retention.

Beveled/Bowed RotorClips® take up endplay and keep assemblies tight on shafts or in housings/bores.



Self-locking RotorClips® can be applied to shafts without grooves for applications with low thrust loads.



Constant Section Retaining Rings offer a uniform shoulder for retention of shaft/bore assemblies.

Full Line of Retaining Rings to World Standards

Rotor Clip offers every retaining ring ever made to world standards including inch rings from 1/25" to 35," DIN metric rings from 1mm to 900mm, Constant Section rings from 1 ¾" to 10", Japanese (JIS) E rings from 1mm to 38mm and American ANSI metric retaining rings from 4mm to 250mm (larger sizes for all of the preceding standards available upon request). For more information, visit our web site: rotorclip.com.

Full Tool Support/Ergonomic Designs

Our full line of installation tools supports our full line of retaining rings. These include pliers/plier kits, applicators, dispensers, retaining ring kits and Rotormatics, our automatic assembly tools. Rotor Clip has also taken the lead with a line of exclusive ergonomic retaining ring pliers. The curved handle of this tool reduces the risk of Carpal Tunnel Syndrome and adds to operator comfort and efficiency. For more information visit our web site: rotorclip.com.

Internet Training

Retaining rings solve a variety of fastener problems. Each one is engineered to perform a specific task. Inverted lugs allow for more clearance….an extra thick ring accommodates more RPM…a self-locking ring can be installed without a groove. To learn more about the different types and functions of retaining rings, visit our Internet training site at rotorclip.com.

Rotor Clip manufacturing facility covering 238,000 square feet in Somerset, New Jersey.

Product Integrity

When you order retaining rings from Rotor Clip, you get rings made by Rotor Clip. NO IMPORTS, NO MIXED RINGS FROM DIFFERENT LOCATIONS. Your rings are manufactured entirely at our headquarters facility in Somerset, New Jersey, and shipped to locations around the world.

Customer Service: 1-800-55-ROTOR

You'll find a helpful, courteous voice ready to give you information on availability, specifications, prices and delivery times. But our customer service personnel are trained to do more than take orders. They are your personal account managers assisting you with your requirements and making suggestions for how we can better serve you. Need information on Rotor Clip tools and/or new products? Ask your customer service representative.

Samples

Samples of Rotor Clip retaining rings are available upon request. See for yourself the care and precision that goes into every ring we make.

Standards

Rotor Clip retaining rings meet ASME specifications for military retaining ring part numbers (formerly MS standards) as well as ANSI and DIN specifications.

ISO/TS 16949:2002 Certification

Rotor Clip is certified to ISO/TS 16949:2002. But more than a plaque on the wall, Rotor Clip Quality assures our customers of a documented quality system in place capable of producing reliable, quality parts order after order. It also provides our customers, on request, with lot traceability and material certifications for every part they buy as well as properly labeled boxes with country of origin and lot numbers prominently displayed.

Technical Engineering Assistance

What size and type of retaining ring meets your fastener requirements? How can you replace a traditional fastener (screw, nut, cotter pin, etc.) with a retaining ring? How can a total fastening approach to an assembly help you save? Our technical engineering expertise is available to you as you work through your design.

Rings up to 35" (900mm) in diameter.

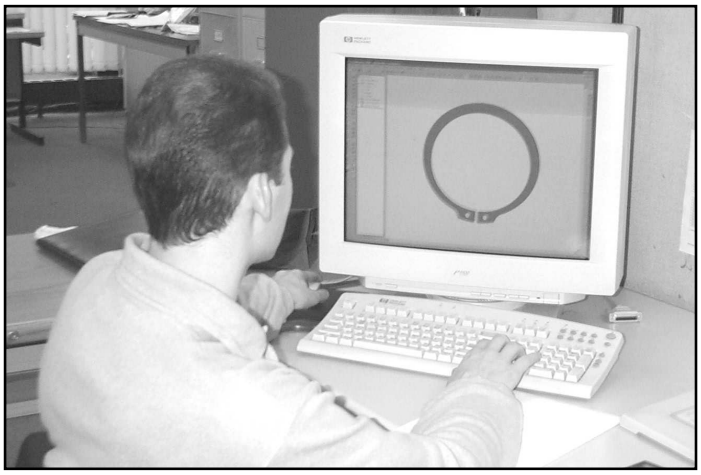
Rotor Clip, The Published Experts

Rotor Clip is recognized as an authority on the latest production and quality control techniques as they pertain to retaining rings. Journals which have published Rotor Clip articles include, "Machine Design," "Industrial Distribution," "Design News," and "Industrial Technology (UK)."

SUPERIOR ENGINEERING & PROCESSES

WE ENGINEER IT

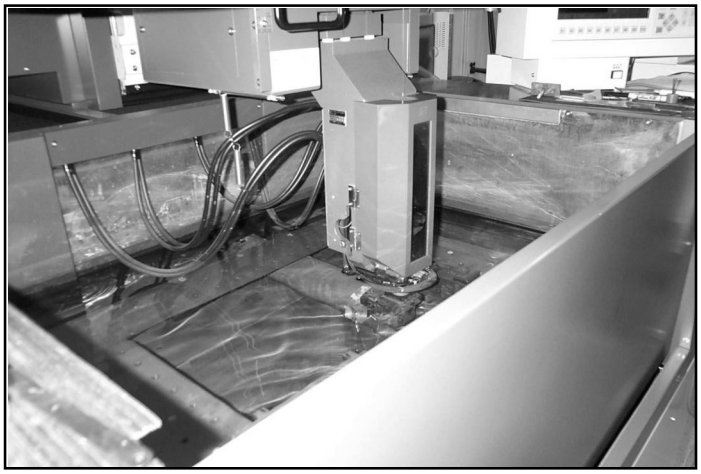
It all begins with engineering, the skilled translation of your needs into accurate, concise engineering language. Our engineers do more than execute drawings; they analyze engineering problems to find solutions and produce designs that stress efficiency and maximum yield of product.



RESULTS: Our engineering techniques ensure a steady flow of "critical" sizes to meet the demands of our customers.

WE BUILD IT

Nowhere in the industry is there a more sophisticated tool room for building high speed, progressive dies. All personnel follow ISO/TS 16949:2002 guidelines for building new tools and repairing existing ones. An ample supply of spare parts assures maximum up time. Prompt maintenance allows for long production runs.



RESULTS: Rotor Clip die design and production techniques yield a generation of tools that consistently produce quality, reliable retaining rings.

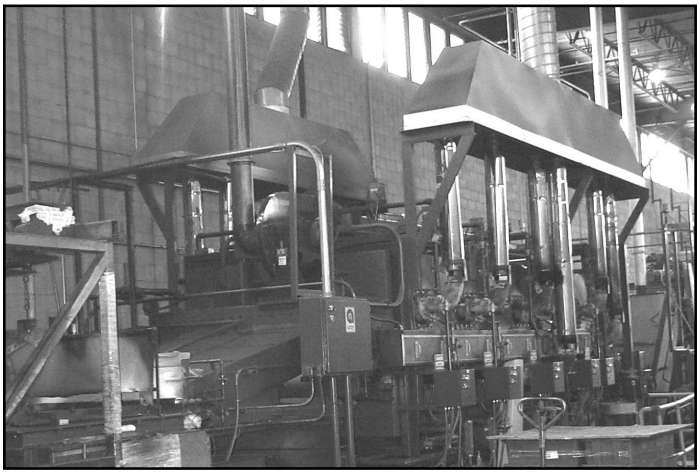
WE STAMP IT

The floor of Rotor Clip's main pressroom pounds with the steady rhythm of the most modern presses in the industry, modified to conform to our requirements for speed and performance. Many of these presses stamp rings at the rate of 1,000 strokes per minute, also producing several rings with each stroke of the press.

RESULTS: You can be sure of a steady flow of RotorClips® to meet your most demanding JIT schedule.

WE HEAT TREAT IT

All Rotor Clip carbon steel retaining rings are heat treated using the austempering method. Rings are heated in specially built furnaces and special care is taken to feed rings into the furnace at the proper rate. A computer automatically weighs the rings and regulates the number moving through the furnace in a given time frame.



RESULTS: You can depend on the performance and reliability of every RotorClip® you buy.

SUPERIOR ENGINEERING & PROCESSES ®

WE FINISH IT

In response to calls for alternatives to hexavalent chrome coatings, we've introduced trivalent (Z3), zinc plus trivalent coating, and Z3X, zinc plus trivalent plus sealer. These afford nearly comparable salt spray protection to the hexavalent-based coatings.

We still offer hexavalent chrome finishes including Zinc Dichromate (ZD), Zinc Dichromate with sealer (ZDL), heavy Zinc Dichromate with sealer (HZDL), and Zinc Bright (ZF.) All of our zinc coatings are applied using a mechanical plating process, which helps reduce the occurrence of hydrogen embrittlement, a condition that can cause rings to fail.

A basic Phosphate (PA) coating is available for all retaining rings at NO EXTRA CHARGE. This affords the ring a basic shelf life protection. Phosphate and Oil (PD), a popular European coating, offers eight hours of salt spray protection and Heavy Phosphate and Oil (HPD), 72 salt spray hours.

RESULTS: Rotor Clip offers the corrosion protection best suited for your application.

ROTOR CLIP: THE LOWEST TOTAL COST PRODUCER

WE PACKAGE IT

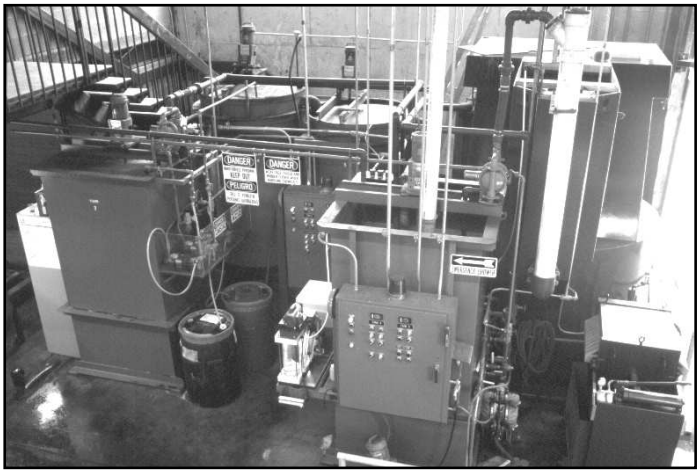
Rotor Clip retaining rings are packaged to afford maximum protection of rings during shipment and to simplify ring handling for our customers.

Rings are packaged in standard bag and box quantities to allow for faster picking and delivery of your order.

RESULTS: Customers receive their rings packaged to meet their internal requirements.

WE MAINTAIN A CLEAN ENVIRONMENT

All water used in our process is channeled into our own in-house water treatment system, designed and built by Rotor Clip personnel. Rotor Clip only uses environmentally safe lubricants.



RESULTS: Rotor Clip is a responsible manufacturer concerned with doing its part to protect our environment. Our efforts have been recognized by the New Jersey Water Environment Association for "....an outstanding contribution on an aspect of industrial waste control."

QUALITY ASSURANCE

Rotor Clip has received numerous quality awards over the years.

21st Century Quality

Rotor Clip is certified to ISO/TS 16949:2002, the international quality standard. Over the years, we have received numerous quality awards as well, including the GM "Mark of Excellence," the Ford Q1 and the Chrysler QE. But our quality reputation means more to us than mere plaques on the wall. It is our way of assuring our customers that they can use our products with confidence. As we move into the 21st Century, it is also our way of demonstrating our commitment to meeting our customers' demands for quality innovation and process savings.

ISO/TS 16949:2002

The new standard is part of Rotor Clip's re-emergence as a brand leader and R&D center for the engineering, production and packaging of retaining rings. TS is goal oriented and fits very well with the company's drive to provide value and service to its global customers. Instead of focusing on core procedures that everyone is expected to follow, TS requires management to set goals and meaningful metrics. These targets are tracked on a regular basis and problems are addressed through corrective and preventive actions. This goal driven philosophy results in timely improvements in every area of the company and cost reduction opportunities for its customers.

ROTOR CLIP QUALITY POLICY

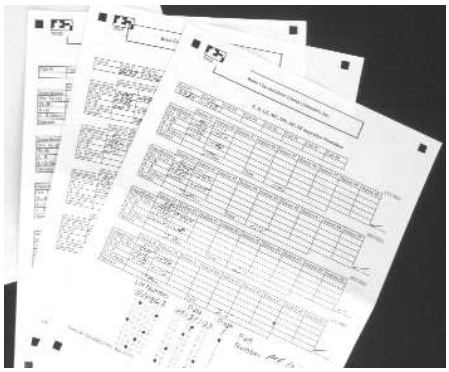
1. **To understand how to do my job well.**
2. **To suggest how to improve my job.**
3. **To provide our customers a quality product delivered 100% on time.**
4. **To know and follow the "voice of the customer."**

CONTINUOUS IMPROVEMENT

Through pre-defined inputs, our Management Review Board monitors the quality system and identifies areas for improvement. The quality system is reviewed regularly by this committee to ensure quality objectives are being met. A business plan is issued for a three-year period stating business and quality goals and objectives for the core business areas. Benchmarking is conducted for key indicators and changes are made based on these comparisons. Customer satisfaction is measured on a regular basis to determine areas in need of improvement.

FULLY ACCREDITED TESTING LABORATORY

Rotor Clip's on-site test facility is fully accredited through our ISO/TS 16949 :2002 designation. This lab routinely performs the necessary testing for Production Part Approval Process (PPAP) submissions that our customers require before accepting parts from us. Internally, this same lab tests the effectiveness of our manufacturing processes, such as heat treating and plating, and verifies our compliance to appropriate standards.


Lot traceability information is accessed electronically for accuracy and customer convenience.

LOT TRACEABILITY

Operators fill out inspection information (as defined by the Control Plan) on worksheets. These are completed for each lot, reviewed by the supervisor, and sent to Quality Assurance, where they are stored electronically. A database is created for each new lot number, which allows us to search and retrieve information by lot number in response to customer requests.

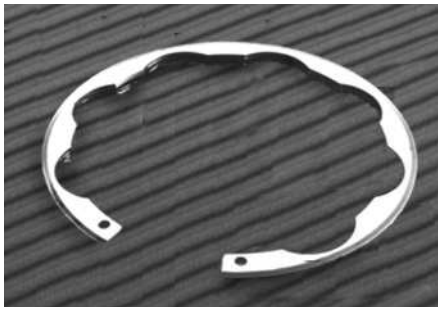
CERTIFIED TO ISO/TS 16949:2002

WIRE FORMS/SPECIAL STAMPINGS

LET US HELP YOU REDUCE YOUR COSTS

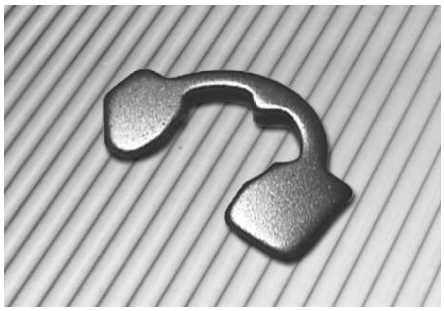
Our engineers will help you select the right ring for your application. They'll make every effort to find the most cost effective approach using a standard ring. However, if this does not solve the problem, they'll work with you to design and produce the right ring for your application.

HERE ARE A FEW EXAMPLES OF HOW WE'VE HELPED OUR CUSTOMERS SOLVE UNIQUE FASTENING PROBLEMS:

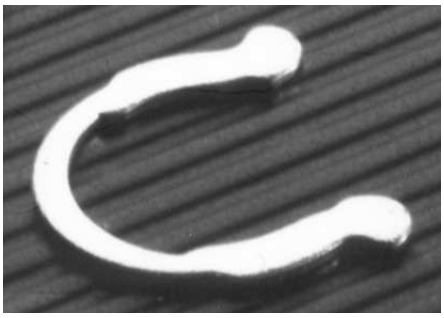


"Scallop" Retaining Ring-This beveled, internal retaining ring is easier to install and provides greater shoulder area than the standard version for more effective retention of the assembly.

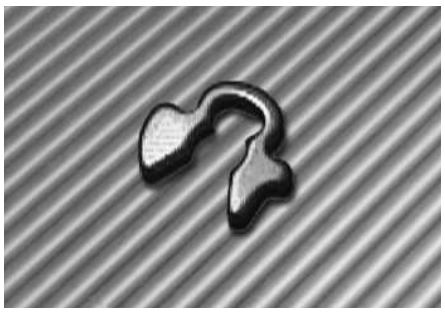
Self-Locking Special Retaining Ring-This version of a TX self-locking retaining ring features a large shoulder for more retention.



DE-12SP2 - This special E ring was designed for an automotive component manufacturer with an enlarged shoulder for extra retention.

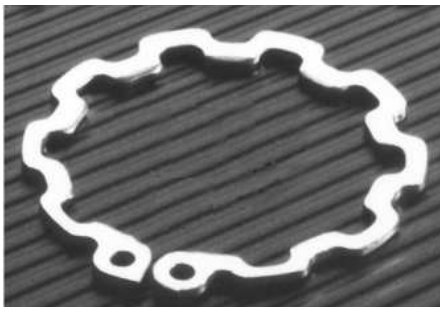


PO-66-This special part is used by a prominent motor manufacturer.

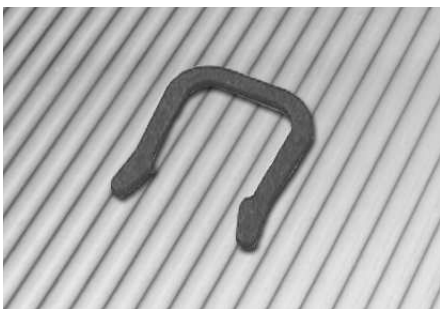


PO-18SP1 This version of a "poodle" style ring was designed for an automotive component manufacturer as a quick-connect for a cable.

SP-214 - This special part is used to retain a pressure regulator in a fuel rail.



Multi-Arc Retaining Ring-This beveled, external retaining ring is designed to expand more than conventional rings so that it can fit over an oversized assembly before installation on a shaft.



CX-37 - A special light-duty radial retainer for a square shaft.

NU-62 - A special external self-locking ring used for an automotive application.

INSPECTION PROCEDURES

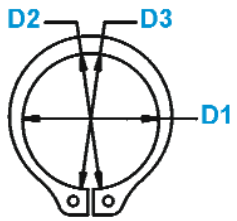
DETERMINING PERMANENT SET LIMITS FOR BASIC EXTERNAL RETAINING RINGS

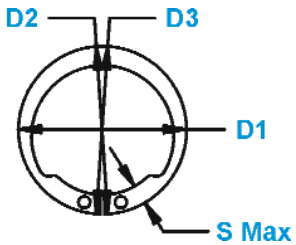
SH, VSH, SHI

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)

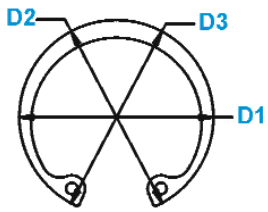
DETERMINING PERMANENT SET LIMITS FOR BASIC INTERNAL RETAINING RINGS

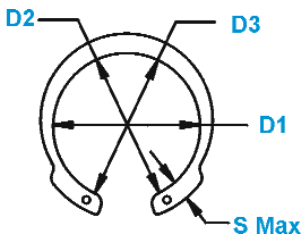
HO, VHO, HOI

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

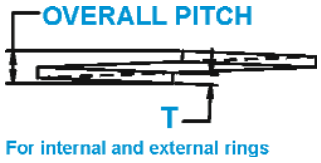
Dish is any difference in height occurring from the outer edge of the ring to the inner edge. This condition should be considered separate from Pitch (see #2). To determine Dish, a small amount of weight can be applied to the upper surface of the ring to remove pitch from the overall height measurement.

DISH LIMITATIONS-For Internal, External & Radial Rings

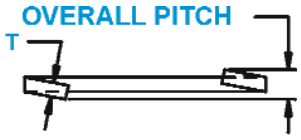
Ring Thickness (In.)	Allowable Dish (In.)
0.010-0.015	0.002
0.025-0.035	0.003
0.042-0.093	0.005
0.109-0.125	0.010
0.156-0.187	0.015

2. Pitch Limitations

Pitch takes into account thickness of the ring including any mismatching of lugs, where applicable.



For internal and external rings



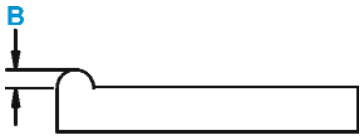
For radially installed rings

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

3. A burr results from the metal stamping process. It is a raised edge for which the following parameters apply.



For all size retaining rings - (B=BURR)

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

RING MATERIALS

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 420 type cold rolled stainless steel (UNS S42000) as an option and in our standard beryllium copper (Alloy #25/UNS C17200) with copper alloy C72900 and phosphor bronze (Alloy#5218/UNS C52180) as options.

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 900° 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.

STAINLESS STEEL 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.

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.

COPPER ALLOY C72900 - A less expensive alternative to Alloy#25 offering the following characteristics:

1. Excellent high temperature stress relaxation resistance
2. High strength and excellent formability
3. Lack of distortion during aging

Contact Technical Sales regarding use of this material.

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	Specification	Rotor Clip Code
Carbon Spring Steel	SAE 1060-1090 (UNS G10600-G10900)	ST
Stainless Steel	PH 15-7 Mo (Grade 632 - UNS S15700) 17-7 PH (Grade 631 - UNS S17700) 420 (UNS S42000)	SS SS* SA
Beryllium Copper	UNS C17200	BC
Phosphor Bronze	UNS C52180 Copper Alloy C72900	PB PF

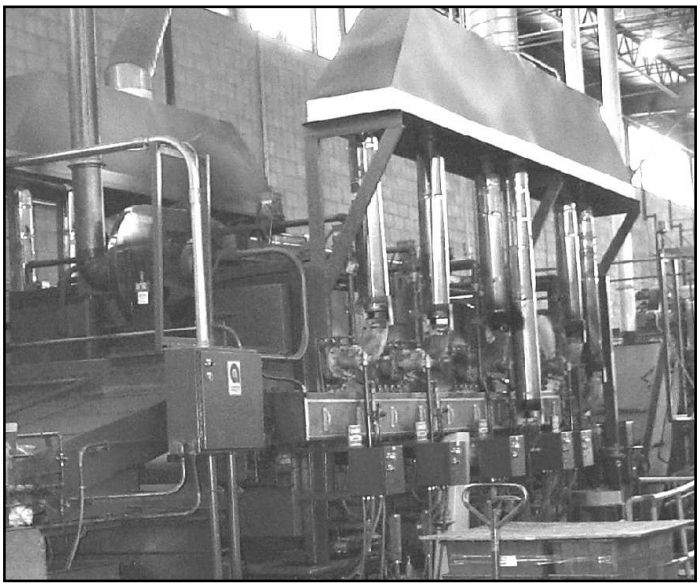
*Note: Large stainless steel rings may be supplied from 17-7 due to material availability. Contact factory for details.

HARDNESS AND THE AUSTEMPERING METHOD
(For Carbon Steel Retaining Rings)

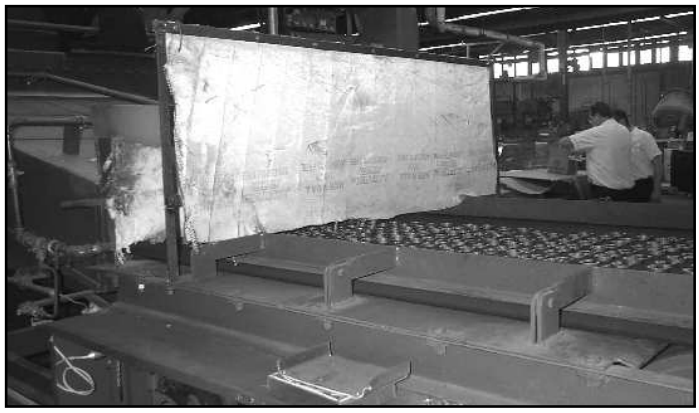
Over the years, Rotor Clip has consistently produced retaining rings with tremendous strength and ductility. The key to producing such quality, high performance products has been Rotor Clip's perfection of the austempering method. Through this process, retaining rings undergo a complete transformation to the desired bainitic structure thus eliminating brittleness and ensuring strength. This is accomplished by our heat treating furnaces (see drawing below). They feature automated feeding which eliminates any possible overloading of the furnace. Parts are uniformly placed on the belt by means of an oscillating feeder, to ensure all parts reach a uniform temperature.

The parts pass from the furnace into a molten salt quench tank where they are transformed isothermally at a predetermined temperature and time. This results in parts with a bainitic structure characterized by good mechanical properties.

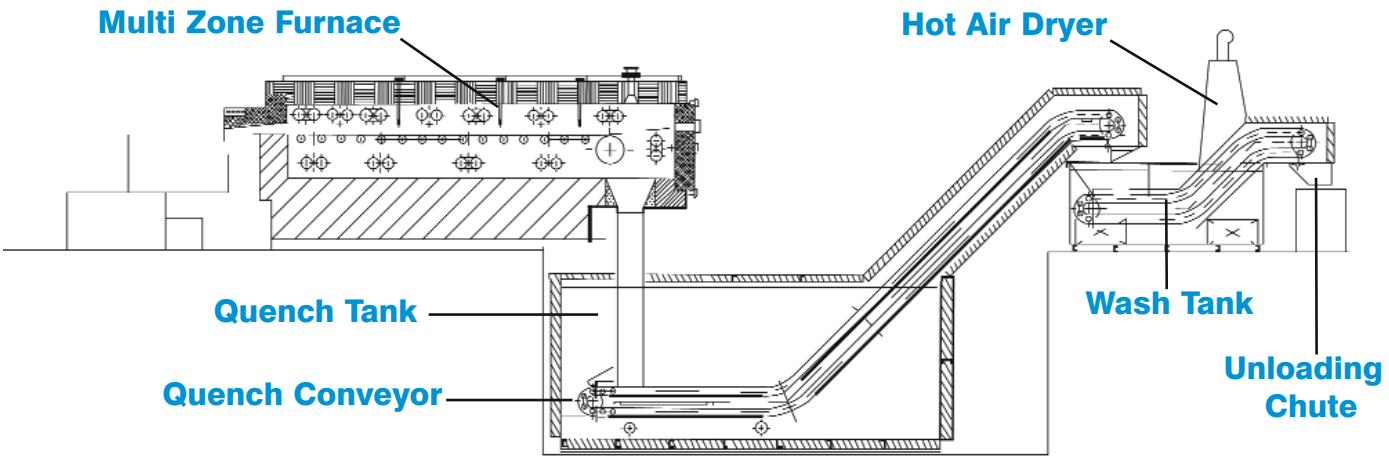
Hardness data for Rotor Clip carbon spring steel, stainless steel, and beryllium copper retaining rings are listed at the end of each specification chart.



Rotor Clip has the largest captive heat treating facility on the eastern coast of the United States.



Rotor Clip Austempering Furnace



FINISHES

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

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

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

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).

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.

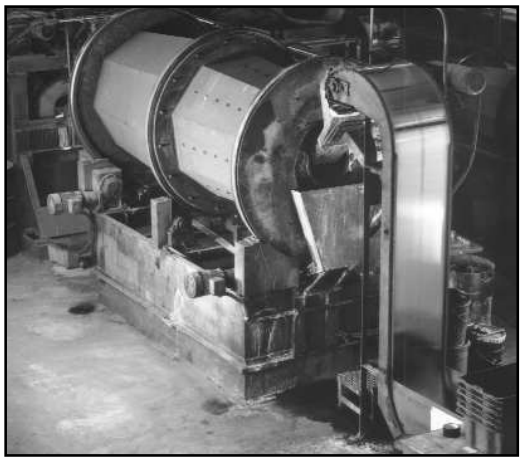
ZINC BRIGHT (ZF)-Most of the dichromate is leeched out of this process, leaving a "bright" silver finish on the parts. ZF offers some corrosion protection (48 hours), but is widely used when the aesthetics of the part are a factor.

ZINC DICHROMATE LACQUER (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.

NEW-TRIVALENT COATING (Z3, Z3X)- This coating meets global requirements for hexavalent-free coatings, and Rotor Clip is working with the automotive industry to write new standards for its use with retaining rings. Z3 offers 120 salt spray hours while trivalent with a sealer (Z3X) affords 240 salt spray hours of protection. (Note: Trivalent is still undergoing testing. Contact Rotor Clip Technical Sales for more information).

NOTE: Electroplating can not be successfully done with steel retaining rings due to the problems encountered with hydrogen embrittlement.

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



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	Z3	Trivalent plus Zinc	24/120	N/A
	Z3X	Trivalent Zinc plus Sealer	72/200	N/A
Optional Color Coding Finishes	ZFF	Zinc Flash	None	Silver
	CF	Copper Flash	None	Copper

*White Corrosion/Red Corrosion

LABORATORY FACILITY & TESTING PROCEDURES

Trained personnel using Rotor Clip's in-house laboratory facility carefully monitor each step of the manufacturing process. Incoming steel is carefully checked for adherence to chemical composition, dimensional requirements and responsiveness to heat-treating. Individual lots of rings are routinely inspected using detailed control plans. Rings are also checked for hardness, using Statistical Process Control (SPC) to ensure the effectiveness of the heat-treating process.

Rotor Clip's laboratory is a fully accredited ISO/TS 16949:2002 facility and is capable of checking all phases of mechanical and metallurgical properties involved in the manufacture of retaining rings.

SALT SPRAY TESTS

Random samples from retaining ring lots are routinely selected for salt spray evaluation. This test verifies the integrity of corrosion resistant coatings and ensures that rings will perform according to stated specifications.

Rotor Clip retaining rings adhere to the acceptable standards for industry and government.

For exceptional salt spray resistance, Rotor Clip retaining rings can be produced from PH 15-7 Mo stainless steel. For applications subject to sea air or sea water atmospheres, Beryllium Copper 25 alloy is available.

TEMPERATURE LIMITS

The effective, maximum operating temperatures for Rotor Clip retaining rings are listed in the chart below. Applications, which exceed these temperatures, will cause a lowering of the retaining ring's Rockwell Hardness. This softening of the material results in lower tensile, rendering the rings less useful for a particular application.

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			600	-100

THIS CHART IS FOR REFERENCE ONLY. FOR INFORMATION REGARDING PERFORMANCE OF A RETAINING RING IN A SPECIFIC APPLICATION, PLEASE CALL ROTOR CLIP TECHNICAL SALES: 1-800-557-6867.

Note: Temperature Limits for all types and sizes of beryllium copper retaining rings (Alloy#25, CDA#172) are 650°F to -300°F. Temperature limits for all types and sizes of stainless steel retaining rings (PH 15-7 Mo or equivalent; AISI 632-AMS 5520) are 900°F to -100°F.

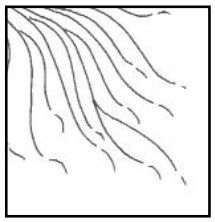
Spark – Carbon Steel

HOW TO DISTINGUISH SAE 1060-1090 AND PH 15-7 Mo Stainless Steel

If rings made from these two materials should be accidentally mixed, there are three simple procedures to distinguish one from another.

1. Clean a portion of a ring and drop a 20% nitric acid solution on it. If the ring is stainless steel, it will not be affected; if it is carbon spring steel, the color will become noticeably darker within 60 seconds.

2. Bring the ring in question into contact with a grinding wheel. If the carrier lines are curved and result in a solid burst, the ring is stainless steel; if the carrier lines are straight and result in an intense spark burst, the ring is carbon spring steel.



PH 15-7 Detached curved elongated tail.

SAE 1060-1090 Long straight streamer with star-shaped burst.

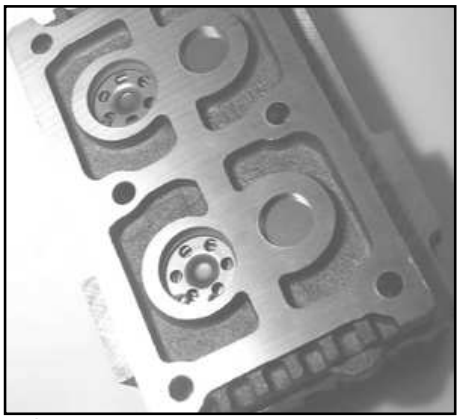
3. Sand a portion of the ring. Mix four grams of copper sulfate into a 10% sulfuric acid solution (H_2SO_4) Place a drop on the sanded area. If it is stainless steel, it will not be affected; if it is carbon spring steel, the ring will copper plate.

APPLICATIONS

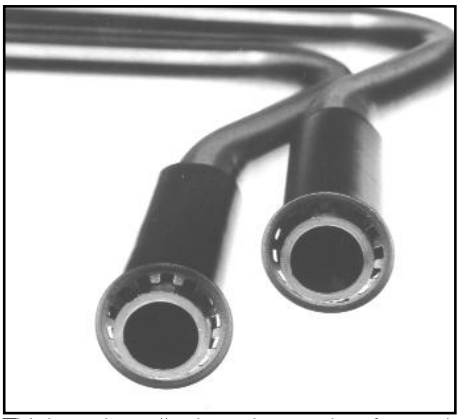
The dynamics of a retaining ring are simple:

It's made from less material than traditional fasteners like screws, nuts and bolts, so you save...It requires a simple groove to function eliminating machined shoulders, threads, cover plates, heat formed studs so you save...It can be assembled/disassembled easily, reducing labor so you save...It is a quality part offering lot traceablliliy, so you use your ROTORCLIPS with confidence while you save!

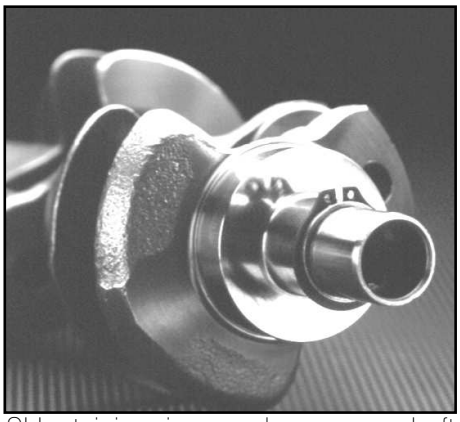
The following are just a few examples of how industry uses retaining rings:



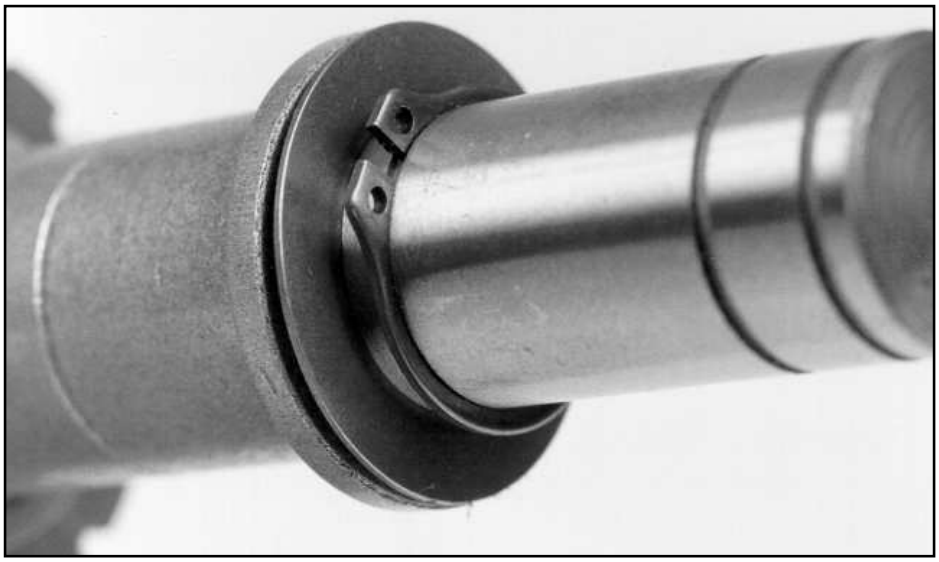
HO internal rings retain check valve assemblies on an air compressor.



TX rings installed on the ends of metal shafts.

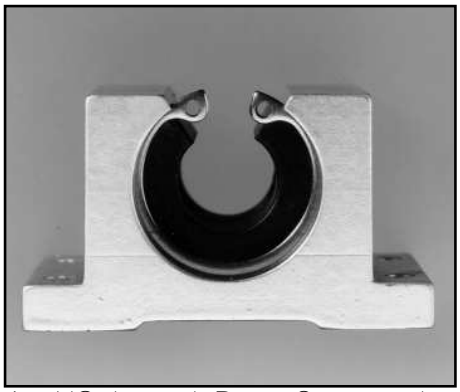


SH retaining ring used on a cam shaft assembly.



An SH ring holds assembly in place on housing of a garden tractor transmission.

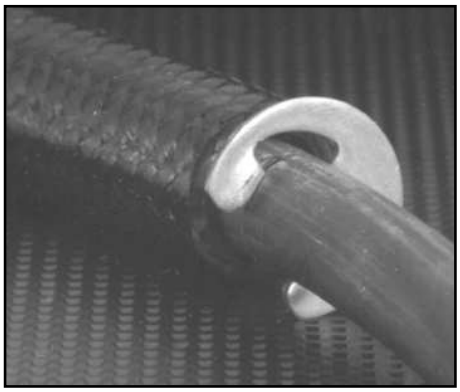
HOI retaining ring differs from the standard HO in that the lugs are inverted. The ring retainins the assembly while allowing another component to pass without interferernce from the lugs.



An HO internal ROTORCLIP® retains this linear bearing assembly.

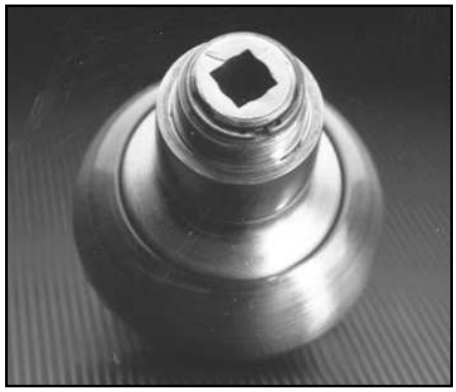
A standard HO retaining ring (left) is easier to assemble/disassemble than wire formed version (right.)

The PO "poodle" ring features large shoulder abutments for effective retention of the shaft.

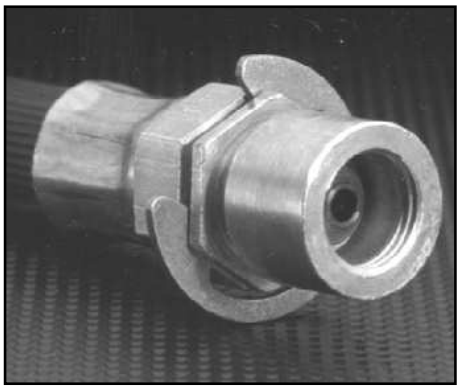


An RE ring cuts into the hard plastic cable coating and provides a shoulder to hold a protective sleeve in place on a transmission.

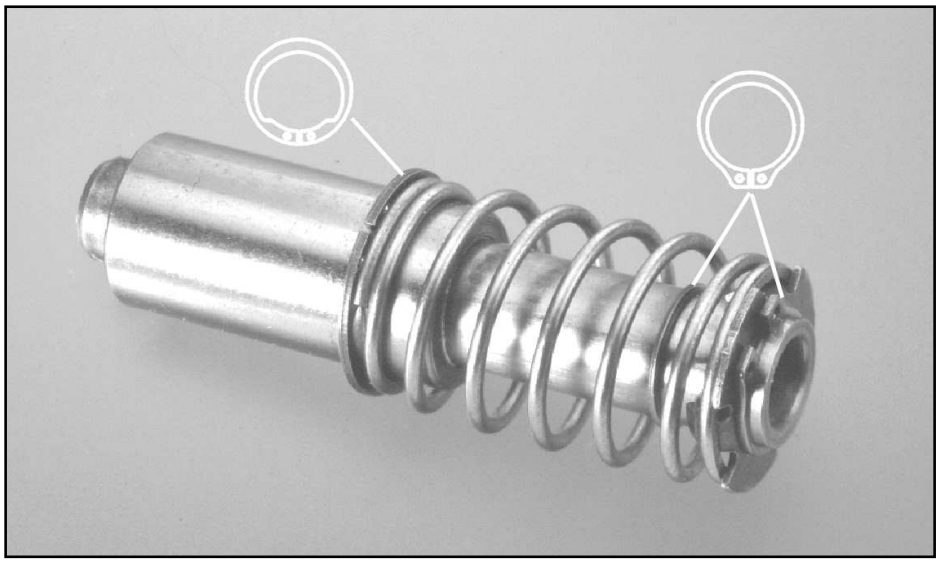
An RE ring holds the folding assembly and molded joints/members for this automobile roof rack.



This SHI ring differs from the standard SH in that the lugs are inverted. The door knob assembly can now be threaded into another piece without interference from the lugs.

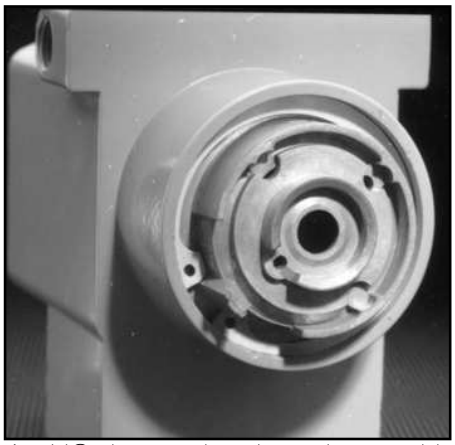


This E ring is used on a hexagonal shaft in a non-standard application to provide an enlarged shoulder for assembly onto another shaft.

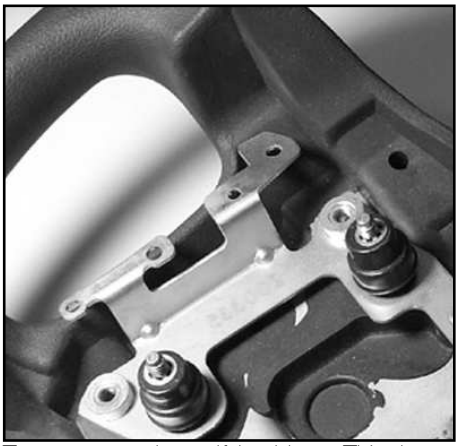


A series of three ROTORCLIPS® (two external SH rings and an SHI version with the lugs inverted) retain the spring assembly in this automatic chain tensioner for an automobile engine application.

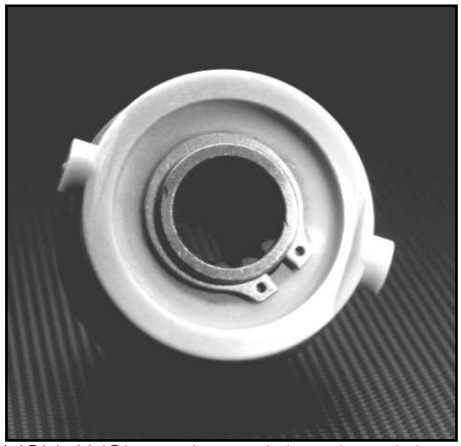
APPLICATIONS



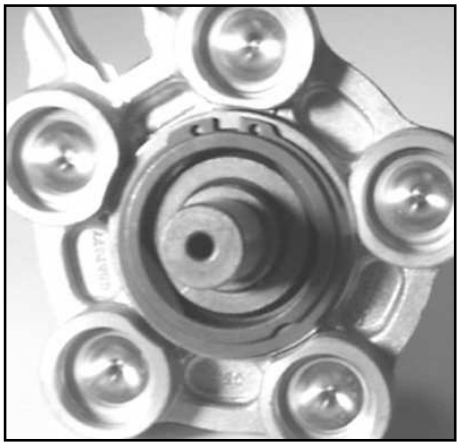
An HO ring retains the valve on this cast assembly.



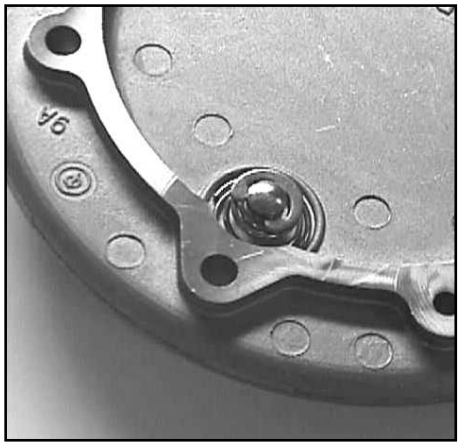
Two external, self-locking TX rings on an automotive steering wheel assembly.



MSH ANSI metric retaining the pinion gear of a starter motor.

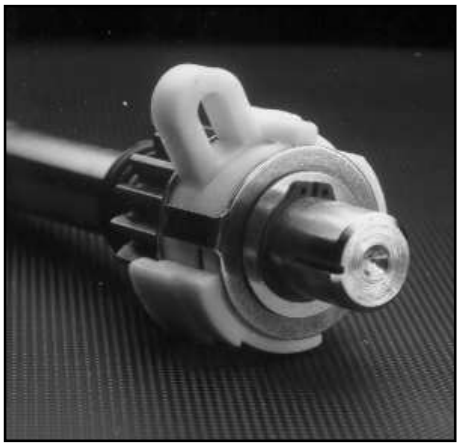


VSH ring used on an automotive air conditioning compressor to reduce noise and vibration.



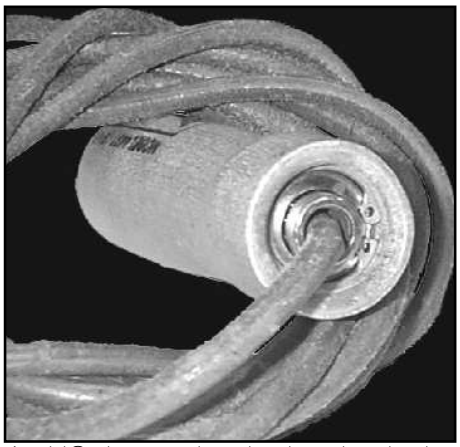
RE retaining ring on a check valve assembly.

HO internal ring retains the valve of this fuel rail assembly.



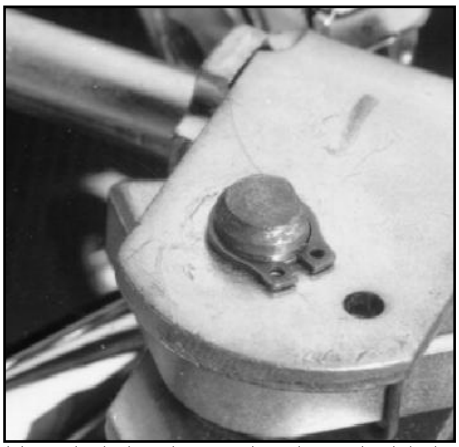
SH retaining ring used to hold components on this washing machine spin cycle shaft.

Two part LC ring is dynamically balanced once installed, making it very effective in retaining this escalator assembly during high rotational speeds.



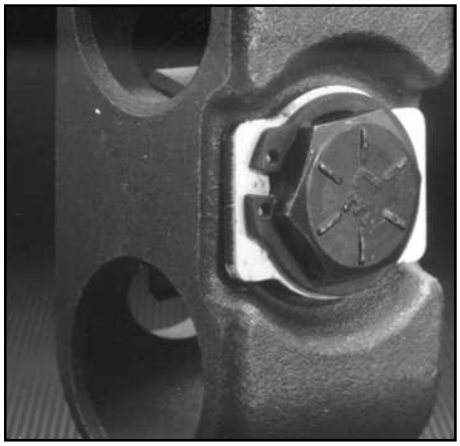
An HO ring retains the bearing in the handle of a jump rope so that it can be easily replaced.

Gear retention is a common application for SH retaining ring shown above.

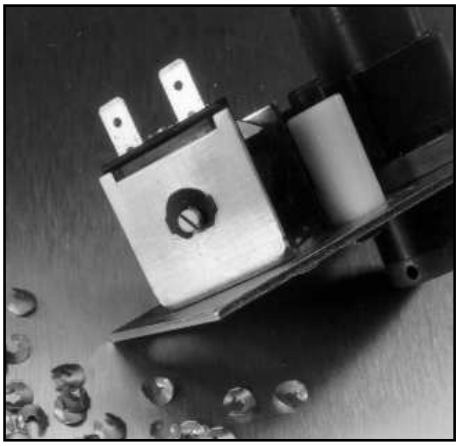


Hospital bed mechanism held in place by SH retaining ring.

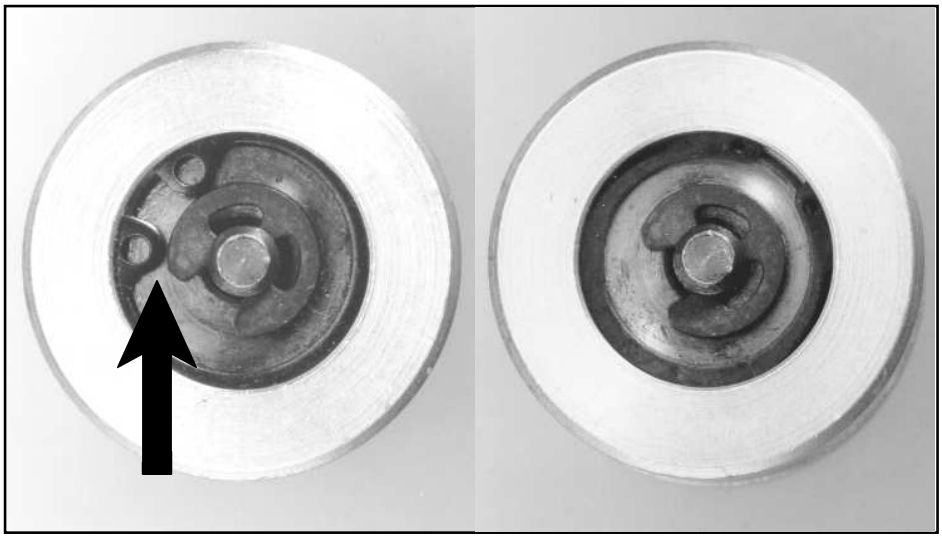
This external RotorClip® keeps a tight seal on the fitting of a vacuum chamber.



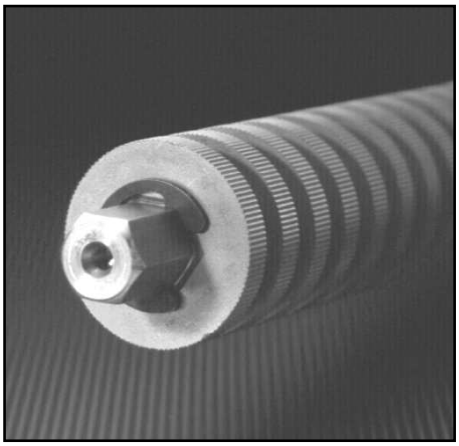
SHR ring retains this plate on tank tread linkage.



EL ring retaining a component of a controller assembly.



When clearance seemed to be a problem between this E ring (left center) and the lugs of the HO ring, the manufacturer switched to an HOI version with inverted lugs (right) for this automotive transmission spool valve.



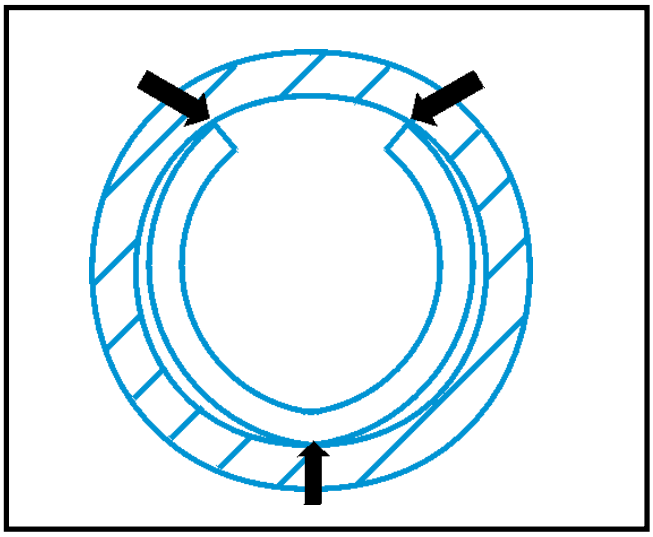
E ring retains the cutters on a shaft used on a paper shredder.

Constant Section and Tapered Section

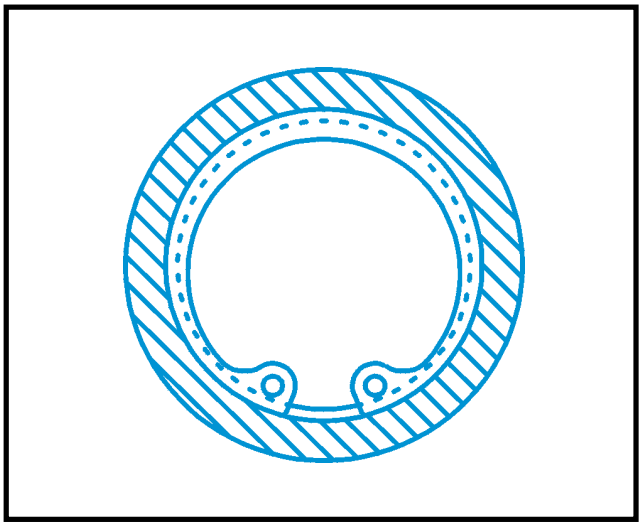
It is important to note that the constant section and tapered section retaining ring lines are meant to complement one another. Constant Section rings offer more clearance than tapered section, but generally accommodate less force. Most tapered section rings have lugholes, which can be used to easily install/remove the ring using manual or pneumatic tools. Some Constant Section rings have lugholes, but different cutoff styles require a different installation method that may be cumbersome. The choice depends upon the requirements of your application and taking care to select the appropriate type of ring will maximize efficiencies and costs.

Both ring types are either compressed (for a housing bore) or expanded (for a shaft) and released into a machined groove. The constant section ring, with its uniform material width, is elliptical when installed in the groove, making only three-point contact as shown.

In contrast, tapered section rings make more circular contact when released in the groove. The maximum section as well as the lugs provide more shoulder with which to retain a component or an assembly than a constant section retaining ring.



Constant section rings make three-point contact with the groove.



Tapered section rings make uniform contact with the groove.

Self-Compensating Hose Clamps

For Low Pressure Applications, Clamp It With Rotor Clamp

NOW YOU HAVE A CHOICE.

Competition makes for a healthy marketplace and Rotor Clamp provides a double dose of it with its full line of self-compensating hose clamps. Purchase clamps at a low price from a manufacturer known for its quality and reliability. Use our products with confidence since they are produced by Rotor Clip Company, Inc., a world class manufacturer of retaining rings and hose clamps.

Self Compensating Hose Clamps from Rotor Clamp simplify assembly/disassembly, reduce production time and lower costs. Ideal for replacing traditional screw/worm type clamps on low-pressure applications.

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 Clamp (HC)

Double Wire Clamp (DW)

PreOpened, PrePositioned Clamps

This unique, patented version of a preopened clamp is held in the open position by compressing the tangs and allowing the stop to hook on to a complementary notch on the side on one of the tangs.

This clamp is intended solely for rubber hose manufacturers who pre-glue clamps to hoses before supplying to the automotive industry.

A hook catches a "dimple" when the clamp is opened for a more secure hold. The clamp can then be glued in position on a hose.

The mechanism to hold the clamp open is accomplished with only minor changes to the original design of the clamp. The clamp cannot be preopened any further than the stop, ensuring the clamp will not be over-expanded. Contact technical sales for more information: **1-800-557-6867**.

Constant Tension Band Clamp (CTB)

Inch Tapered Section Retaining Rings/Circlips Axially Assembled

www.rotorclip.com

Axially Assembled Rings.

Axial retaining rings are designed for axial installation into machined grooves. These rings are either internal for installation in housings and bores, or external, for assembly on shafts. Once installed, they provide a protrusion or "shoulder" for retaining parts and will perform according to the specifications listed in the pages that follow:

HO Page 28-33

Internal Housing 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.

SH Page 34-39

External Shaft ring. 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.

HOI Page 40-41

Internal Housing Inverted ring. 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.

SHI Page 42-43

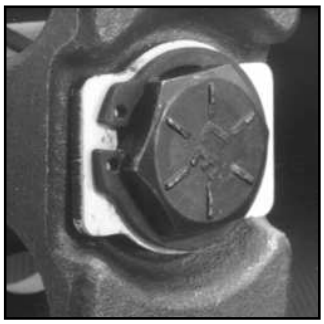
External Shaft Inverted ring. Functions like an SH ring on a shaft, only the lugs are "reversed." This version reduces the distance the lugs of the standard SH extend beyond the circumference of the shaft. The shaft can then be used in an application where clearance is minimal.

SHR Page 44-45

External Shaft Reinforced ring. 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.

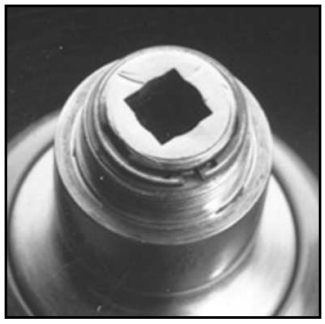
SHM Page 46-47

External Shaft Tamper-Proof ring. 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.

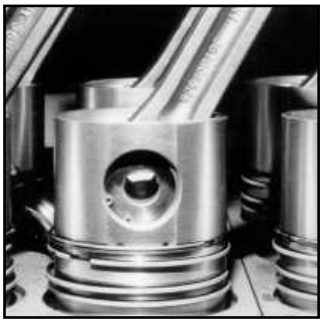


SHR ring retains this plate on tank tread linkage.

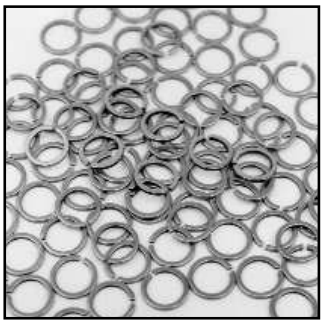
HOI with inverted lug provides better clearance for E ring (center) on this automatic transmission spool valve.



SHI used on door knob assembly.

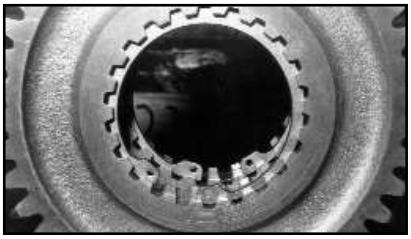


HO-200 used to attach connecting rod wrist pin to piston.



SHM retaining rings.

SH-237 used externally to retain gears on main shaft assembly of a truck transmission.



HO-334 holds gear on a main shaft assembly for a truck transmission.

FOR TOOLS SEE PAGE 157-168
FOR MATERIALS SEE PAGE 16
FOR FINISHES SEE PAGE 18
FOR PACKAGING SEE PAGE 5

Inch Tapered Section Retaining Rings/Circlips Axially Assembled

www.rotorclip.com

Rings For End-Play Takeup.

Rotor Clip bowed and beveled retaining rings are designed to compensate for accumulated tolerances in assemblies. Once snapped into the groove, bowed rings exert a force or a "preload" on the retained parts made to the low side of the tolerances "snugging" everything up. They also act like a spring and "give" when parts made to the high side of the tolerances extend too far into the groove. Beveled retaining rings feature a 15 degree beveled edge that is installed in a groove with a complementary angle. This angle allows the ring to wedge itself between the groove and the retained part until it can go no further, effectively "locking" everything in place. Once installed, these rings will retain parts according to the specifications listed on the pages that follow.

BHO Page 48-49

Internal Bowed Housing ring. 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 in the catalog.

BSH Page 50-51

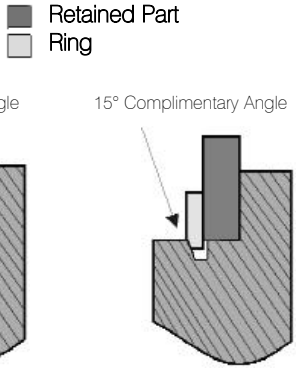
External Bowed Shaft ring. Compensating for accumulated tolerances is what a BSH "bowed" retaining ring is designed to do on a shaft. Once snapped into the groove, bowed rings exert a force or a "preload" on the retained parts for the range specified in the catalog.

VHO Page 52-55

Internal Beveled Housing ring. 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.

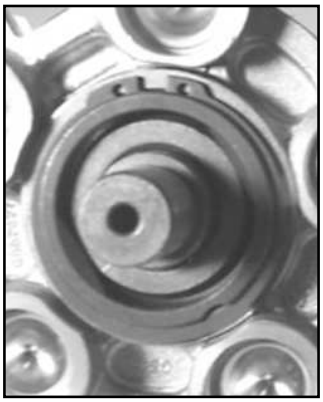
VSH Page 56-59

External Beveled Shaft ring. 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.



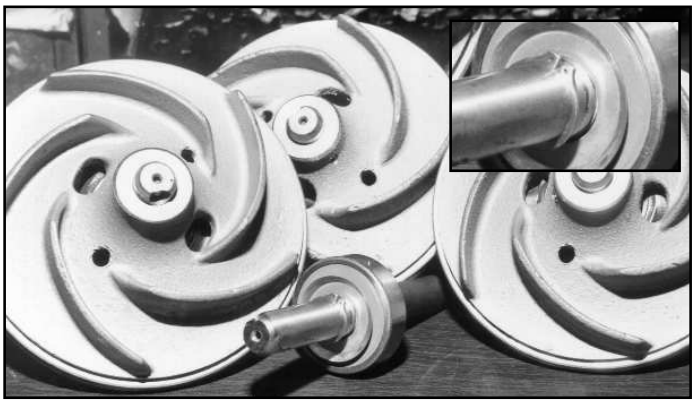
Maximum insertion of a beveled internal retaining ring.

Minimum insertion of a beveled internal retaining ring.



VSH retaining ring used on an automotive air conditioning compressor to reduce noise and vibration.

VHO-206 retaining water pump shaft in housing.



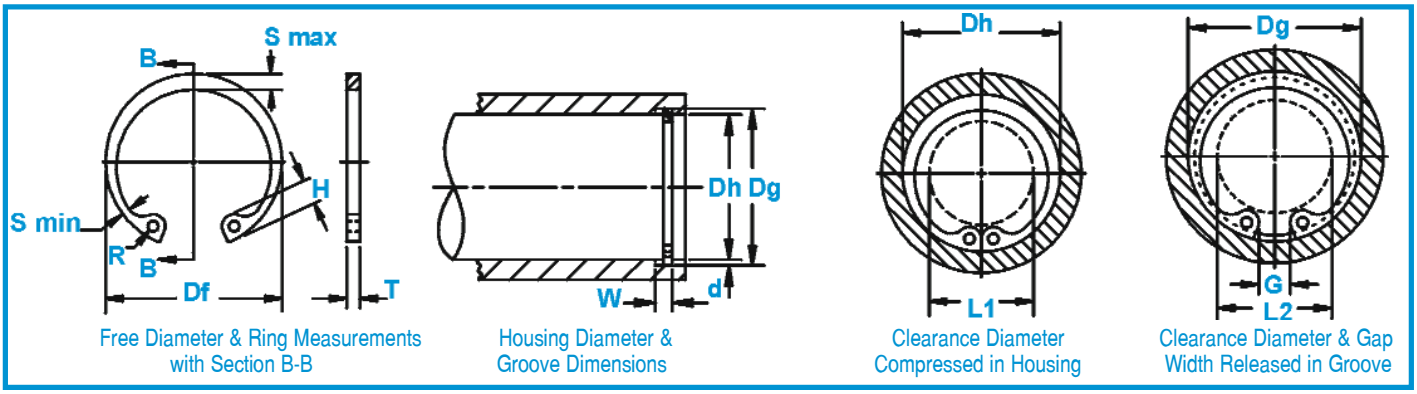
BSH "bowed" retaining ring (insert) holds a bearing on a shaft assembly used to turn the rotor of a water pump.

BHO "bowed" internal retaining rings.

HO Housing Rings

Axially Assembled, Internal

Once installed in the groove of a housing/bore, the shoulder holds an assembly in place.



Free Diameter & Ring Measurements with Section B-B

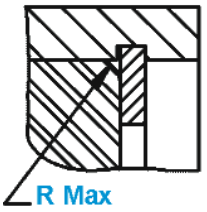
Housing Diameter & Groove Dimensions

Clearance Diameter Compressed in Housing

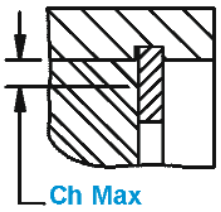
Clearance Diameter & Gap Width Released in Groove

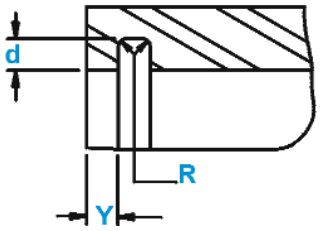
RING NO.	HOUSING DIAMETER			GROOVE SIZE DIAMETER		GROOVE SIZE WIDTH		GROOVE SIZE DEPTH	RING SIZE & WEIGHT FREE DIAMETER		RING SIZE & WEIGHT THICKNESS***		Wght. Per 1000 Pcs.	CLEARANCE DIA. Com-pressed in housing	CLEARANCE DIA. Re-leased in groove	î THRUST LD.(lbs.) Sqr. corner abutment Ring Safety Factor of 4	î THRUST LD.(lbs.) Sqr. corner abutment 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	±.005	.068		.048	1.734	+.035	.062	±.003	8.9	1.15	1.24	13906	6350
HO-162	1.625	1-5/8	41.3	1.725	.005*	.068		.050	1.804	-.025	.062		10.0	1.15	1.25	14413	6900
HO-165	1.653	-	42.0	1.755		.068		.051	1.835		.062		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

*** 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.**

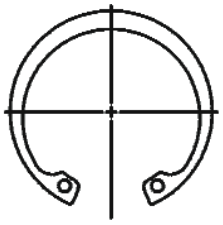


Allowable Corner Radius and Chamfer

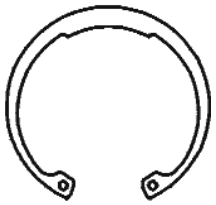




Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -25 thru -100; .010 for ring sizes 102 thru 1000



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



Alternate Design (Manufacturer's Option)

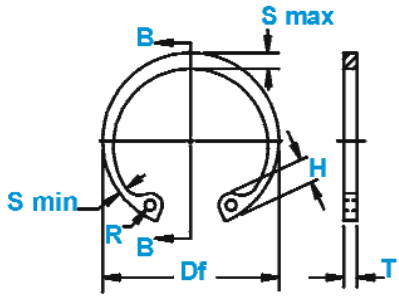
RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in Groove	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (lbs.)	EDGE MAR-GIN
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G Min	R max	Ch max	P'r	Y
HO-25	.065		.025	±.002	.015	±.002	.031		.047	.011	.0085	190	.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	+.015	.290	.048	.038	2400	.120
HO-131	.180		.130		.062		.078	-.002	.284	.048	.038	2400	.126
HO-137	.180		.130		.063		.078		.297	.048	.038	2400	.129
HO-137	.180		.130		.063		.078		.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	±.007	.082	±.007	.078		.339	.064	.050	3900	.150
HO-165	.230		.167		.083		.078		.348	.064	.050	3900	.153
HO-168	.230		.170		.085		.078		.357	.064	.050	3900	.156

FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION

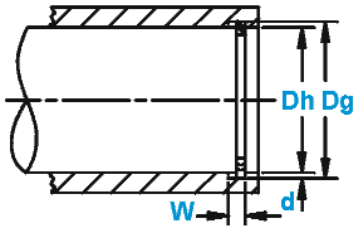
HO Housing Rings

Axially Assembled, Internal

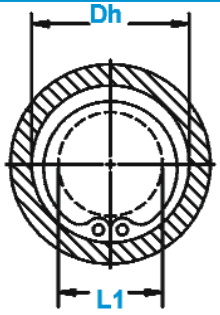
Once installed in the groove of a housing/bore, the shoulder holds an assembly in place.



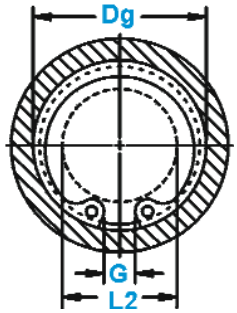
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



Clearance Diameter Compressed in Housing



Clearance Diameter & Gap Width Released in Groove

RING NO.	HOUSING DIAMETER			GROOVE SIZE DIAMETER		WIDTH		DEPTH	RING SIZE & WEIGHT Free Diameter		Thickness***		Wght. Per 1000 Pcs.	CLEARANCE DIA. Com-pressed in housing	CLEARANCE DIA. Re-leased in groove	î THRUST LD. (lbs.) Sqr. corner abutment 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-175	1.750	1-3/4	44.4	1.858	±.005	.068	+.004	.054	1.942	+.035	.062		10.3	1.26	1.36	15580	8050
HO-181	1.812	1-13/16	46.0	1.922	.005*	.068	-.000	.055	2.012	-.025	.062		11.5	1.34	1.38	16139	8450
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		.068		.057	2.072		.062		12.8	1.37	1.48	16697	9050
HO-193	1.938	1-15/16	49.2	2.056		.068		.059	2.141		.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	±.003	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		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	±.055	.109		57.0	2.50	2.69	49329	25700
HO-325	3.250	3-1/4	82.5	3.446		.120		.098	3.623		.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

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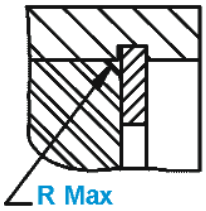
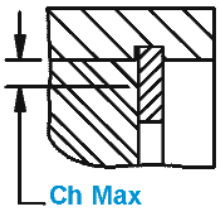
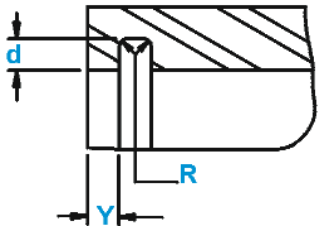
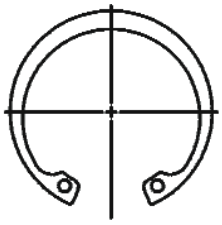


Allowable Corner Radius and Chamfer

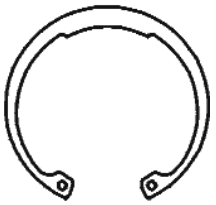




Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -25 thru -100; .010 for ring sizes 102 thru 1000



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



Alternate Design (Manufacturer's Option)

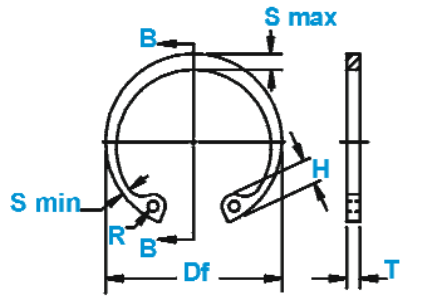
RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in Groove	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (lbs.)	EDGE MAR-GIN
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G Min	R max	Ch max	P'r	Y
HO-175	.230		.170		.083		.078		.372	.064	.050	3900	.162
HO-181	.230		.170		.084		.093		.382	.064	.050	3900	.165
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	±.005	.186	±.007	.091	±.007	.093	+.015	.468	.078	.062	6200	.186
HO-212	.250		.195		.096		.093	-.002	.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		.206		.100		.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		.597	.078	.062	6200	.225
HO-256	.300		.222		.109		.110		.540	.088	.070	9000	.228
HO-262	.290		.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

FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION

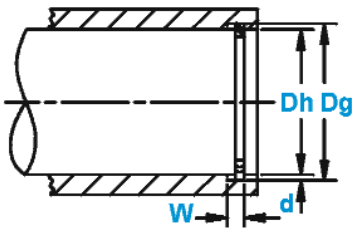
HO Housing Rings

Axially Assembled, Internal

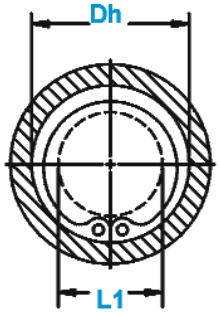
Once installed in the groove of a housing/bore, the shoulder holds an assembly in place.



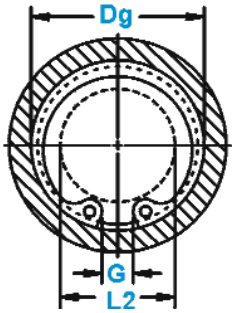
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



Clearance Diameter Compressed in Housing



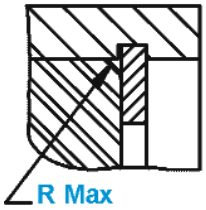
Clearance Diameter & Gap Width Released in Groove

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-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	±.055	.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	±.006	.120	+.005	.112	4.157		.109		78.0	3.02	3.24	58566	35600
HO-375	3.750	3-3/4	95.2	3.974	.006*	.120	-.000	.112	4.157		109		78.0	3.03	3.25	58566	35600
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	±.003	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		.120		.120	4.691		.109		101.0	3.48	3.72	66483	43200
HO-433	4.331	-	110.0	4.571		.120		.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		.109		117.0	3.79	4.03	72370	47000
HO-475	4.724	-	120.0	4.969		.120		.122	5.213	±.065	.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	±.004	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		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	±.008	.174	+.008	.152	7.445		.156		325.0	5.68	5.98	151032	87000
HO-700	7.000	7	177.8	7.315	.006*	.174	-.000	.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		.209		.170	8.270		.187		485.0	6.36	6.70	201173	108100
HO-775	7.750	7-3/4	196.8	8.100		.209		.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	±.090	.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		.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

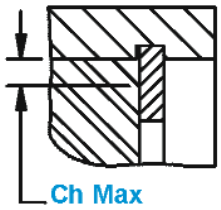
*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & HOUSING.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR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

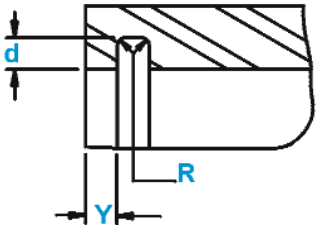
HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

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

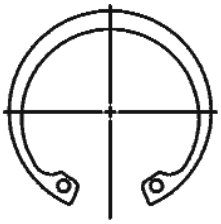


Allowable Corner Radius and Chamfer

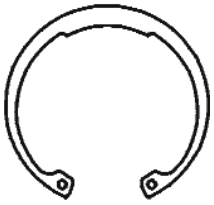




Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -25 thru -100; .010 for ring sizes 102 thru 1000



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	EDGE MAR-GIN	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/R max or Ch max. (lbs.)
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G Min	Y	R max	Ch max	P'r
HO-354	.342		.292		.142		.125		.788	.318	.110	.088	12000
HO-354	.342		.292		.142		.125		.842	.321	.110	.088	12000
HO-362	.342		.299		.150		.125		.833	.324	.116	.093	12000
HO-375	.342		.309		.155		.125		.844	.336	.120	.096	12000
HO-375	.342		.309	±.008	.155	±.008	.125	+.015 -.002	.871	.336	.120	.096	12000
HO-387	.370		.319		.160		.125		.891	.348	.123	.098	12000
HO-393	.370		.324		.161		.125		.905	.354	.124	.099	12000
HO-400	.370		.330		.166		.125		.918	.360	.128	.102	12000
HO-412	.370	±.008	.330		.171		.125		.940	.360	.130	.104	12000
HO-425	.370		.335		.180		.125		.960	.360	.138	.110	12000
HO-433	.405		.343		.180		.156		1.000	.360	.142	.114	12000
HO-450	.405		.351		.181		.156		.980	.360	.146	.117	12000
HO-462	.405		.360		.183		.156		1.000	.360	.151	.121	12000
HO-475	.405		.370		.183		.156		.960	.366	.154	.123	12000
HO-475	.405		.370	±.009	.183	±.009	.156		1.030	.366	.154	.123	12000
HO-500	.435		.390		.186		.156		.970	.390	.158	.126	12000
HO-525	.435		.435		.198		.156		1.10	.405	.168	.134	15000
HO-537	.435		.435		.198		.156		1.12	.405	.168	.134	15000
HO-550	.435		.435		.198		.156		1.09	.405	.168	.134	15000
HO-575	.435		.435		.198		.156		1.11	.405	.168	.134	15000
HO-600	.435		.435		.198		.156		1.13	.405	.168	.134	15000
HO-625	.485		.485		.211		.187		1.16	.420	.177	.142	23000
HO-650	.485		.485		.219		.187		1.25	.435	.181	.145	23000
HO-662	.485		.485		.221		.187	+.020 -.005	1.28	.450	.183	.146	23000
HO-675	.530		.530		.224		.187		1.21	.456	.188	.150	23000
HO-700	.515		.515		.232		.187		1.26	.471	.196	.157	23000
HO-725	.545	±.010	.545		.238		.187		1.32	.486	.202	.162	34000
HO-750	.545		.545		.247		.187		1.39	.510	.208	.166	34000
HO-775	.560		.560		.255		.187		1.44	.525	.214	.171	34000
HO-800	.560		.560		.262		.187		1.50	.540	.220	.176	34000
HO-825	.580		.580	±.010	.270	±.010	.187		1.53	.555	.229	.183	34000
HO-850	.580		.580		.277		.187		1.71	.570	.235	.188	34000
HO-875	.660		.591		.286		.187		1.77	.591	.241	.193	34000
HO-900	.660		.609		.294		.187		1.83	.606	.249	.199	34000
HO-925	.660		.625		.299		.187		1.87	.627	.253	.202	34000
HO-950	.735		.642		.304		.187		1.91	.645	.258	.206	34000
HO-975	.735		.658		.309		.187		2.00	.660	.263	.210	34000
HO-1000	.735		.675		.315		.187		2.01	.675	.270	.216	34000

LARGER SIZES MAY BE AVAILABLE UPON REQUEST.

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

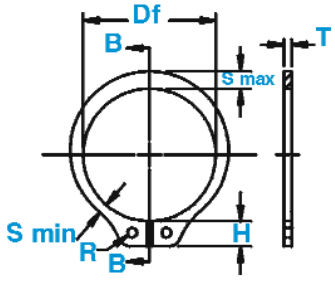
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

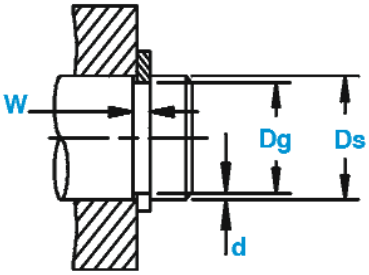
SH Shaft Rings

Axially Assembled, External

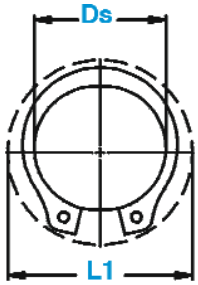
Once installed in the groove of a shaft, the shoulder holds an assembly in place.



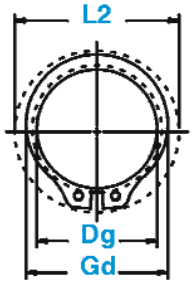
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



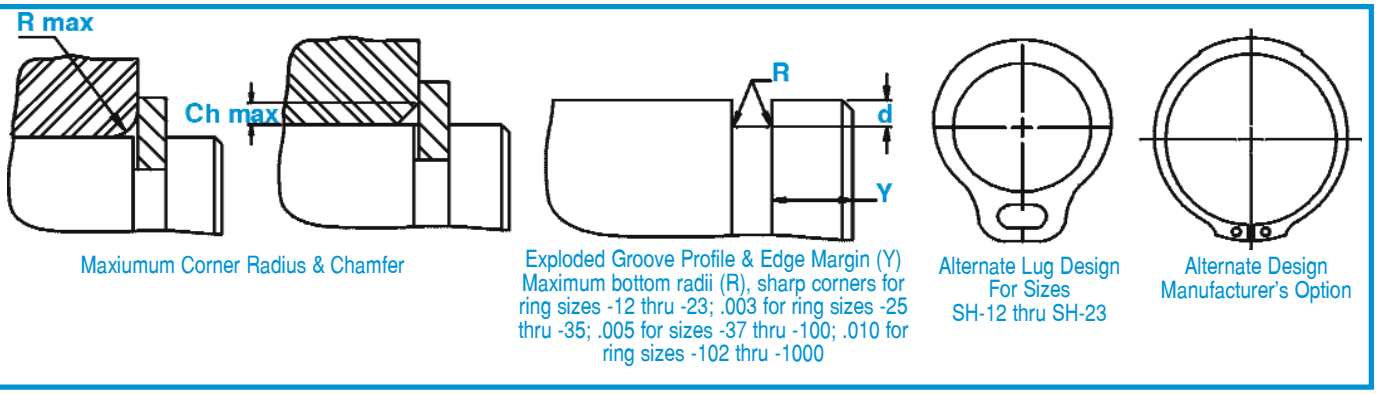
Clearance Diameter Expanded Over Shaft



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.



Maxiumum 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

Alternate Lug Design For Sizes SH-12 thru SH-23

Alternate Design Manufacturer's Option

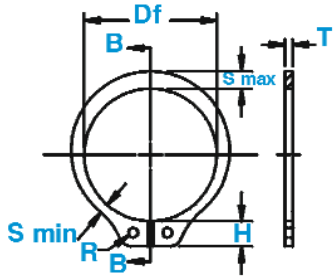
RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAGING DIA.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (lbs.)	EDGE MARGIN	R.P.M. LIMITS Standard Material
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	Gd Max	R max	Ch max	P'r	Y	RPM
**SH-12	.046		.018	±.0015	.011	±.0015	.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.

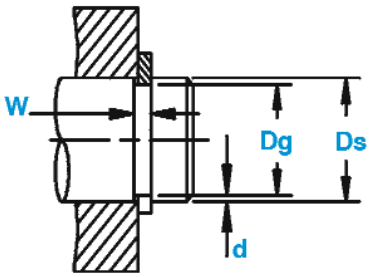
SH Shaft Rings

Axially Assembled, External

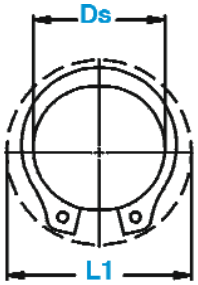
Once installed in the groove of a shaft, the shoulder holds an assembly in place.



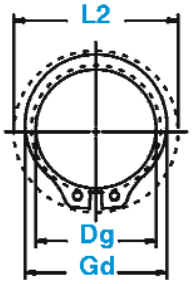
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



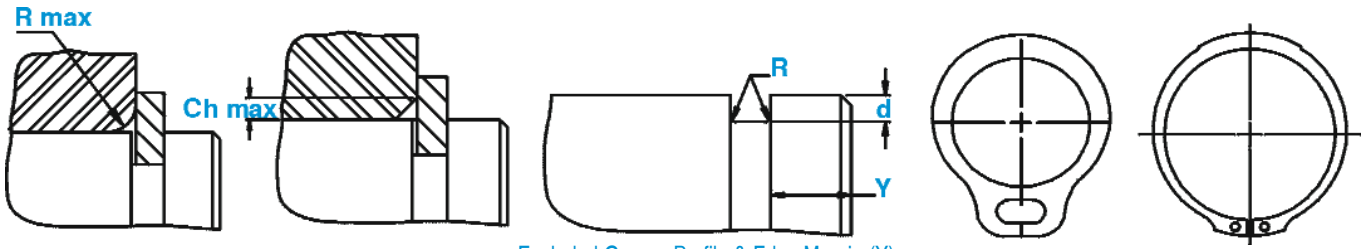
Clearance Diameter Expanded Over Shaft



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	±.004	.056		.037	1.156		.050	±.002	5.9	1.69	1.62	7460	3250
SH-131	1.312	1-5/16	33.3	1.232	.005*	.056		.040	1.214	+.010	.050		6.8	1.75	1.67	7866	3700
SH-137	1.375	1-3/8	34.9	1.291		.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	±.005	.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		.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	±.006	.086	+.005	.069	2.255		.078		29.5	3.07	2.94	22736	11900
SH-250	2.500	2-1/2	63.5	2.360	.006*	.086	-.000	.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		.086		.072	2.428		.078		35.0	3.30	3.16	24462	13350
SH-268	2.688	2-11/16	68.3	2.541		.086		.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.**



Maxiumum 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

Alternate Lug Design For Sizes SH-12 thru SH-23

Alternate Design Manufacturer's Option

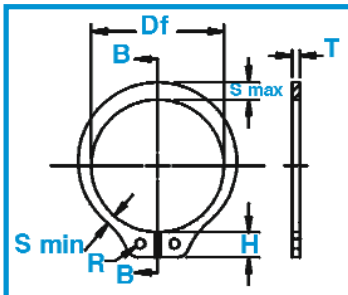
RING NO.	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAGING DIA.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (lbs.)	EDGE MAR-GIN	R.P.M. LIMITS Stan-dard Material
	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	Gd Max.	R max	Ch max	P'r	Y	RPM
SH-118	.182		.132		.072		.078		1.325	.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	.239		.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	+.015 -.002	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		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	.267		.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	.268		.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		.246		.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	.308		.292		.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.

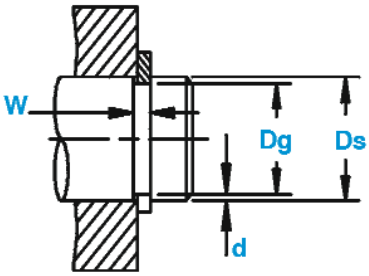
SH Shaft Rings

Axially Assembled, External

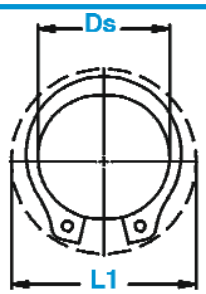
Once installed in the groove of a shaft, the shoulder holds an assembly in place.



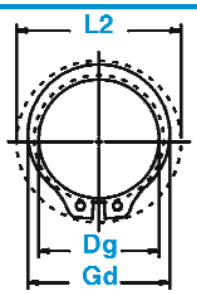
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



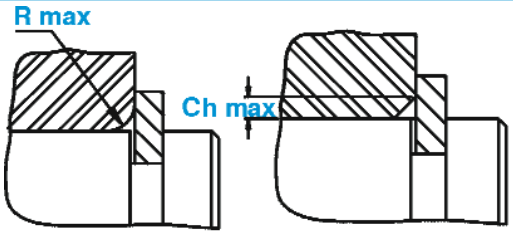
Clearance Diameter Expanded Over Shaft



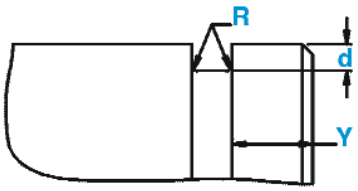
Clearance Diameter & Gaging Diameter Released in Groove.

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	4.33	4.14	47299	24300
SH-368	3.688	3-11/16	93.7	3.493		.120		.097	3.410		.109		80.0	4.31	4.12	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	4.62	4.42	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	5.62	5.42	61915	33600
SH-500	5.000	5	127.0	4.790		.120		.105	4.692		.109		149.0	5.77	5.56	65163	37100
SH-525	5.250	5-1/4	133.3	5.030		.139		.110	4.927		.125		190.0	6.10	5.89	78460	40800
SH-550	5.500	5-1/2	139.7	5.265	±.007	.139	+.006	.117	5.162	+.020	.125	±.004	202.5	6.45	6.22	82215	45500
SH-575	5.750	5-3/4	146.0	5.505	.006*	.139	-.000	.122	5.396	-.040	.125		220.0	6.69	6.45	85971	49600
SH-600	6.000	6	152.4	5.745		.139		.127	5.631		.125		210.0	6.91	6.66	89625	53800
SH-625	6.250	6-1/4	158.7	5.985		.174		.132	5.866		.156		282.0	7.26	7.00	116522	58300
SH-650	6.500	6-1/2	165.1	6.225		.174		.137	6.100	+.020	.156		330.0	7.62	7.35	121191	62900
SH-675	6.750	6-3/4	171.4	6.465		.174		.142	6.335	-.050	.156		356.0	7.83	7.55	125860	67700
SH-700	7.000	7	177.8	6.705		.174		.147	6.570		.156		371.0	7.86	7.78	130529	72700
SH-725	7.250	7-1/4	184.2	6.942		.209		.154	6.775		.187		510.0	7.59	8.13	162096	78900
SH-750	7.500	7-1/2	190.5	7.180		.209		.160	7.009		.187		534.0	8.73	8.41	167678	84800
SH-775	7.750	7-3/4	196.9	7.420	±.008	.209	+.008	.165	7.243	+.050	.187	±.005	545.0	8.85	8.52	173261	90450
SH-800	8.000	8	203.2	7.660	.006*	.209	-.000	.170	7.478	-.130	.187		640.0	9.25	8.91	178843	96100
SH-825	8.250	8-1/4	209.6	7.900		.209		.175	7.712		.187		665.0	9.54	9.19	184426	102100
SH-850	8.500	8-1/2	215.9	8.140		.209		.180	7.947		.187		692.0	9.79	9.43	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

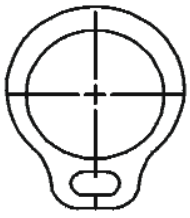
*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR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



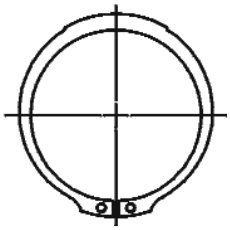
Maxiumum Corner Radius & Chamfer



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



Alternate 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	.342		.342		.163		.125		4.169	.137	.082	10500	.303	5100
SH-393	.342		.342		.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	.435		.435		.209		.156		5.867	.175	.105	13500	.351	3700
SH-575	.435		.435		.220		.156		6.134	.184	.110	13500	.366	3500
SH-600	.435		.435		.171		.156		6.302	.143	.086	13500	.381	3400
SH-625	.485		.485		.176		.156		6.568	.148	.089	21000	.396	3100
SH-650	.485		.485		.236		.156		6.905	.191	.114	21000	.411	3000
SH-675	.515		.515		.246		.187	+.020	7.172	.200	.120	21000	.426	3000
SH-700	.515		.515		.256		.187	-.005	7.439	.208	.125	21000	.441	2900
SH-725	.545		.545		.267		.187		7.700	.214	.128	30000	.460	2800
SH-750	.545		.545		.277		.187		7.963	.220	.132	30000	.480	2700
SH-775	.560	±.012	.560	±.015	.285	±.015	.187		8.228	.227	.136	30000	.495	2600
SH-800	.560		.560		.294		.187		8.493	.235	.141	30000	.510	2500
SH-825	.580		.580		.304		.187		8.758	.242	.146	30000	.525	2400
SH-850	.580		.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: STAINLESS STEEL RINGS (PH 15-7MO)

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

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

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SH	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

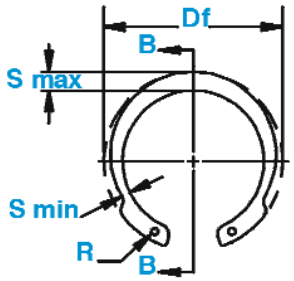
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SH	12-23	15N	77-82*
	25-102	30N	56.5-62
	106+	C	37-43

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

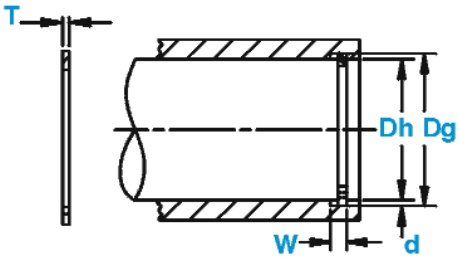
HOI Housing Rings

Axially Assembled, Internal

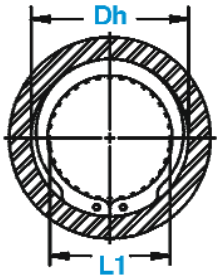
The inverted position of the lugs affords greater clearance than the basic internal retaining ring.



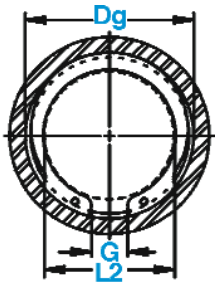
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



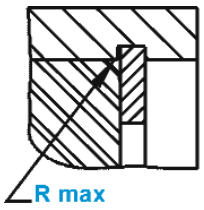
Clearance Diameter Compressed in Housing



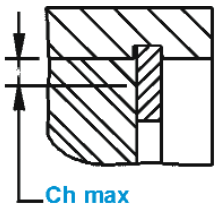
Clearance Diameter & Gap Width Released in Groove

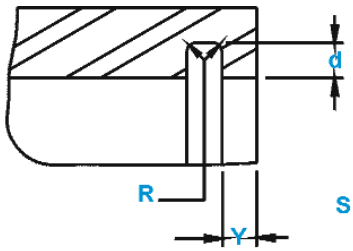
RING NO.	HOUSING DIAMETER			GROOVE SIZE DIAMETER		GROOVE SIZE WIDTH		GROOVE SIZE DEPTH	RING SIZE & WEIGHT FREE DIAMETER		RING SIZE & WEIGHT THICKNESS***		RING SIZE & WEIGHT Wght. Per 1000 Pcs.	CLEARANCE DIA. Com-pressed in housing	CLEARANCE DIA. Released in groove	î THRUST LD. (lbs.) Sqr. Corner Abutment Ring Safety Factor of 4	î THRUST LD. (lbs.) Sqr. Corner Abutment 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.**

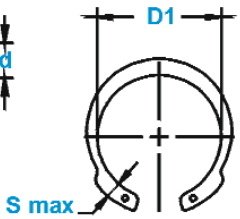


Allowable Corner Radius & Chamfer

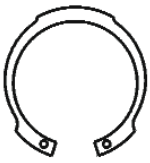




Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 for ring sizes -62 thru -100; .010 for ring sizes -106 thru -400



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		.16	.042	.028	400	.060
HOI-75	.085		.042		.042		.165	.050	.031	850	.069
HOI-81	.092		.044		.042		.18	.054	.034	1250	.075
HOI-87	.099		.047		.042		.19	.057	.036	1250	.084
HOI-93	.106	±.005	.051	±.005	.042	+.010	.22	.060	.038	1250	.093
HOI-100	.113		.054		.042	-.002	.235	.064	.040	1250	.099
HOI-106	.120		.057		.050		.22	.069	.043	1800	.102
HOI-112	.123		.059		.050		.245	.070	.044	1800	.108
HOI-118	.126		.060		.050		.26	.071	.045	1800	.111
HOI-125	.129	±.006	.061	±.006	.050		.28	.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

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

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

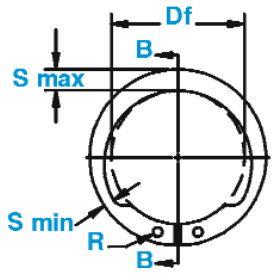
HARDNESS RANGES: BERYLLIUM COPPER RINGS

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

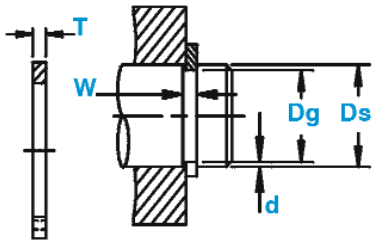
SHI Shaft Rings

Axially Assembled, External

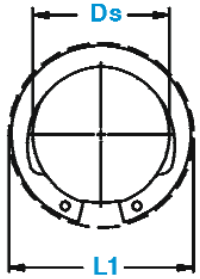
The inverted position of the lugs affords greater clearance than the basic external retaining ring.



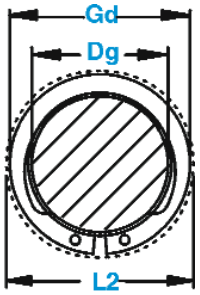
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



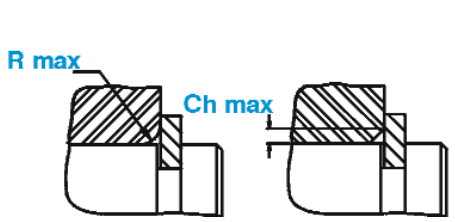
Clearance Diameter Expanded Over Shaft



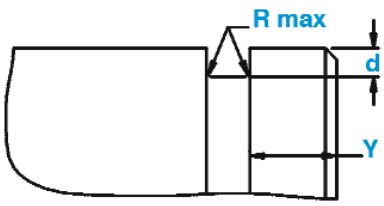
Clearance Diameter & Gaging Diameter Released in Groove

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.	Expan-ded over shaft	Relea-sed 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	±.003	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	±.006	.086	+.005	.061	1.993		.078		30.0	2.62	2.50	13195	4550
SHI-215	2.156	2-5/32	54.8	2.032	.006*	.086	-.000	.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		.103		.074	2.543		.093		57.9	3.34	3.20	20402	7200
SHI-287	2.875	2-7/8	73.0	2.721		.103		.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

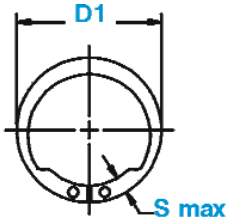
*** F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
*****FOR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



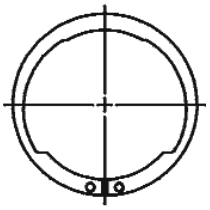
Maximum Corner Radius & Chamfer



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 -.002	.79	.062	.039	680	.055	30000
SHI-68	.104		.052		.042		.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 -.002	1.52	.096	.060	1460	.111	17000
SHI-131	.161		.080		.078		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

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

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

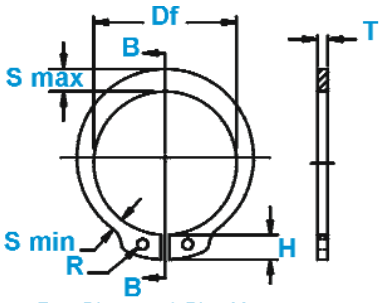
HARDNESS RANGES: BERYLLIUM COPPER RINGS

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

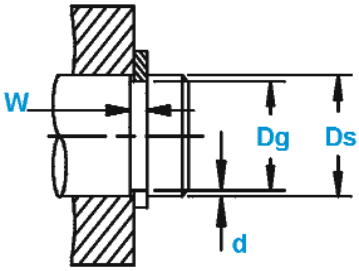
SHR Shaft Rings

Axially Assembled, External

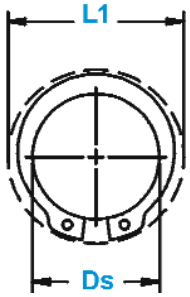
This heavy duty ring affords the user higher thrust load capacity.



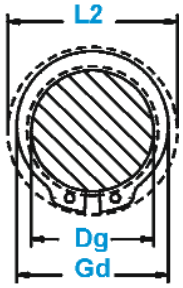
Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



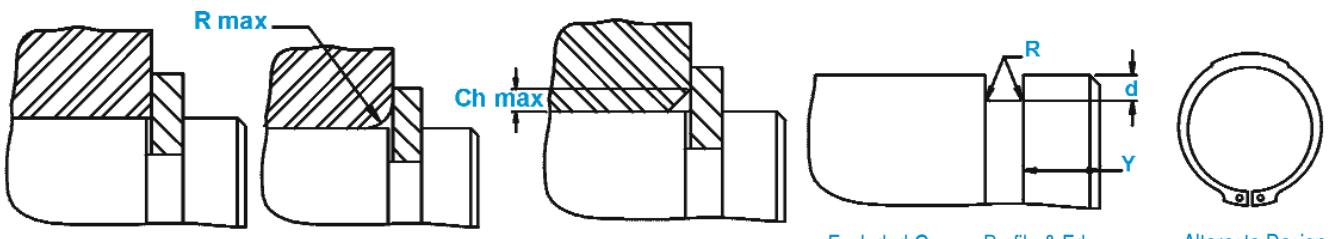
Clearance Diameter Expanded Over Shaft



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 MARGINS	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 -.002	.589	.070	.058	550	.045	69000
SHR-50	.120		.090		.050		.050		.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

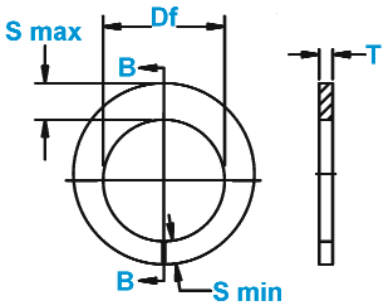
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

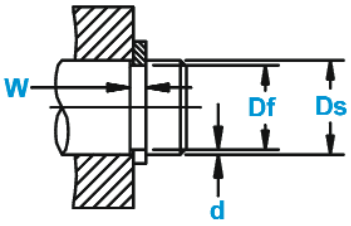
SHM Shaft Rings

Axially Assembled, External

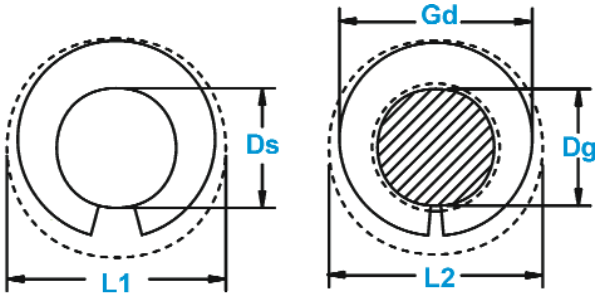
This tamper-proof ring cannot be easily removed once installed.



Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions



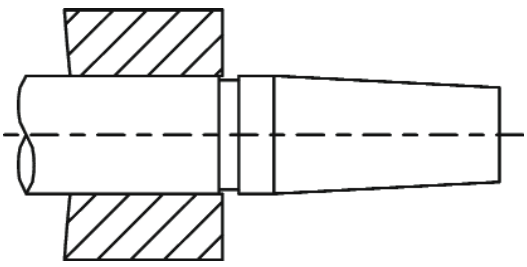
Clearance Diameter & Gaging Diameter

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.	IBS.	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		.416	.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

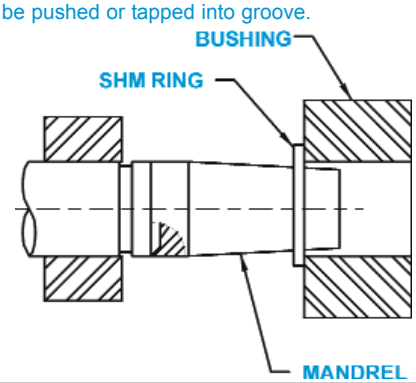
*F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
***FOR PLATED RINGS, 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:1-800-557-6867

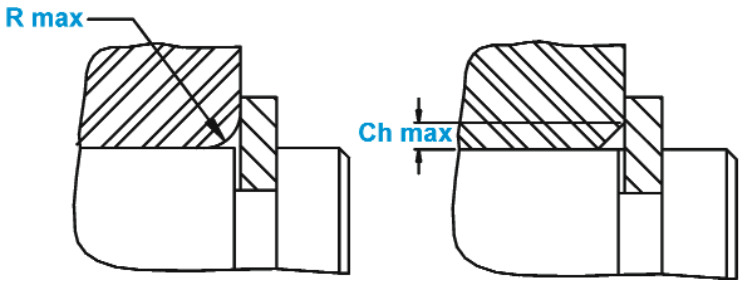
INSTALLATION OF ROTOR CLIP SHM RINGS

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.

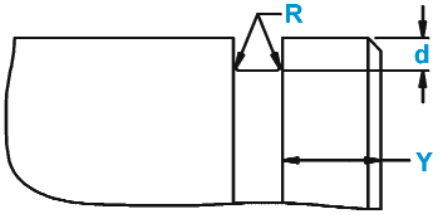


To install, place ring on mandrel and position bushing as shown. Ring can be pushed or tapped into groove.





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.

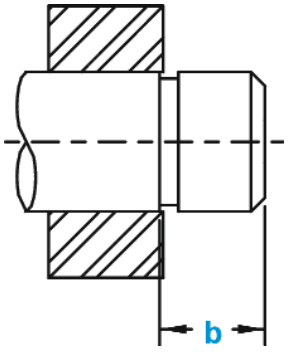
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

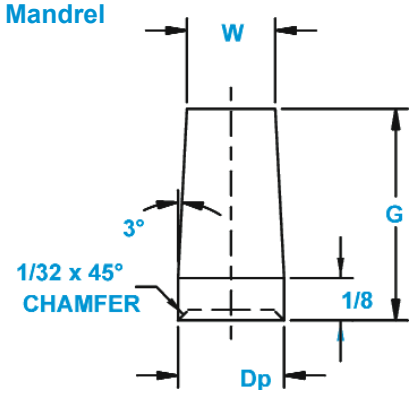
*HARDNESS CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

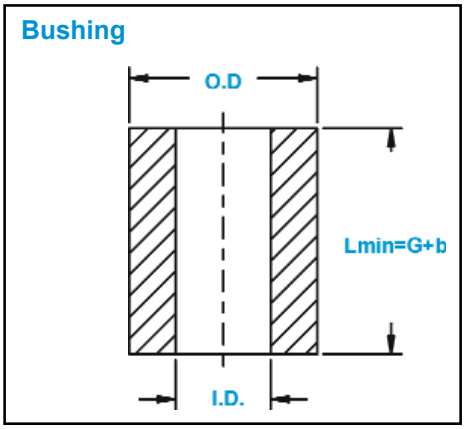
PRODUCTION OF MANDREL AND BUSHING

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

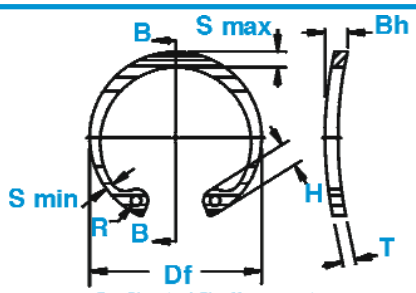




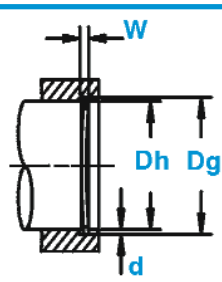
BHO Housing Rings

Axially Assembled, Internal, Bowed

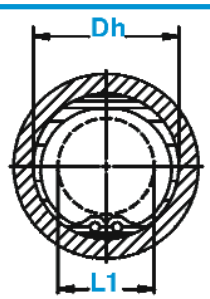
Bowed rings exert a force on the retained part, compensating for accumulated tolerances.



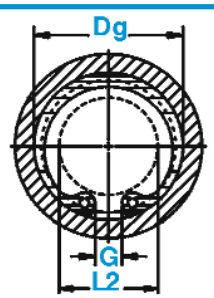
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



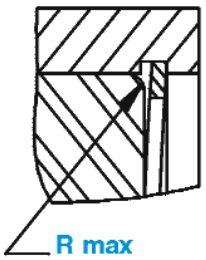
Clearance Diameter Compressed in Housing

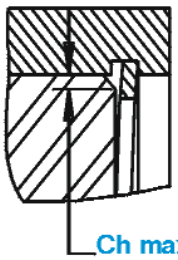


Clearance Diameter & Gap Width Released in Groove

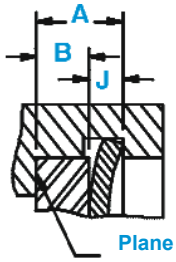
RING NO.	HOUSING DIAMETER			GROOVE SIZE DIAMETER		GROOVE SIZE WIDTH		GROOVE SIZE DEPTH	RING SIZE & WEIGHT FREE DIAMETER		RING SIZE & WEIGHT THICKNESS***		RING SIZE & WEIGHT BOW HEIGHT		Weight Per 1000 Pcs.	CLEAR.DIA. Com-pressed in housing	CLEAR.DIA. Re-leased in groove	î THRUST LD. (lbs.) Sqr. Corner Abutment Ring Safety factor of 4	î THRUST LD. (lbs.) Sqr. Corner Abutment 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	.763		.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.**

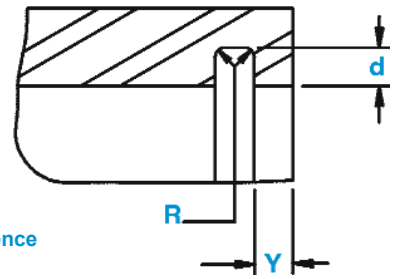




Maximum Corner Radius & Chamfer



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 MAR-GIN	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		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	.011	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: STAINLESS STEEL RINGS (PH 15-7MO)

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

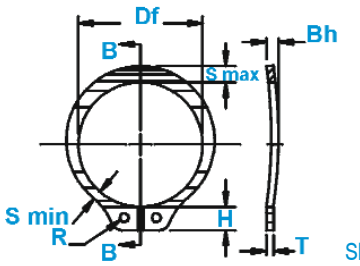
HARDNESS RANGES: BERYLLIUM COPPER RINGS

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

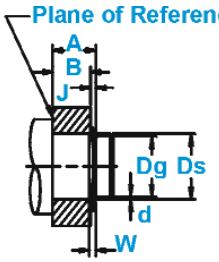
BSH Shaft Rings

Axially Assembled, External Bowed

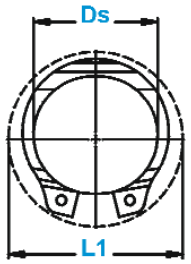
Once snapped into the groove, bowed rings exert a force or a "preload" on the retained parts for the range specified.

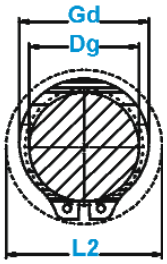


Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions & Outer Groove Locations
A max = B min + J max
A min = B max + J min





Clearance Diameter & Gaging Diameter

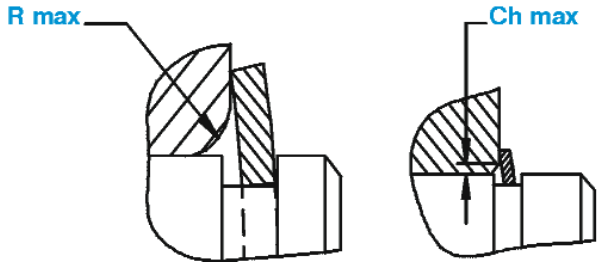
RING NO.	SHAFT Diameter			GROOVE SIZE Diameter		Width		Depth	RING SIZE & WEIGHT Free Diameter		Thickness ***		Bow Height		Wght. Per 1000 Pcs.	CLEAR. DIA. Ex-panded over shaft	Released in groove	î THRUST LD. (lbs.) Sqr. Corner Abutmen RING Safety Factor of 4	GROOVE Safety Factor of 2
	Ds DEC	Ds FRACT	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	±.002	.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		.055		.016	.461		.035		.063		.91	.77	.74	1675	550
BSH-55	.551	-	14.0	.519	±.002	.055	+.003	.016	.509		.035		.063	±.007	.90	.81	.78	1827	600
BSH-56	.562	9/16	14.3	.530	.004*	.055	-.000	.016	.521		.035		.063		1.1	.82	.79	1878	650
BSH-59	.594	19/32	15.1	.559		.055		.017	.550		.035		.063		1.2	.86	.83	1979	750
BSH-62	.625	5/8	15.9	.588		.055		.018	.579		.035		.063		1.3	.90	.87	2091	800
BSH-66	.669	-	17.0	.629		.055		.020	.621		.035		.063		1.4	.93	.89	2233	950
BSH-66	.672	43/64	17.1	.631		.055		.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	±.008	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		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		.070		.037	1.156		.050		.085		5.9	1.69	1.62	7460	3250
BSH-131	1.312	1-5/16	33.3	1.232	±.004	.070		.040	1.214	+.010	.050		.085	±.012	6.8	1.75	1.67	7866	3700
BSH-137	1.375	1-3/8	34.9	1.291	.005*	.070		.042	1.272	-.015	.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.**
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.**

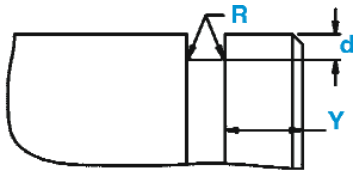
HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

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

For the most up-to-date specifications, online quotations & sample orders, visit rotorclip.com



Maximum Corner Radius & Chamfer



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		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	.011	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: 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.

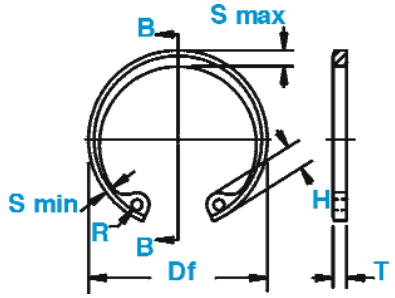
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

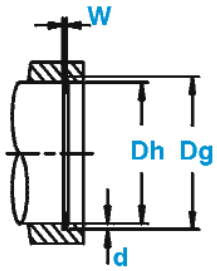
VHO Housing Rings

Axially Assembled, Internal

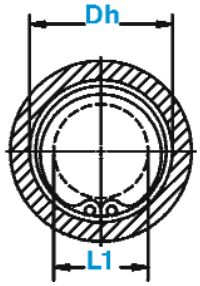
A 15° beveled edge along with a complementary groove angle combine to eliminate end play when the ring is installed.



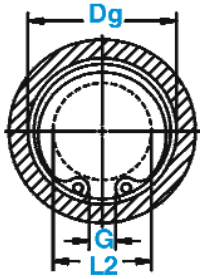
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



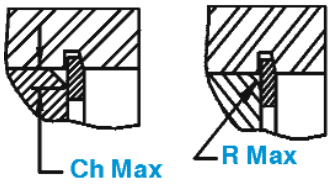
Clearance Diameter Compressed in Housing



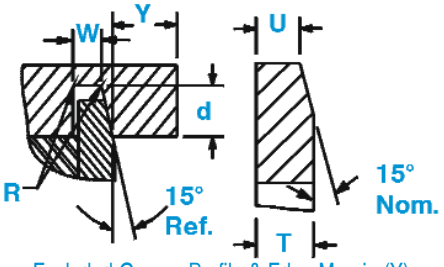
Clearance Diameter & Gap Width Released in Groove

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		.042		.046	1.388	-.020	.050		.039		4.8	.885	.93
VHO-131	1.312	1-5/16	33.3	1.408		.042		.048	1.456		.050		.039		5.0	.93	.97
VHO-137	1.375	1-3/8	34.9	1.475		.041		.050	1.526		.050		.038		5.1	.99	1.03
VHO-137	1.378	-	35.0	1.478	+.004	.041	+.005	.050	1.526		.050		.038	±.001	5.1	.99	1.03
VHO-143	1.438	1-7/16	36.5	1.542	-.000	.040	-.000	.052	1.596		.050		.037		5.8	1.06	1.11
VHO-145	1.456	-	37.0	1.562	.005*	.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		.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-187	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		.065		.074	2.280		.078		.060		18.0	1.54	1.61
VHO-212	2.125	2-1/8	54.0	2.279		.065		.077	2.350		.078		.060		19.4	1.60	1.67
VHO-218	2.165	-	55.0	2.327		.064		.081	2.415		.078		.059		19.6	1.63	1.71
VHO-218	2.188	2-3/16	55.6	2.350	+.006	.064		.081	2.415	+.040	.078	±.003	.059	±.0015	19.6	1.66	1.74
VHO-225	2.250	2-1/4	57.1	2.420	-.000	.064		.085	2.490	-.030	.078		.059		21.8	1.67	1.75
VHO-231	2.312	2-5/16	58.7	2.484	.006*	.063	+.007	.086	2.560		.078		.058		22.6	1.73	1.80
VHO-237	2.375	2-3/8	60.3	2.552		.063	-.000	.089	2.630		.078		.058		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		.094	2.844		.093		.072		34.0	1.93	2.02
VHO-262	2.625	2-5/8	66.7	2.820		.077		.097	2.910		.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		.076		.104	3.121		.093		.070		36.0	2.21	2.31
VHO-287	2.875	2-7/8	73.0	3.085		.076		.105	3.191		.093		.070		41.0	2.24	2.34
VHO-295	2.953	-	75.0	3.178		.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	+.008	.114	3.418	±.055	.109		.082	±.0025	53.0	2.41	2.51
VHO-312	3.125	3-1/8	79.4	3.355		.089	-.000	.115	3.488		.109		.082		56.0	2.47	2.58

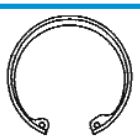
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL.
NOTE: CONTACT ROTOR CLIP FOR AVAILABILITY OF SIZES LISTED.
* F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND HOUSING.
***FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS (T) AND BEVELED END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



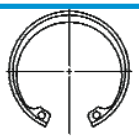
Allowable Corner Radius & Chamfer



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



Asymmetrical Design (Manufacturer's Option)



Alternate Design For Larger Sizes (Manufacturer's Option)

Alternate Design (Manufacturer's Option)

RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (in lbs.) P'r	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	(lbs.)	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		.133		.066		.078		.238	10708	3300
VHO-156	.064	.050	3900	.084	.0075	.202		.157		.078		.078		.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	+.015	.255	15022	4300
VHO-175	.064	.050	3900	.096	.0085	.230	±.005	.171		.083		.078	-.002	.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-187	.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
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		.222		.109		.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-295	.092	.074	9000	.168	.015	.300		.250		.122		.110		.449	40093	14200
VHO-300	.092	.074	9000	.168	.015	.300		.250		.122		.110		.568	40093	14200
VHO-306	.097	.078	12000	.171	.015	.310	±.008	.254	±.008	.126	±.008	.125		.473	47807	14800
VHO-312	.099	.079	12000	.172	. 0155	.310		.259		.129		.125		.469	48822	15200

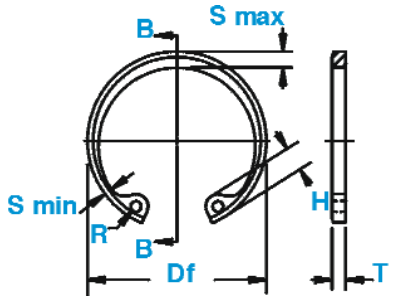
*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND HOUSING.**
*****FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS (T) AND BEVELED END THICKNESS (U) VALUES.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL.
NOTE: CONTACT ROTOR CLIP FOR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

VHO Hardness information can be found on pages 56-57.

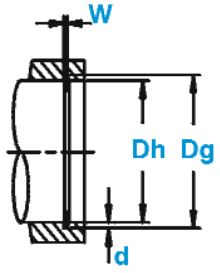
VHO Housing Rings

Axially Assembled, Internal

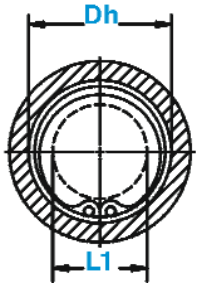
A 15° beveled edge along witha complimentary groove angle combine to eliminate end play when the ring is installed.



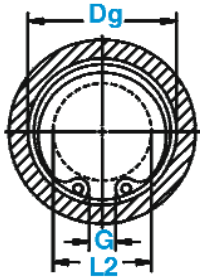
Free Diameter & Ring Measurements with Section B-B



Housing Diameter & Groove Dimensions



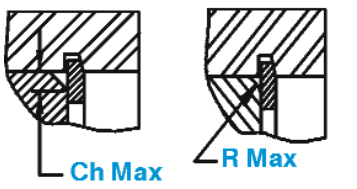
Clearance Diameter Compressed in Housing



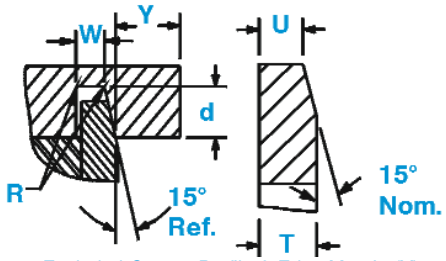
Clearance Diameter & Gap Width Released in Groove

RING NO.	HOUSING DIAMETER			GROOVE SIZE DIAMETER		WIDTH		DEPTH	RING SIZE & WEIGHT FREE DIAMETER		THICKNESS***		THICKNESS BEVELED END		Weight. Per 1000 Pcs.	CLEARANCE DIA. 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-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		.109		.082		60.0	2.54	2.65
VHO-334	3.346	3-11/32	85.0	3.591		.089		.122	3.734		.109		.082		65.0	2.63	2.74
VHO-347	3.469	3-15/32	88.1	3.726		.089		.128	3.857	±.055	.109		.082		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-354	3.543	-	90.0	3.806		.089		.132	3.936		.109		.082		72.0	2.83	2.95
VHO-354	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	+.006	.089	+.008	.145	4.157		.109		.082		78.0	3.02	3.15
VHO-375	3.750	3-3/4	95.2	4.040	-.000	.089	-.000	.145	4.157		.109		.082		78.0	3.03	3.17
VHO-387	3.875	3-7/8	98.4	4.171	.006*	.089		.148	4.291		.109	±.003	.082	±.0025	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
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		.089		.158	4.756	±.065	.109		.082		105.0	3.50	3.65
VHO-450	4.500	4-1/2	114.3	4.824		.089		.162	4.940		.109		.082		111.00	3.66	3.81
VHO-462	4.625	4-5/8	117.5	4.955		.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		.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

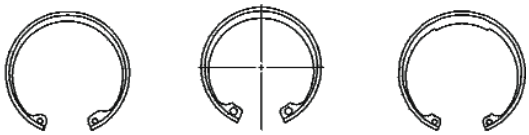
*** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND HOUSING.**
*****FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS (T) AND BEVELED END THICKNESS (U) VALUES.**



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



Asymmetrical Design (Manufacturer's Option)

Alternate Design For Larger Sizes (Manufacturer's Option)

Alternate Design (Manufacturer's Option)

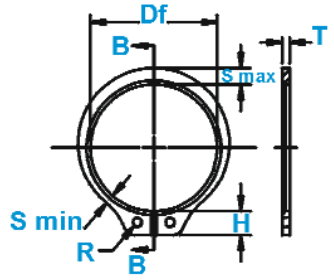
RING NO.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (in lbs.)	EDGE MAR-GIN	END-PLAY TAKE-UP	LUG HEIGHT		MAXIMUM SECTION		MINIMUM SECTION		HOLE DIAMETER		GAP WIDTH Ring in groove	î THRUST LD. (lbs.) Sqr. corner abutment	
	R max	Ch max	P'r (lbs.)	Y	In.	H	Tol.	S max	Tol.	S min	Tol.	R	Tol.	G min	Ring Safety factor of 4 Pr	Groove Safety factor of 2 Pg
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-334	.108	.086	12000	.183	.0165	.342		.276		.140		.125		.514	52374	17300
VHO-347	.108	.086	12000	.192	.017	.342		.286		.144		.125		.571	54201	18800
VHO-350	.110	.088	12000	.195	.017	.342		.289		.142		.125		.574	54709	19300
VHO-354	.110	.088	12000	.198	.0175	.342		.292		.142		.125	+.015	.586	55419	19800
VHO-354	.110	.088	12000	.201	.018	.342		.292		.142		.125	-.002	.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	±.008	.309	±.008	.155	±.008	.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
VHO-412	.130	.104	12000	.231	.021	.370		.330		.171		.125		.718	64554	26900
VHO-425	.138	.110	12000	.234	.021	.370		.335		.180		.125		.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		.351		.181		.156		.787	70340	30900
VHO-462	.151	.121	12000	.247	.022	.405		.360		.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		.390		.186		.156		.753	78155	38700
VHO-525	.168	.134	15000	.271	.024	.435		.435		.198		.156	+.020	.886	94091	40300
VHO-537	.168	.134	15000	.273	.024	.435		.435	±.009	.198	±.009	.156	-.005	.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		.956	139766	52000
VHO-650	.181	.145	23000	.306	.027	.485		.485		.219		.187		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		.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	±.010	.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

*** 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.**

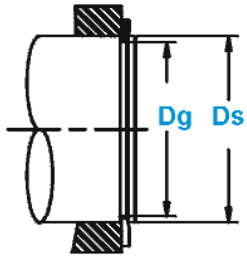
VSH Shaft Rings

Axially Assembled, External

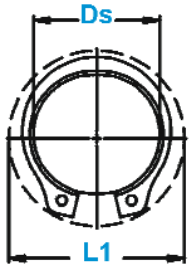
A 15° beveled edge along with a complimentary groove angle combine to eliminate end play when the ring is installed.



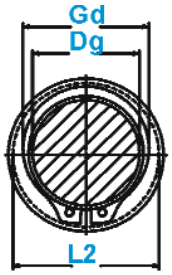
Free Diameter & Ring Measurements with Section B-B



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	+.005	.040	1.098	+.010	.050	±.002	.041	±.001	5.6	1.61	1.57
VSH-125	1.250	1-1/4	31.7	1.166	-.004	.043	-.000	.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		.047	1.333		.050		.039		8.1	1.87	1.83
VSH-150	1.500	1-1/2	38.1	1.397		.041		.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	±.003	.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	2.54	3.09
VSH-200	2.000	2	50.8	1.863		.051		.068	1.850		.062		.047		19.0	2.57	3.10
VSH-206	2.062	2-1/16	52.4	1.921		.067		.070	1.906		.078		.062		25.0	2.68	3.22
VSH-212	2.125	2-1/8	54.0	1.979		.067		.073	1.964		.078		.062		26.1	2.78	3.29
VSH-215	2.156	2-5/32	54.8	2.008	+.000	.067	+.007	.074	1.993	+.015	.078		.062	±.0015	26.3	2.81	3.40
VSH-225	2.250	2-1/4	57.1	2.096	-.006	.066	-.000	.077	2.081	-.025	.078		.061		27.7	2.90	3.51
VSH-231	2.312	2-5/16	58.7	2.154	.006*	.065		.079	2.139		.078		.060		28.0	2.97	3.58
VSH-237	2.375	2-3/8	60.3	2.212		.065		.081	2.197		.078		.060		29.2	3.06	3.50
VSH-243	2.438	2-7/16	61.9	2.270		.065		.084	2.255		.078		.060		29.5	3.07	3.64
VSH-250	2.500	2-1/2	63.5	2.328		.064		.086	2.313		.078		.059		29.7	3.17	3.09
VSH-255	2.559	-	65.0	2.397		.064		.081	2.377	+.020	.078		.059		33.9	3.18	3.10
VSH-262	2.625	2-5/8	66.7	2.448		.064		.088	2.428	-.030	.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		.093		.073		47.0	3.48	3.40
VSH-287	2.875	2-7/8	73.0	2.679		.078		.098	2.659		.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

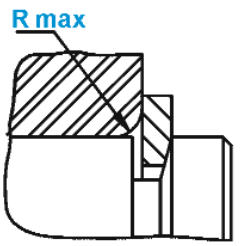
***** FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS (T) AND BEVELED END THICKNESS (U) VALUES.**
*** F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.

NOTE: THESE HARDNESS CHARTS ARE FOR THE VHO RINGS SHOWN ON THE PREVIOUS 4 PAGES.
HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

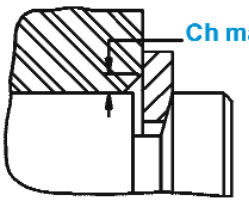
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
VHO	100&102	30N	63-69.5
	106+	C	44-51

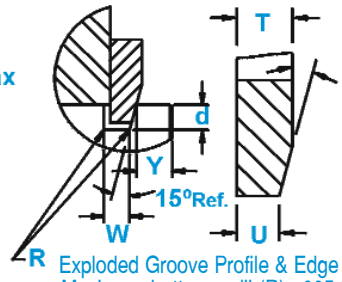
NOTE: THESE HARDNESS CHARTS ARE FOR THE VHO RINGS SHOWN ON THE PREVIOUS 4 PAGES.
HARDNESS RANGES: BERYLLIUM COPPER RINGS

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

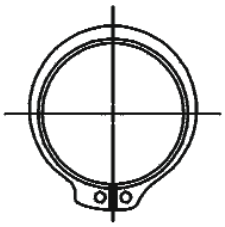


Maximum Corner Radius & Chamfer





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	+.015	1.636	8628	2450
VSH-150	.079	.047	1950	.076	.007	.214		.168		.091		.120	-.002	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	.237		.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		2.047	13449	3950
VSH-187	.094	.056	3000	.094	.0085	.239		.196		.104		.125		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: THESE HARDNESS CHARTS ARE FOR THE VHO RINGS SHOWN ON THE PREVIOUS 4 PAGES.

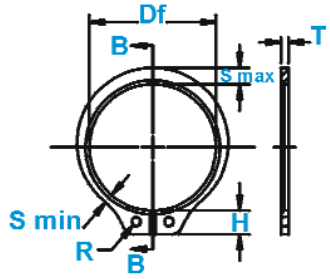
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

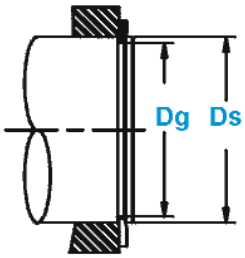
VSH Shaft Rings

Axially Assembled, External

A 15° beveled edge along with a complementary groove angle combine to eliminate end play when the ring is installed.

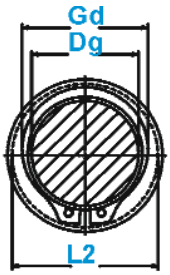


Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions

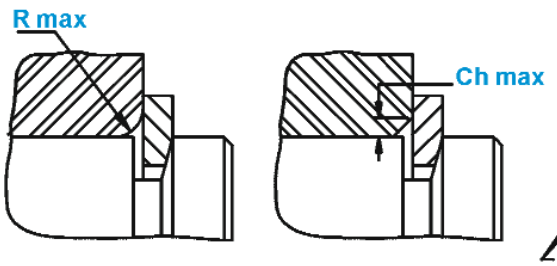
Clearance Diameter Expanded Over Shaft



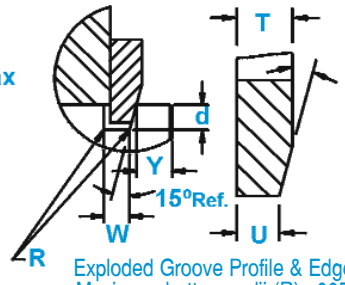
Clearance Diameter & Gaging Diameter Released in Groove

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT							CLEARANCE DIA.	
	Ds DEC	Ds FRACT	Ds mm	DIAMETER Dg	Tol.	WIDTH W	Tol.	DEPTH d	FREE DIAMETER Df	Tol.	THICKNESS*** T	Tol.	THICKNESS BEVELED END U	Tol.	WEIGHT PER 1000 PCS. lbs.	EXPANDED OVER SHAFT L1	RELEASED IN GROOVE 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	+.000	.076	+.007	.108	2.920		.093		.070		59.0	3.88	3.78
VSH-325	3.250	3-1/4	82.5	3.026	-.006	.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	.006*	.075		.117	3.092	+.020	.093		.069		64.0	4.02	3.92
VSH-343	3.438	3-7/16	87.3	3.199		.075		.119	3.179	-.030	.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		.091		.123	3.277		.109		.084		73.0	4.25	4.14
VSH-362	3.625	3-5/8	92.1	3.372		.090		.126	3.352		.109		.083		76.0	4.33	4.21
VSH-368	3.688	3-11/16	93.7	3.430		.090		.129	3.410		.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	+.008	.138	3.642		.109		.081	±.0025	95.0	4.70	4.57
VSH-400	4.000	4	101.6	3.720		.088	-.000	.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		.136	4.458		.109		.085		113.0	5.62	5.49
VSH-500	5.000	5	127.0	4.712		.091		.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		.129		.205	6.570		.156		.121		388.0	8.13	7.93
VSH-750	7.500	7-1/2	190.5	7.059		.158		.220	7.039		.187		.149		534.0	8.70	8.49
VSH-800	8.000	8	203.2	7.528	+.000	.157		.236	7.508		.187	±.005	.148		628.0	9.24	9.01
VSH-850	8.500	8-1/2	215.9	7.997	-.008	.154		.251	7.977	+.020	.187		.145		700.0	9.79	9.54
VSH-900	9.000	9	228.6	8.465	.006*	.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

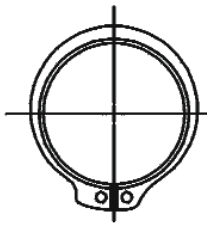
*** F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
*****FOR PLATED RINGS ADD .002" TO THE LISTED MAXIMUM THICKNESS. MAXIMUM RING THICKNESS WILL BE A MINIMUM OF .0002" LESS THAN THE LISTED GROOVE WIDTH (W) MINIMUM.**



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	(lbs.)	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	±.005	.300	±.008	.148	±.008	.125	+.015	3.767	38266	14300
VSH-350	.122	.073	10500	.181	.016	.285		.285		.148		.125	-.002	3.821	45574	14800
VSH-354	.123	.074	10500	.184	.0165	.310		.310		.149		.125		3.866	46183	15200
VSH-362	.127	.076	10500	.189	.017	.310		.310		.153		.125		3.956	47299	16300
VSH-368	.1295	.078	10500	.193	.017	.310		.310		.156		.125		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	.435		.390		.209		.156		5.940	82215	30800
VSH-575	.184	.110	13500	.250	.022	.435		.435		.220		.156		6.210	85971	33800
VSH-600	.143	.086	13500	.261	.023	.435		.435		.171		.156		6.380	89625	37000
VSH-625	.148	.089	21000	.273	.024	.485		.485		.176		.156	+.020	6.650	116522	40000
VSH-650	.191	.114	21000	.285	.025	.485		.485		.236		.156	-.005	6.980	121191	43500
VSH-675	.200	.120	21000	.295	.026	.515		.515		.246		.187		7.260	125860	47000
VSH-700	.208	.125	21000	.307	.027	.515		.515		.256		.187		7.520	130529	50500
VSH-750	.220	.132	30000	.330	.029	.545	±.012	.545	±.015	.277	±.015	.187		8.060	167678	58000
VSH-800	.235	.141	30000	.354	.032	.560		.560		.294		.187		8.590	178843	66500
VSH-850	.250	.150	30000	.376	.034	.580		.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: STAINLESS STEEL RINGS (PH 15-7MO)

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

HARDNESS RANGES: BERYLLIUM COPPER RINGS

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

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

Inch Tapered Section Retaining Rings/Circlips Radially Assembled

www.rotorclip.com

Radially Assembled Rings.

Radial retaining rings are radially installed into machined grooves on shafts. They don't have lugs or lug holes and do not extend as far around the circumference of the grooves as their axial counterparts. Consequently, they can accommodate applications with lower thrust loadings than those retained by axial retaining rings. They can be installed quickly using Rotor Clip applicators and dispensers described in the tool section of this catalog. Rotor Clip radial retaining rings are also available stacked (excluding the LC rings.)

E Page 62-63

External E ring. 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.

RE Page 64-65

External Reinforced E ring. 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.

C Page 66-67

External Crescent ring. Ideal for low clearance applications where radial installation is preferred.

LC Page 68-69

External Interlocking ring. 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.

PO/POL Page 70-71

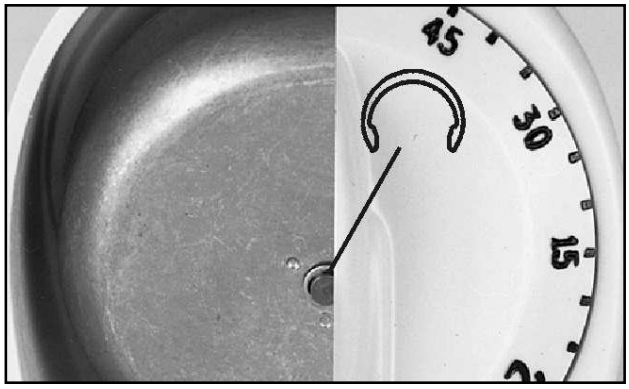
External Poodle ring/Poodle Light ring. The PO ring features wide "ears" (resembling those of a poodle dog, thus the name) which offer extra retention surface against the retained part. PO rings also come in thinner sizes as a standard series of rings known as POL.

The PO "poodle" ring features large shoulder abutments for effective retention of the shaft.

E ring retains the cutters on a shaft used on a paper shredder.

An RE ring cuts into the hard plastic cable coating and provides a shoulder to hold a protective sleeve in place on a transmission.

Two part LC ring is dynamically balanced once installed, making it very effective in retaining this escalator assembly during high rotational speeds.



C ring holds timer bell in place.

FOR TOOLS SEE PAGE 157-168
FOR MATERIALS SEE PAGE 16
FOR FINISHES SEE PAGE 18
FOR PACKAGING SEE PAGE 5

Inch Tapered Section Retaining Rings/Circlips Radially Assembled

www.rotorclip.com

Rings For End-Play Takeup.

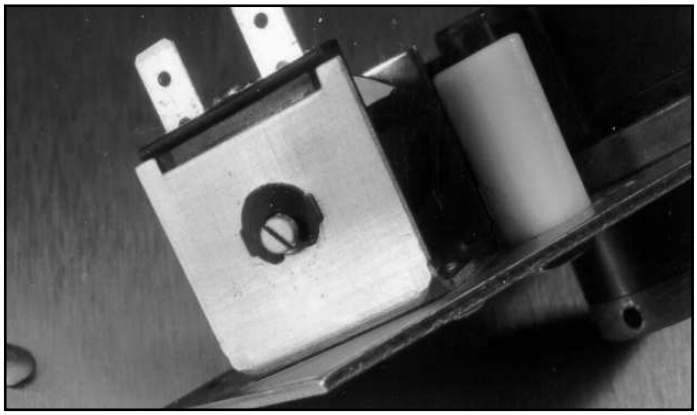
Rotor Clip bowed retaining rings are designed to compensate for accumulated tolerances in assemblies. Once snapped into the groove, bowed rings exert a force or "preload" on the retained parts made to the low side of the tolerances "snugging" everything up. They also act like a spring and "give" when parts made to the high side of the tolerances extend too far into the groove. Once installed, these rings will retain parts according to the specifications listed on the appropriate pages that follow.

BE **Page 72-73**

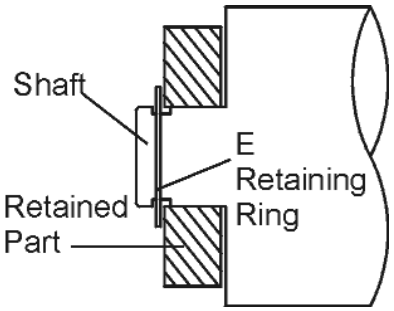
External Bowed E ring. Compensating for accumulated tolerances is what a BE "Bowed" retaining ring is designed to do on a shaft. Once snapped into the groove, bowed rings exert a force or a "preload" on the retained parts for the range specified on the BE specification pages.

EL **Page 74-75**

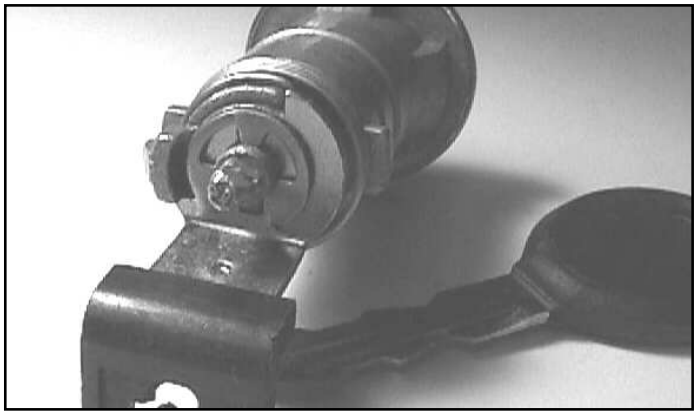
External Bowed Locking ring. Another variation of a bowed E ring is the EL. In addition to the bowed design for eliminating "play" in an assembly, it also features two prongs, which extend from the inner circumference to the open end locking the ring firmly into place.



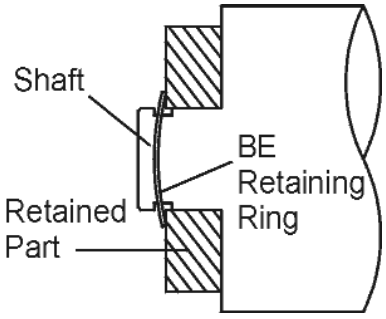
EL retaining a shaft on a controller assembly.



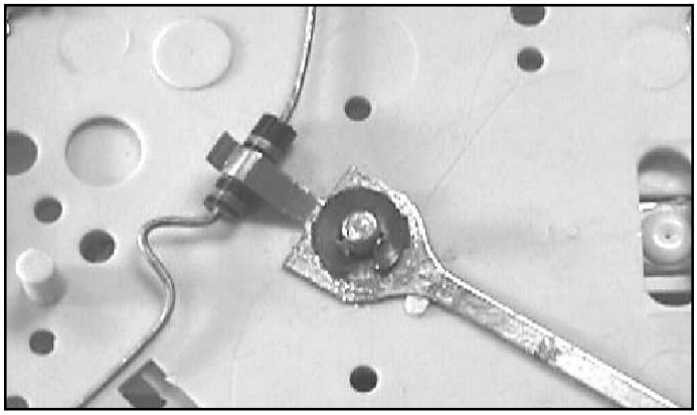
This component was originally held in place by a regular E retaining ring. But there was "play" in the assembly, since the parts were made on the "low side" of the tolerances.



BE retaining ring on a car ignition starter assembly.



The manufacturer switched to the bowed E (BE) ring. The curved shape of the ring compensated for the slightly undersized pieces and held the components tightly in place.

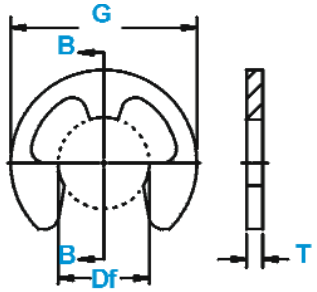


EL retaining ring retains element on a thermostat.

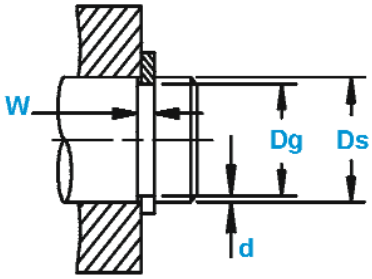
E Retaining Rings

Radially Assembled, External

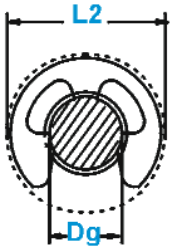
The three prongs of this ring make contact with the bottom of the groove for effective retention of an assembly.



Free Diameter & Ring Measurements With Section B-B



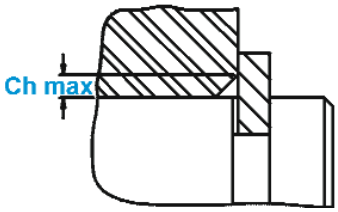
Shaft Diameter & Groove Dimensions

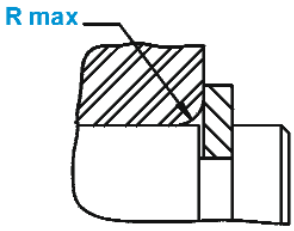


Clearance Diameter Installed In Groove

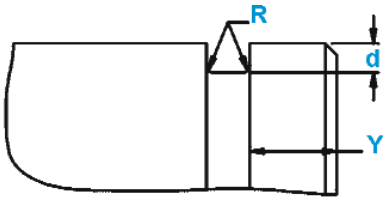
RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD. (lbs.) Sqr. corner abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight. Per 1000 pcs.	Free out-side dia. REF.	Installed in groove	Ring Safety factor of 3 Ring	Groove Safety factor of 2 Nut
	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	+.001 -.003	.010	±.001	.009	.079	.090	13	6
E-6	.062	1/16	1.6	.052	+.002 -.000 *.0015	.012	+.002 -.000	.005	.051		.010		.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		.023		.005	.051		.020		.094	.187	.200	41	7
SE-9	.094	3/32	2.4	.074		.020		.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	+.002 -.000 *.002	.029		.017	.102	+.001 -.003	.025	±.002	.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		.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		.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	+.003 -.000 *.004	.029	+.003 -.000	.031	.243	+.002 -.004	.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		.035		1.050	.567	.587	680	300
E-37	.375	3/8	9.5	.303		.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 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 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: 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 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 CAN NOT BE CHECKED WITH ANY DEGREE OF ACCURACY DIRECTLY ON THESE RINGS.

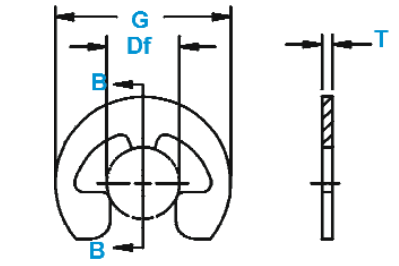
HARDNESS RANGES: BERYLLIUM COPPER RINGS

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

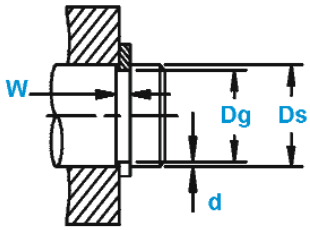
RE Retaining Rings

Radially Assembled, External

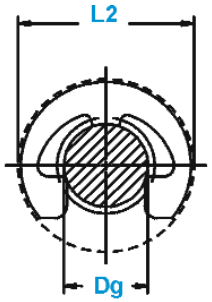
A reinforced version of the E ring which will accommodate higher RPM



Free Diameter & Ring Measurements with Section B-B



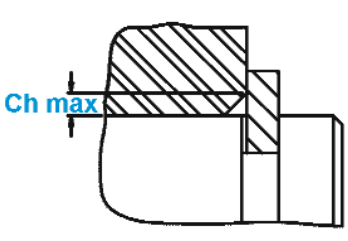
Shaft Diameter & Groove Dimensions

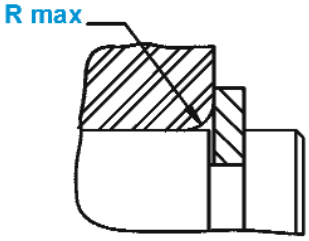


Clearance Diameter Installed in Groove

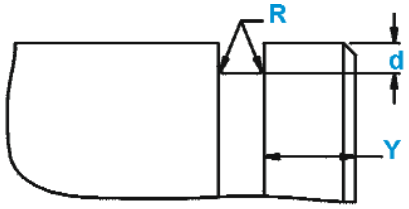
RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					CLEARANCE DIA.		ì THRUST LD. (lbs.) Sqr. Corner Abutment	
				DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight. Per 1000 Pcs.	Free Out-Side Dia.	Installed In Groove	Ring Safety factor of 3	Groove Safety factor of 2
	Ds DEC	Ds 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.
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. 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 MAR-GIN	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: 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

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

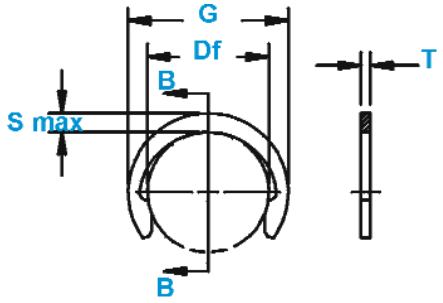
HARDNESS RANGES: BERYLLIUM COPPER RINGS

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

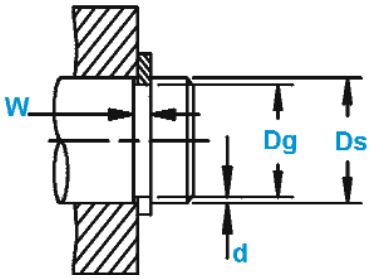
C Retaining Rings

Radially Assembled, External

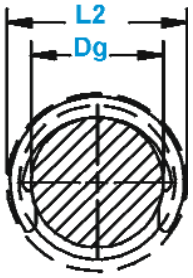
Ideal for low clearance applications where radial installation is preferred.



Free Diameter & Ring Measurements with Section B-B



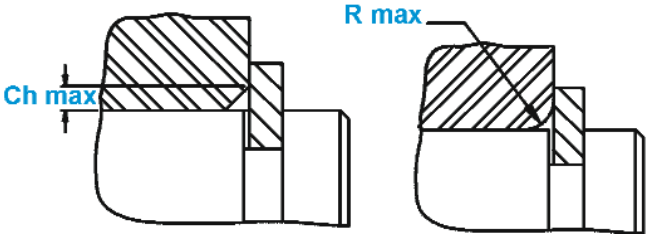
Shaft Diameter & Groove Dimensions



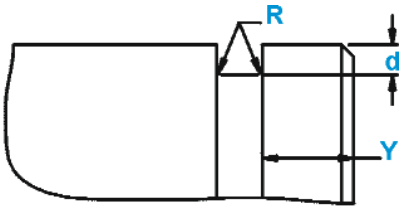
Clearance Diameter Installed in Groove

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	±.003	.039	+.003	.025	.441	±.006	.035	±.002	.671	.581	.60	842	450
C-56	.562	9/16	14.3	.507	*.004	.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		.046		.034	.608		.042		1.3	.784	.80	1726	800
C-75	.750	3/4	19.0	.676		.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	+.004	.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	-.000	.069	1.220		.050		6.1	1.555	1.58	4111	3350
C-150	1.500	1-1/2	38.1	1.350		.056		.075	1.331		.050		7.6	1.691	1.72	4486	4000
C-162	1.625	1-5/8	41.3	1.483		.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	*.005	.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



Exploded 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 Stan-dard material
	S max	Tol.	R max	Ch max	P'r	Y	
C-12	.031	±.003	.014	.011	85	.020	80000
C-15	.037		.018	.014	100	.020	75000
C-18	.042		.021	.016	110	.022	73000
C-21	.044		.021	.016	260	.026	71000
C-23	.046	±.004	.022	.017	275	.028	62000
C-25	.050		.023	.018	290	.030	60000
C-28	.051		.021	.016	310	.034	56000
C-31	.053		.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	±.005	.030	.023	610	.050	25000
C-56	.078		.033	.025	610	.056	22000
C-62	.081		.033	.025	610	.062	20000
C-68	.086		.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	±.007	.052	.040	1250	.112	11500
C-125	.150		.057	.044	1250	.124	10500
C-137	.165		.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

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 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

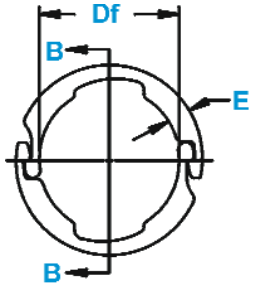
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
C	12-62	15N	77-82*
	68-81	30N	54-62
	87+	C	34-43

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

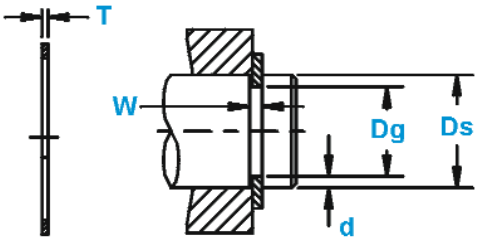
LC Retaining Rings

Radially Assembled, External

The two halves of this retaining ring interlock and retain assemblies with extremely high rotational speeds.

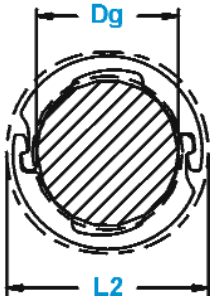


Free Diameter & Ring Measurements with Section B-B



Shaft Diameter & Groove Dimensions

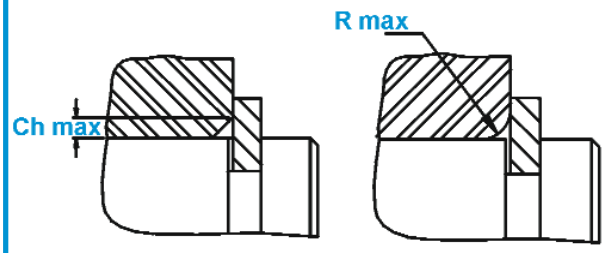
Plier Notch Design (Call for additional information)



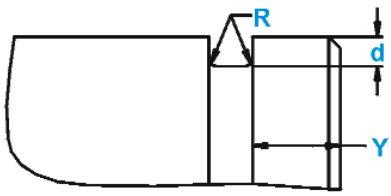
Clearance Diameter Installed in Groove

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE & WEIGHT					Clear. TOLERANCE DIA.	î Thrust Id. (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

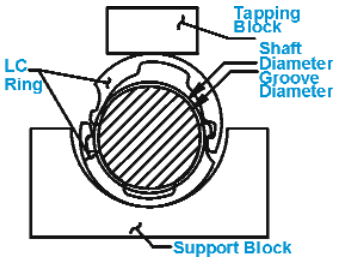
***F.I.M. (FULL INDICATOR MOVEMENT) -MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPT.
*****FOR PLATED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

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

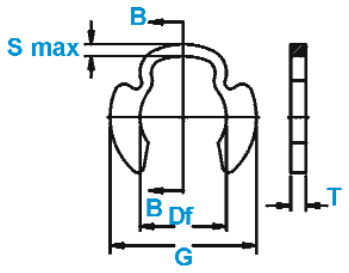
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

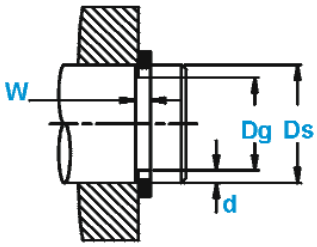
PO/POL Rings

Radially Assembled, External

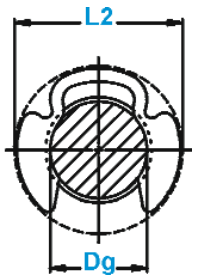
The ring features wide "ears" which offer extra retention surface against the retained part.



Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions

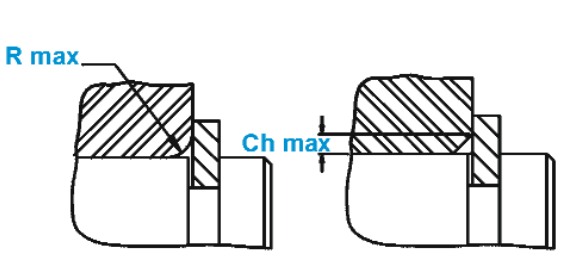


Clearance Diameter Installed In Groove

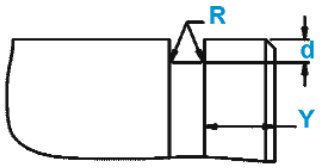
RING NO.	SHAFT DIAMETER			GROOVE SIZE DIAMETER			WIDTH		DEPTH	RING SIZE & WEIGHT FREE DIAMETER		THICKNESS***		Weight Per 1000 Pcs.	CLR. DIA. In-stalled in groove	î THRUST LD. (lbs.) Sqr. Corner Abutment Ring Safety factor of 2 1/2	Groove Safety factor of 2
	Ds DEC	Ds FRACT	Ds mm	Dg	Tol.	F.I.M*	W	Tol.	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.

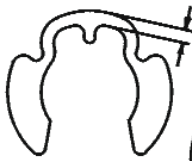
NOTE: THIS GROUP CONTAINS ALTERNATE THICKNESS VALUES (COLUMN "T"). OTHER PARAMETERS SUCH AS WIDTH OF GROOVE ("W") AND THRUST LOAD "Pr" ALSO DIFFER FROM STANDARD VERSIONS. PLEASE TAKE THIS INTO CONSIDERATION WHEN SELECTING A PO RING FOR YOUR DESIGN.



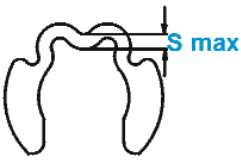
Maximum Corner Radius & Chamfer



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 max	R max	Ch max	P'r (lbs.)	y min	
PO-15	.320	.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 PAGE 70.

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

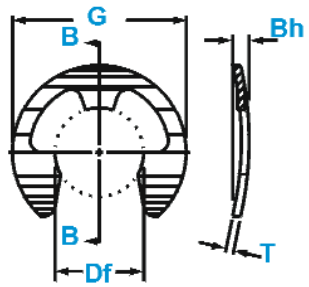
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

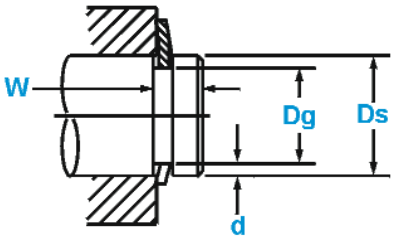
BE Retaining Rings

External, For End Play Take Up

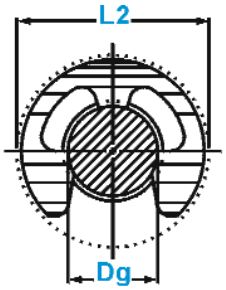
Once snapped into the groove, this ring exerts a force or a "preload" on the retained part.



Free Diameter & Ring Measurements with Section B-B



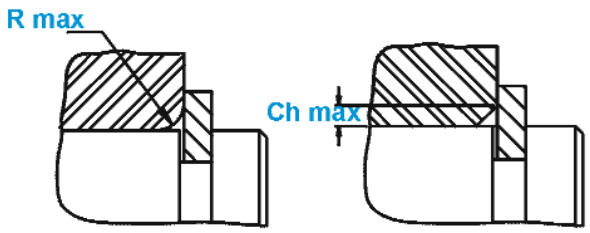
Shaft Diameter & Groove Dimensions



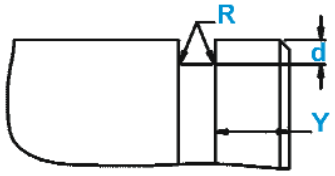
Clearance Diameter Installed in Groove

RING NO.	SHAFT DIAMETER			GROOVE SIZE					RING SIZE AND WEIGHT						CLEAR. DIA.		
				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

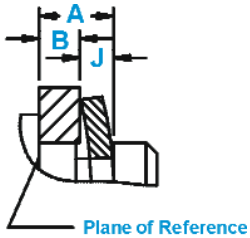
***F.I.M. (FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
*****FOR PLATED RINGS, ADD .002" TO THE LISTED MAXIMUM THICKNESS.**



Maximum Corner Radius & Chamfer



Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), .005 For ring sizes BSE-11Thru 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	
			J max-J min							Ring Safety factor of 3	Groove Safety factor of 2
	J min	J max		lbs.	R max	Ch max	(lbs.)	Y		Pr	Pg
BSE-11	.017	.022	.005	19	.080	.060	60	.030	35000	61	40
BE-1 2	.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

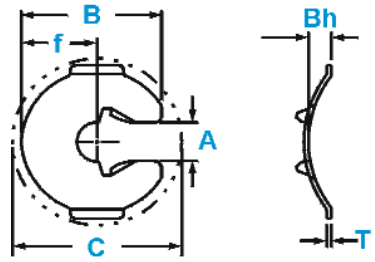
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
BE	BE12-BSE14	15N	77-82*
	BSE11,BE14-BSE21	15N	77-82
	BE25&BSE31	30N	54-62
	BE37+	C	34-43

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

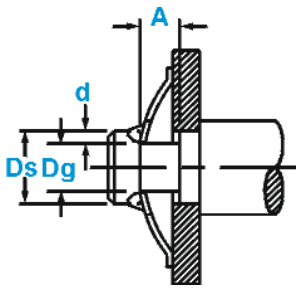
EL Retaining Rings

External, For End Play Take Up

Two prongs along the inner circumference retain the EL against the shaft.



Ring Measurements

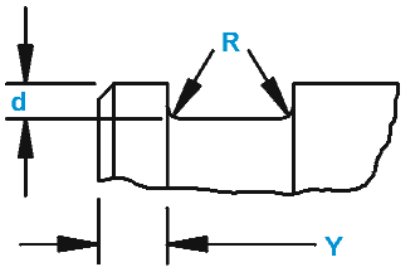


Shaft Diameter & Groove Dimensions

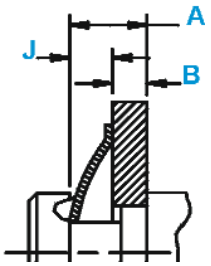
RING NO.	SHAFT			GROOVE SIZE					RING SIZE & WEIGHT									CLR. DIA.	îTHRUST LOAD (lbs.sq. corner abutment)	
	DIAMETER INCHES			DIAMETER		WIDTH		DEPTH	LENGTH		THICKNESS***		BOW HEIGHT		GAP		WGHT. PER 1000 Pcs.	Released In Groove	Ring Safety Factor Of 3	Groove Safety Factor Of 3
	DEC		FRACT	Dg	Tol.	W	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
A max=Bmin + J max
A min=B max + J min

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			EDGE MARGIN
	J MIN.	J MAX.	J MAX. - J MIN.	LBS.	IN-STALLED	FLAT-TENED	f 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 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
EL	9&12	15N	77-82*
	18-37	15N	77-82

*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
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.

Inch Tapered Section Retaining Rings/Circlips Self-Locking

www.rotorclip.com

Self-Locking Retaining Rings.

Self-locking retaining rings can be installed on a shaft or in a housing/bore without using a groove. They save machining time and overall costs since a groove is not needed for installation. They also come in small sizes (some fitting shafts as small as .058" in diameter) and can be used effectively and economically on small applications with very low thrust loadings. Most self-locking retaining rings can not be easily removed once installed and will perform according to the specifications listed on the pages that follow.

SHF Page 78-79

External Shaft Friction ring. 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.)

RG Page 80

External Radial Grip ring. 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. Automate installation using a Rotor Kick Jr. pneumatic installation too. (Note: this product works only on "soft" shafts.)

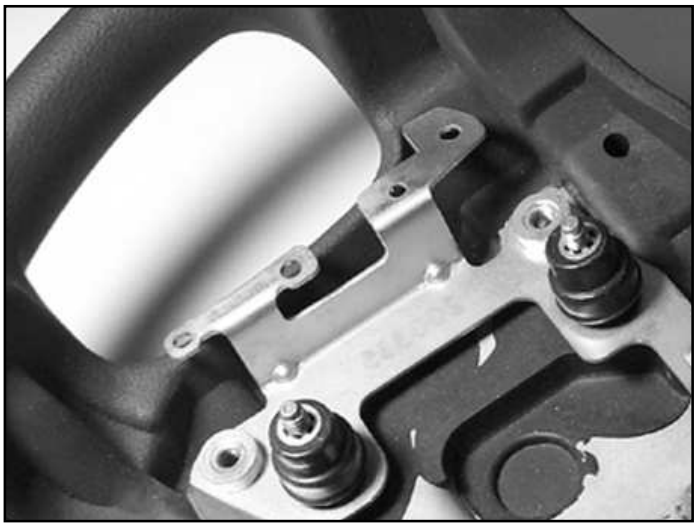
TX/TY Page 81

Toothed External "Push on" ring (Curved Rim/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 difference between these two rings is that the outer rim of the TX is curved while the rim of the TY is flat. The curved rim of the TX affords greater thrust load capacity than the TY and is easier to orient for assembly.

TI Page 82

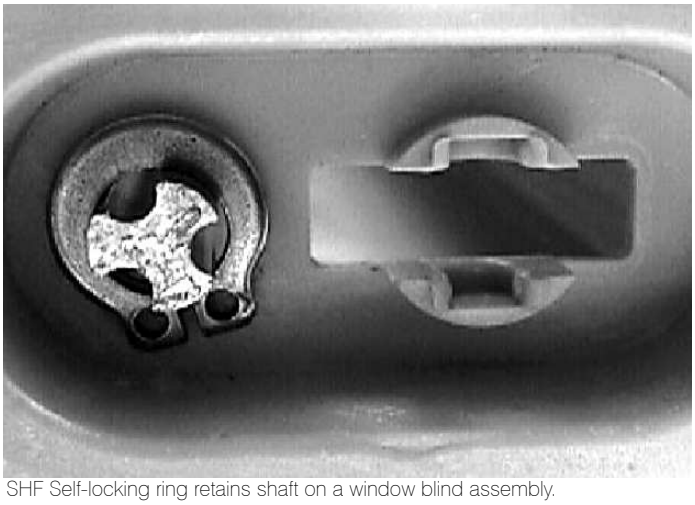
Toothed Internal "Push On" ring. The internal version of the TY featuring a series of prongs protruding outward. The ends create interference with the housing when the ring is installed and a load introduced to the other side.

TX-75 retaining ring installed on the ends of a metal shaft used to retain mirror housing and internal insert of a van mirror.

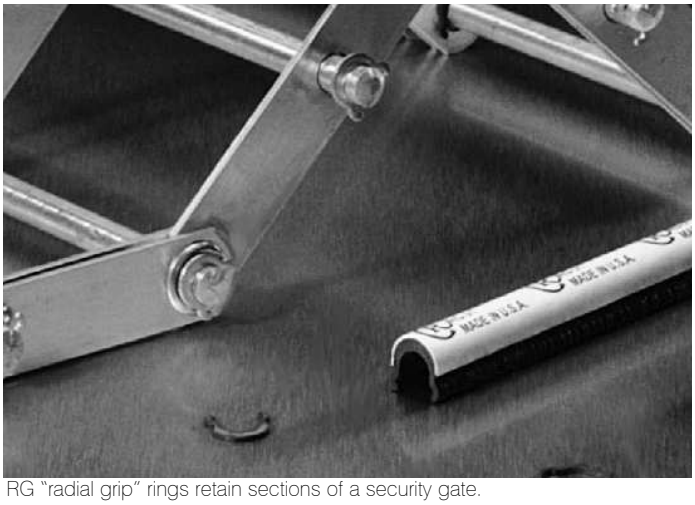


Two external, self-locking TX rings on an automotive steering wheel assembly.

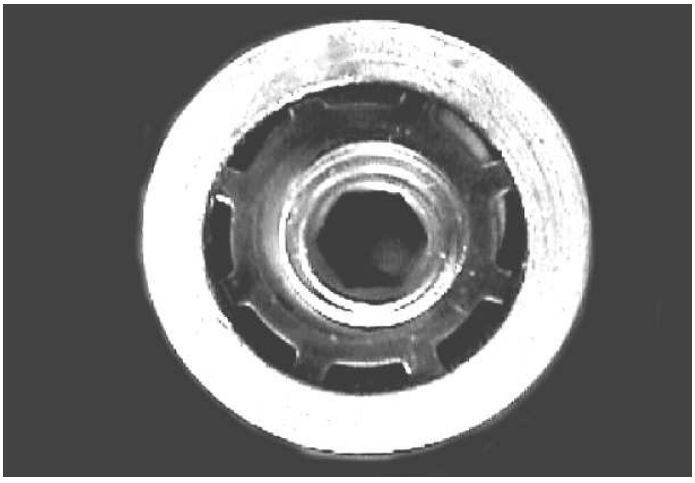
FOR TOOLS SEE PAGE 157-168
FOR MATERIALS SEE PAGE 16
FOR FINISHES SEE PAGE 18
FOR PACKAGING SEE PAGE 5



SHF Self-locking ring retains shaft on a window blind assembly.



RG "radial grip" rings retain sections of a security gate.

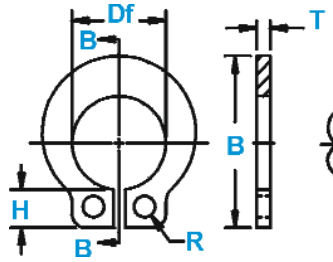


TI internal ring retains an assembly in a bore.

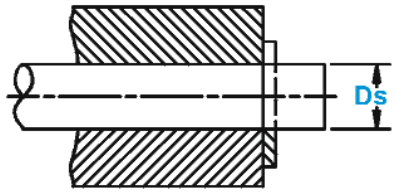
SHF Rings

External, Self-Locking

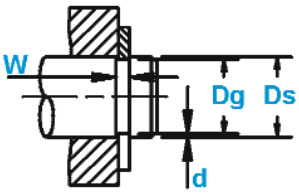
This ring exerts significant gripping power uniformly on the shaft (except where the gap occurs).



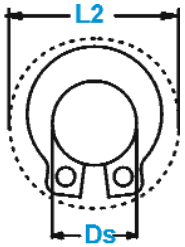
Free Diameter & Ring Measurements with Section B-B



Without Groove



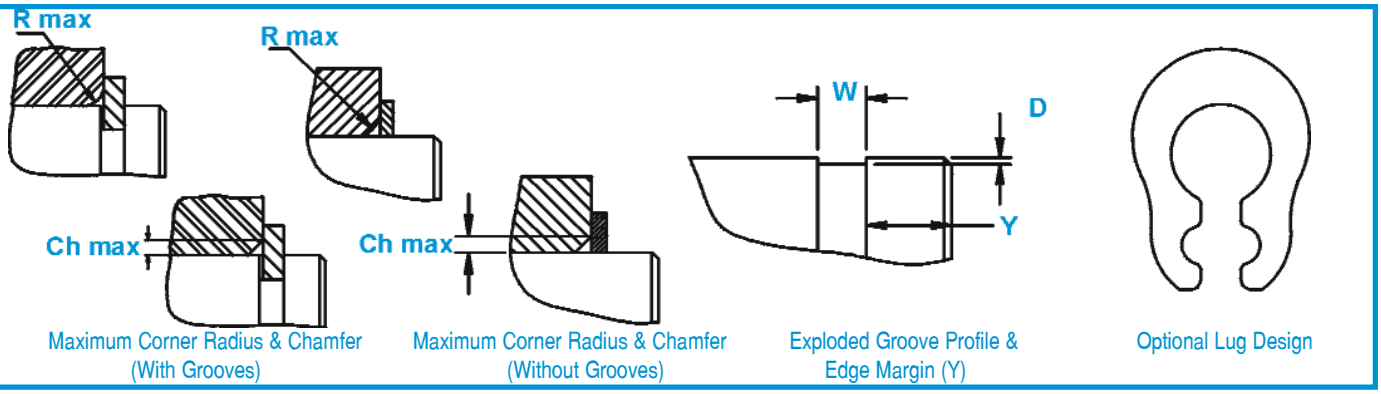
Optional Use in Groove (Larger Sizes)



Clearance Diameter Expanded Over Shaft

RING NO.	SHAFT DIAMETER				GROOVE SIZE					RING SIZE & WEIGHT					CLEAR.	î THRUST LD.(lbs.) Sqr. corner abutment	
					DIAMETER		WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Weight Per 1000 Pcs.	Re-leased over shaft	Allow-able 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		.035	±.003	.76	.48	22	70
SHF-25	.248	.252	1/4	6.3	.240		.041		.005	.238	+.002-.004	.035		.74	.49	23	90
SHF-31	.310	.316	5/16	7.9	.303		.048		.005	.298		.042		1.39	.68	25	110
SHF-37	.373	.379	3/8	9.5	.361	+.001 -.002	.048	+.004 -.000	.007	.354	+.003 -.005	.042		1.72	.74	31	180
SHF-43	.434	.440	7/16	11.0	.419		.056		.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	NOT RECOMMENDED FOR USE WITH GROOVES	.066	±.005	.035	±.004	.145	OVER 80000
SHF-7	.036	.022		.071	±.003	.034		.184	
SHF-9	.042	.025		.074		.034		.207	
SHF-12	.054	.032		.078		.042	+.010 -.002	.268	
SHF-15	.059	.035		.078		.042		.307	
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 -.002	.422	
SHF-25	.072	.043	.030	.097		.051		.437	77000
SHF-31	.080	.048	.030	.141	±.004	.078	+.015 -.002	.553	58000
SHF-37	.086	.051	.030	.141		.078		.620	51000
SHF-43	.093	.056	.030	.151		.078		.701	44000
SHF-50	.100	.060	.040	.158		.078		.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.

FOR HARDNESS SPECIFICATIONS, SEE END OF THIS SECTION.

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

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
SHF	9	15N	82.5-86
	12-18	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
	12-18	30N	54-62
	25+	C	34-43

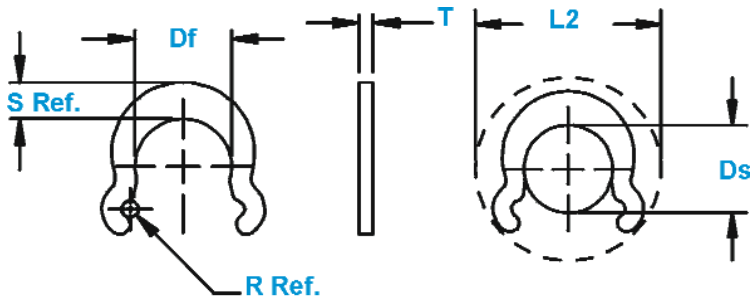
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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 Rings

External, Self-Locking

This ring can be installed flush against an assembly virtually eliminating end play.



Free Diameter & Ring Measurements

Clearance Diameter Installed On Shaft

RING NO.	SHAFT DIAMETER				RING SIZE & WEIGHT							CLEAR.	î THRUST LOAD Allow-able load (lbs.)	RPM LIMITS Standard Material
	Ds DEC				FREE DIAMETER		THICKNESS***		NOTCH DIA.	MAXIMUM SECTION	Weight Per 1000 Pcs.	Installed on shaft		
	FROM	TO	Ds	Ds mm	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

Hardness Ranges For TX Retaining Rings

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 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
TX	All .010 Thick Rings	15N	77-82*
	All .015 Thick Rings	15N	77-82

*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
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.

Hardness Ranges For TY Retaining Rings

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 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
TY	9-21,25-37	15N	77-82*
	24,43+	15N	77-82

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

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

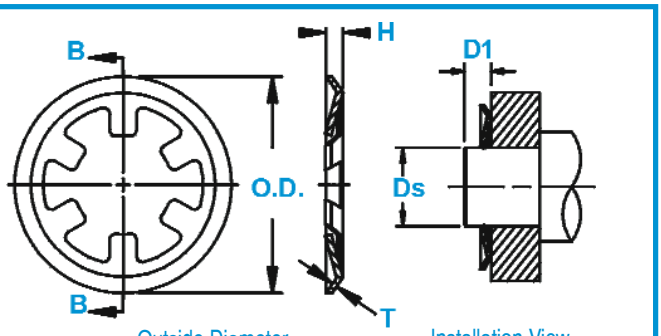
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TY	9-21,25-37	15N	84-86*
	24,43+	15N	84-86

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

External, Self-Locking

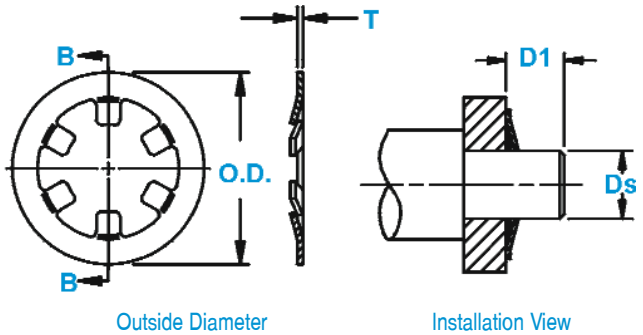
Prongs dig into shaft when load is introduced into other side.

TX,TY Rings



Outside Diameter With Section B-B

Installation View



Outside Diameter With Section B-B

Installation View

RING NO.	SHAFT DIAMETER				OUTSIDE DIAMETER		No. of prongs	*** RING HEIGHT		* THICK-NESS **Stan-dard	î Thrust Ld. @ Std. T	Wght. Per 1000 Pcs. @ Std. T	* Thick-ness Optional	î 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		3	.029			27	.16		45	.25	.058
TX-12	.121	.129	1/8	3.17	.366		4	.029	±.005	.010 ±.001	39	.19	.015 ±.002	57	.30	.058
TX-15	.152	.160	5/32	3.96	.397		4	.029			46	.22		70	.35	.058
TX-18	.184	.192	3/16	4.77	.444	±.005	6	.031	±.007		56	.27		85	.42	.062
TX-25	.246	.254	1/4	6.35	.522		6	.042			112	.55		58	.39	.074
TX-31	.308	.316	5/16	7.92	.584		8	.042	±.008		112	.64	.010 ±.001	60	.44	.074
TX-37	.371	.379	3/8	9.53	.645		8	.042			122	.74		65	.48	.074
TX-43	.432	.442	7/16	11.1	.737		10	.045	±.009		122	.96				.090
TX-50	.495	.505	1/2	12.7	.828		10	.054		.015 ±.002	122	1.27				.108
TX-56	.557	.567	9/16	14.27	.889		12	.054			127	1.38				.108
TX-62	.620	.630	5/8	15.88	.951	±.010	12	.054	±.010		137	1.47				.108
TX-75	.745	.755	3/4	19.05	1.076		14	.054			142	1.65				.108
TX-87	.870	.880	7/8	22.23	1.203		16	.054			142	1.96				.108
TX-100	.995	1.005	1	25.4	1.327		18	.054			142	2.29				.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.
FOR HARDNESS SPECIFICATIONS SEE PAGE 80.
THRUST LOAD CAPACITY IF APPLICABLE TO PARTS MADE FROM CARBON SPRING STEEL AND STAINLESS STEEL MATERIALS ONLY.

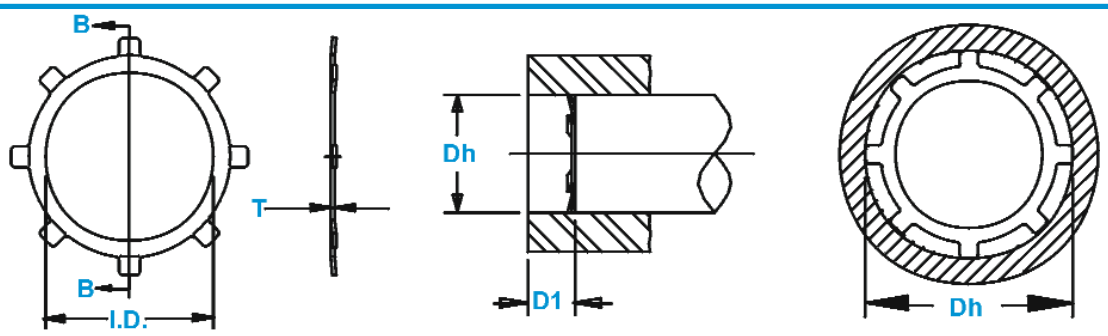
RING NO.	SHAFT DIAMETER				OUTSIDE DIAMETER		No. Of Prongs	THICKNESS*		î Thrust Load	WEIGHT Per 1000 Pcs.	Min. Distance Face of part to end of shaft
	Ds DEC-DEZ FROM	Ds DEC-DEZ TO	Ds FRACT	Ds mm	O.D.	Tol.		T	Tol.	lbs.	lbs.	D1
TY-9	.093	.095	3/32	2.39	.250		3			13	.09	.040
TY-12	.124	.126	1/8	3.17	.325		4			20	.14	.040
TY-15	.155	.157	5/32	3.96	.356		4	.010	±.001	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	±.005	6	.015	±.002	40	.35	.060
TY-25	.249	.251	1/4	6.35	.450		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			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		6			50	.75	.060
TY-62	.623	.627	5/8	15.88	.875		7	.015	±.002	50	.82	.060
TY-75	.748	.752	3/4	19.05	1.000	±.010	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.
FOR HARDNESS SPECIFICATIONS SEE PAGE 80.

TI Rings

Internal, Self-Locking

Prongs dig into the housing when load is introduced to other side.



Inside Diameter With Section B-B

Housing Diameter

RING NO.	HOUSING DIAMETER Inches				RING SIZE & WEIGHT							Min. Distance Face of part to end of housing
					INSIDE DIAMETER		THICKNESS***		No. of Prongs	Thrust Load	Weight Per 1000 Pcs.	
	DEC FROM	DEC TO	FRACT	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.

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 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
TI	31-62	15N	77-82*
	75+	15N	77-82

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

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

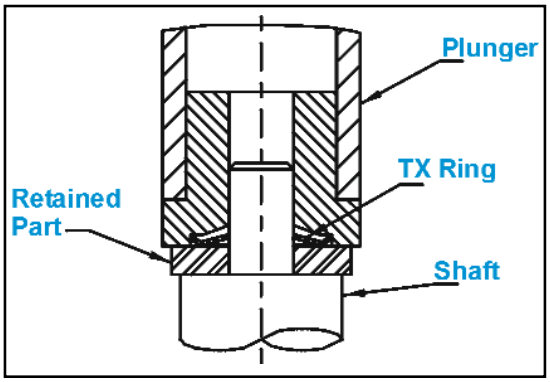
RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
TI	31-62	15N	84-86*
	75+	15N	84-86

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

PLUNGER

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

See page 162 for the "Easy Guide" TX Applicator Tool.



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.

Metric Tapered Section Retaining Rings/Circlips ®

www.rotorclip.com

Axially Assembled, Metric Retaining Rings

DHO - DIN 472 Page 84-87

Internal DIN Housing 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.

DHI Page 88

Internal DIN Housing Inverted ring. Functions like an HO 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.

DHT - DIN 984 Page 89

Internal DIN Housing Teeth ring. 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.

DHR Page 90

Internal DIN Housing Reinforced ring. 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.

DSH - DIN 471 Page 92-95

External DIN Shaft ring. 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.

DSI Page 96

External DIN Shaft Inverted ring. 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.

DST - DIN 983 Page 97

External DIN Shaft Teeth ring. 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.

DSR Page 91

External DIN Shaft Reinforced ring. 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.

Radially Assembled, Metric Retaining Rings

DE - DIN 6799 Page 98

External DIN E ring. 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.

DC Page 99

External DIN Crescent ring. Ideal for low clearance applications where radial installation is preferred.

Self-Locking, Metric Retaining Rings

DTX Page 100

External DIN Toothed "Push-On" ring. 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.

DTI Page 101

Internal DIN Toothed "Push-On" ring. The internal version of the TX with a curved inner rim and a series of prongs protruding outwards. The ends create interference with the housing when the ring is installed and a load introduced to the other side.

Radially Assembled, JIS Retaining Rings

JE Page 102

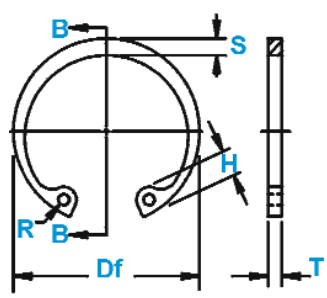
External Japanese E ring. Perhaps the most popular and widely used radial retaining ring is the "E" (so named because it is shaped like the letter "E"). Three prongs make contact with the bottom of the groove and provide a shoulder for effective retention of assemblies.

FOR TOOLS SEE PAGE 157-168
FOR MATERIALS SEE PAGE 16
FOR FINISHES SEE PAGE 18
FOR PACKAGING SEE PAGE 5

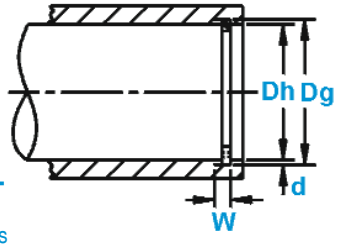
DHO Rings (DIN 472)

Axially Assembled, Internal, Metric

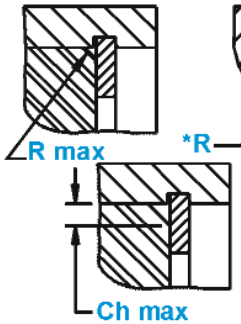
Once installed in the groove of a housing/bore, the shoulder holds an assembly in place.



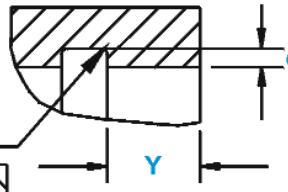
Free Diameter & Ring Measurements With Section B-B



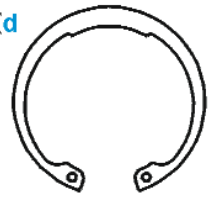
Groove Dimensions



Allowable Corner Radius & Chamfer



Groove Details



Alternate Design (Manufacturer's Option)

Ring No.	HOUSING Dia. (mm)	GROOVE SIZE DIAMETER		WIDTH	DEPTH	RINGS SIZE & WEIGHT THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	SUPPLEMENTARY DATA 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	4,1	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		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	-0,06	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		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	+0,25	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
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		1,85	1,25	1,75		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	-0,07	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

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.**

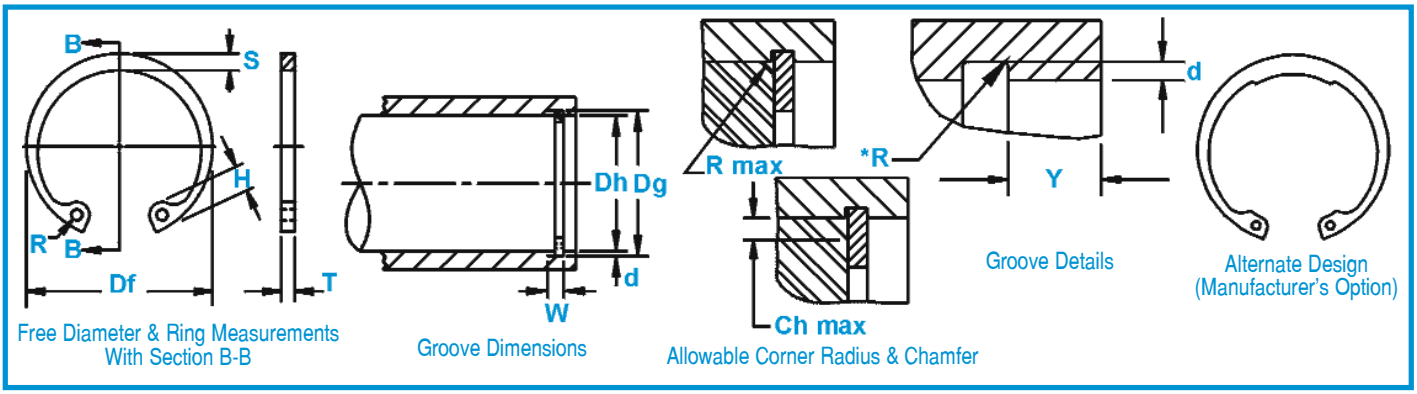
Ring No.	HOUSING	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
	Dia. (mm)	DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allow-able Rad./ Cham.	Max. load w/ R /Ch Max.
	Dh	Dg	Tol.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	Kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN
DHO-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		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	-0,07	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		8,5	6,8	3,0	20,40	4,5	121	61,60	2,5	21,5
DHO-78	78	81,0		2,65	1,50	2,50		82,5		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
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		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
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

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.

DHO Rings (DIN 472)

Axially Assembled, Internal, Metric

Once installed in the groove of a housing/bore, the 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)

Ring No.	HOUSING	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
	Dia. (mm)	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-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		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		14,2	13,8	4,0	174,0	7,5	343	249,0	3,5	58,0
DHO-190	190	195,0		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	+1,70	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	-0,72	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	+0,72	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		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
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	-0,12	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		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		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		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

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.**

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

RING TYPE	SIZE RANGE	HV	HRC
DHO	8-48	470-580	47-54
	50-200	435-530	44-51
	202-300	390-470	40-47
	305-400	370-415	38-43

Ring No.	HOUSING	GROOVE SIZE				RINGS SIZE & WEIGHT								SUPPLEMENTARY DATA				
	Dia. (mm)	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-230	232	238,0		5,15	3,00	5,00		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	+0,72	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		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		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		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	-0,12	270,0		16,2	16,0	5,0	368,0	12,0	545	546,0	4,0	81,00
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	+2,00	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	-0,81	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	+0,81	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		16,2	16,0	5,0	393,0	12,0	509	585,0	4,0	75,50
DHO-275	277	285,0		5,15	4,00	5,00		290,0		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		322,0		16,2	20,0	6,0	755,0	15,0	961	810,0	5,0	114,00
DHO-310	310	320,0		6,20	5,00	6,00		327,0		20,2	20,0	6,0	770,0	15,0	947	823,0	5,0	113,00
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	-0,15	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		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	+2,00	20,2	20,0	6,0	960,0	15,0	764	1033,0	5,0	91,00
DHO-395	395	405,0	+1,00	6,20	5,00	6,00		412,0	-1,00	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		20,2	20,0	6,0	980,0	15,0	746	1060,0	5,0	89,00

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: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
DHO	8-23	30N	66-72.0
	24-48	C	47-54
	50-200	C	44-51
	202-300	C	40-47
	305-400	C	38-43

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

RING TYPE	SIZE RANGE	HV	HRC
DHO	8-400	435-530	44-51

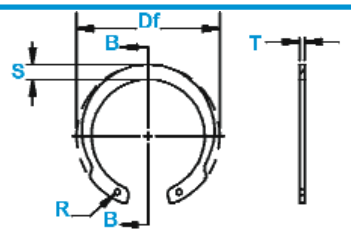
HARDNESS RANGES: STAINLESS STEEL RINGS (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
DHO	8-23	30N	63-69.5
	24-400	C	44-51

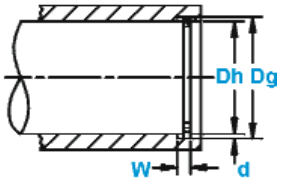
DHI Rings

Axially Assembled, Internal, Metric

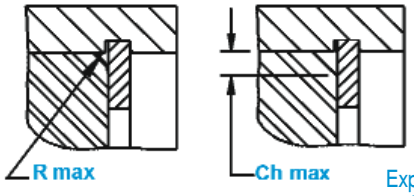
The inverted position of the lugs affords greater clearance than the basic external retaining ring.



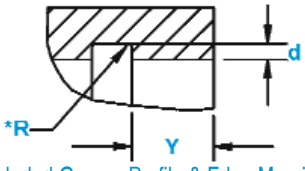
Free Diameter & Ring Measurements With Section B-B



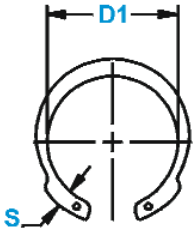
Housing Diameter & Groove Dimensions



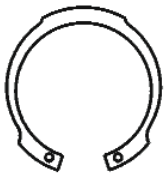
Allowable Corner Radius & Chamfer



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


Alternate Design (Manufacturer's Option)

RING NO.	HOUSING DIAMETER	GROOVE SIZE DIAMETER		WIDTH	DEPTH	RING SIZE & WEIGHT THICKNESS ***		FREE DIAMETER		MAX. SEC.		HOLE DIA.	WEIGHT	SUPPLEMENTARY DATA 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		1,60	0,85	1,50		36,5		3,4		1,7	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	+0,25	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
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		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		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.

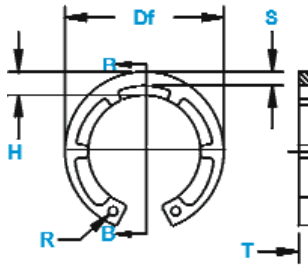
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

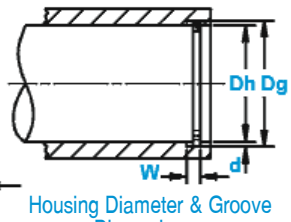
Axially Assembled, Internal, Metric

The increased shoulder offered by the teeth is particularly effective in retaining applications with large radii or chamfers.

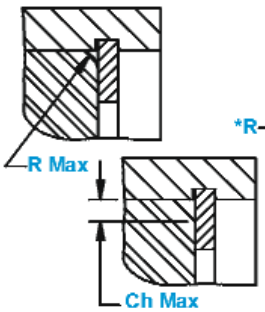
(DIN 984) DHT Rings



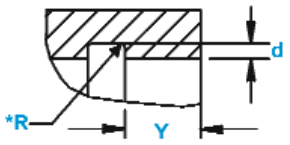
Free Diameter and Ring Measurements With Section B-B



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		4,1	2,3	2,0	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		7,2	4,5	2,5	6,90	3,8	43,5	31,4	2,0	8,3
DHT-48	48	50,5		1,85	1,25	1,75		51,5		7,2	4,5	2,5	7,50	3,8	43,2	32,0	2,0	8,4
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		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	-0,07	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

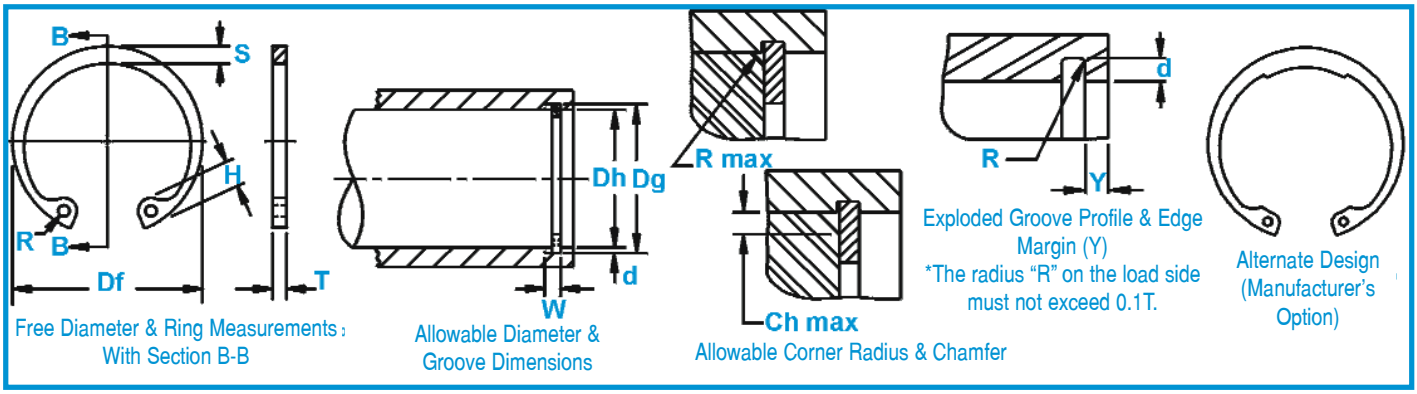
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	HV	HRC
DHT	16-48	470-580	47-54
	50-170	435-530	44-51

DHR Rings DIN 472 - Heavy Type

Axially Assembled, Internal, Metric

This heavy-duty ring affords the user higher thrust load capacity.



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	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA				
	DIA.	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.

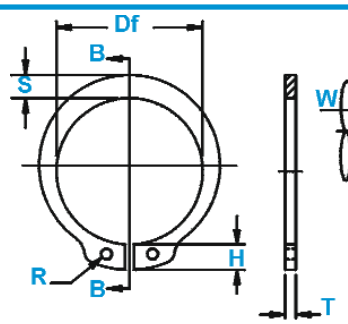
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

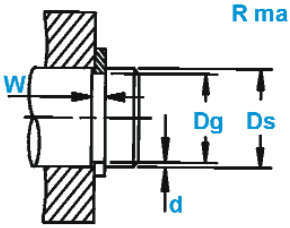
Axially Assembled, External, Metric

This heavy-duty ring affords the user higher thrust load capacity.

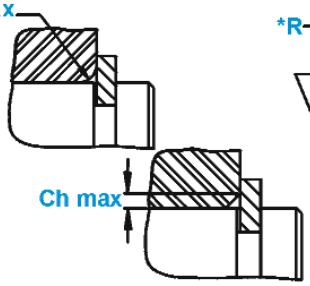
DIN 471 - Heavy Type DSR Rings



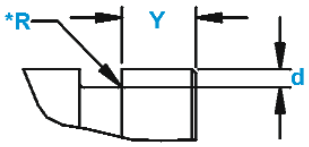
Free Diameter & Ring Measurements With Section B-B



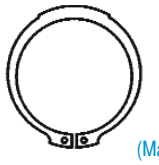
Shaft Diameter & Groove Dimensions



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 DIAMETER		WIDTH	DEPTH	RING SIZE & WEIGHT THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	SUPPLEMENTARY DATA 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.

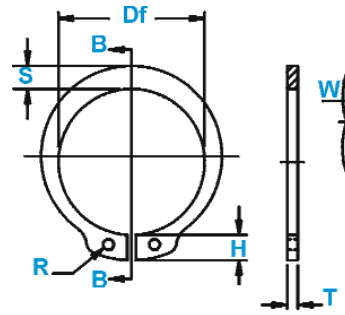
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

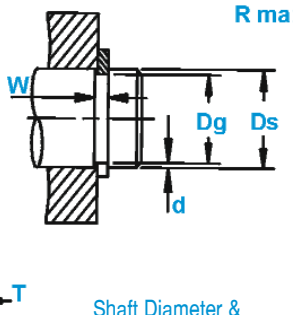
DSH Rings (DIN 471)

Axially Assembled, External, Metric

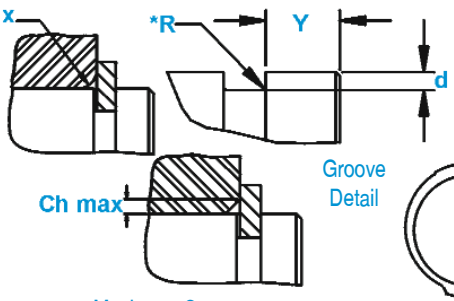
Once installed in the groove of a shaft, the shoulder holds an assembly in place.



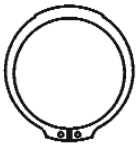
Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



Alternate Design Manufacturer's Option

Alternate Lug Design Manufacturer's Option

Ring No.	SHAFT DIA. (mm)	GROOVE SIZE DIAMETER		WIDTH	DEPTH	RING SIZE & WEIGHT THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	SUPPLEMENTARY DATA EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allowable 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 -0,15	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		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 -0,18	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		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 -0,36	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		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		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 -0,42	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		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	-0,06	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 -0,42	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		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		1,60	0,85	1,50		30,5		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		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	+0,25 -0,50	5,6	3,9	2,5	4,000	3,0	30,80	17,8	2,0	5,55	15500
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		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		5,8	4,2	2,5	5,620	3,0	49,50	19,3	2,0	9,10	13600
DSH-39	39	37,0	-0,25	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		1,85	1,25	1,75		38,5	+0,39 -0,90	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		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	-0,07	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	-0,30	2,15	1,50	2,00		50,8	+0,46-1,10	7,2	5,4	2,5	11,40	4,5	71,4	42,0	2,5	11,40	9000

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 the most up-to-date specifications, online quotations & sample orders, visit rotorclip.com

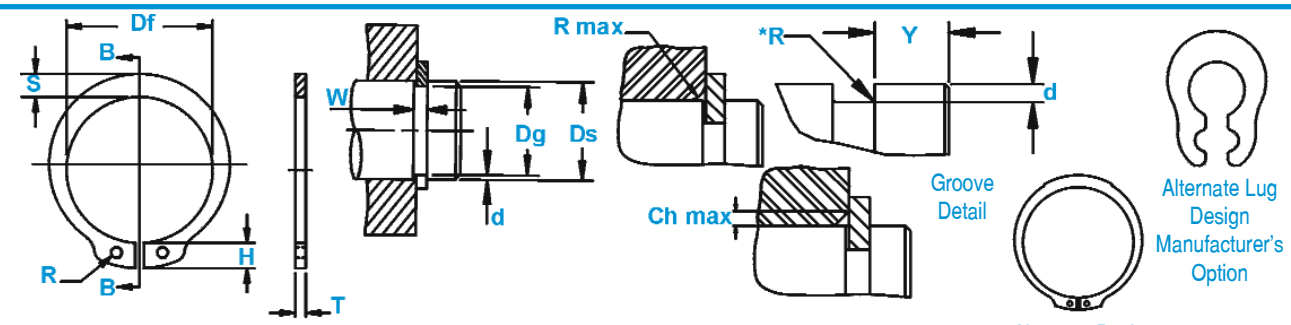
Ring No.	SHAFT	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
	DIA. (mm)	DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allowable Rad/Cham.	Max. Load W/Ch Max.	RPM Limits
	Ds	Dg	TOL.	W Min.	d	T	Tol.	Df	Tol.	H Max.	S Ref.	R Min.	Kg/ 1000	Y Min.	Pr kN	Pg kN	R/Ch Max.	P'r kN	
DSH-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		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	-0,07	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	8,7	3,0	31,20	5,3	128,0	73,5	3,0	19,60	6000
DSH-85	85	81,5		3,15	1,75	3,00		79,5		8,7	7,8	3,5	36,40	5,3	215,0	76,2	3,0	33,40	6000
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		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	+0,54	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	-1,30	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		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	-0,10	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		4,15	2,00	4,00		130,0		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		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	-0,63	4,15	2,00	4,00		140,0	+0,63	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	-1,50	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
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		4,15	2,50	4,00		157,5		13,5	12,9	4,0	163,0	7,5	353,0	216,0	5,0	42,40	2000

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

DSH Rings (DIN 471)

Axially Assembled, External, Metric

Once installed in the groove of a shaft, the shoulder holds an assembly in place.



Free Diameter & Ring Measurements With Section B-B

Shaft Diameter & Groove Dimensions

Maximum Corner Radius & Chamfer

Alternate Design Manufacturer's Option

Ring No.	SHAFT	GROOVE SIZE				RING SIZE & WEIGHT								SUPPLEMENTARY DATA					
	DIA. (mm)	DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		LUG HT.	MAX. SEC.	HOLE DIA.	WEIGHT	EDGE MARGIN	THRUST LOAD Ring	THRUST LOAD Groove	Allowable 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-170	170	165,0		4,15	2,50	4,00		160,5		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	-0,63	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	+0,63	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	-1,50	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	-0,10	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		14,2	14,0	4,0	230,0	7,5	319,0	258,0	5,0	38,30	2000
DSH-202	202	196,0		5,15	3,00	5,00		190,0		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		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	+0,72	14,2	14,0	4,0	260,0	9,0	577,0	337,0	6,0	57,80	2000
DSH-220	220	214,0	-0,72	5,15	3,00	5,00		208,0	-1,70	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	-0,12	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		5,15	3,00	5,00		223,0		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		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

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.

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	Allowable Rad/Cham.	Max. 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-255	257	249,0	-0,72	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		5,15	4,00	5,00		245,0	+0,72	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	-1,70	16,2	16,0	5,0	355,0	12,0	542,0	540,0	6,0	54,40	1000
DSH-265	265	257,0		5,15	4,00	5,00		250,0		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		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	-0,12	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		5,15	4,00	5,00		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	-0,81	5,15	4,00	5,00		270,0		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		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	+0,81	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	-2,00	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		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
DSH-320	320	310,0		6,20	5,00	6,00		303,0		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		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	-0,15	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		343,0	+0,90	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	-2,00	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		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		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

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	HV	HRC
DSH	3-400	435-530	44-51

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

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
DSH	3-4	15N	82.5-86
	5-19	30N	63-69.5
	20-400	C	44-51

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

RING TYPE	SIZE RANGE	HV	HRC
DSH	3-48	470-580	47-54
	50-200	435-530	44-51
	202-300	390-470	40-47
	305-400	370-415	38-43

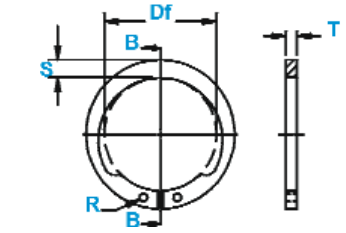
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
DSH	3-4	15N	84-87.5
	5-19	30N	66-72.0
	20-48	C	47-54
	50-200	C	44-51
	202-300	C	40-47
	305-400	C	38-43

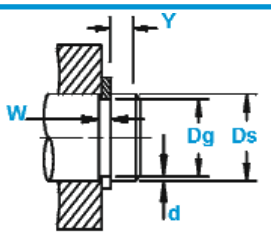
DSI Rings

Axially Assembled, External, Metric

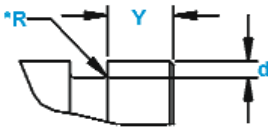
The inverted position of the lugs affords greater clearance than the basic external retaining ring.



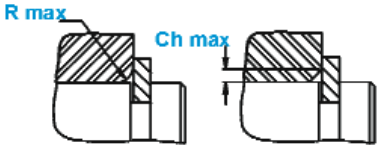
Free Diameter & Ring Measurements With Section B-B



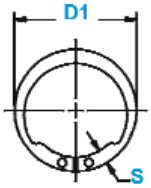
Shaft Diameter & Groove Dimensions



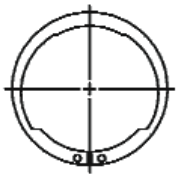
The radius "R" on the load side must not exceed 0.1T



Maximum corner Radius & Chamfer



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


Alternate Design (Manufacturer's Option)

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		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	-0,06	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		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
DSI-40	40	37,5	-0,25	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		1,85	1,25	1,75		41,50	+0,39	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	-0,90	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	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	-1,10	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		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	±0,3	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	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	-1,30	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.

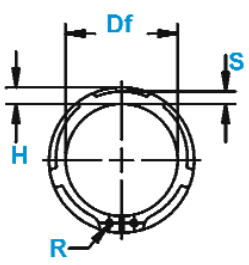
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

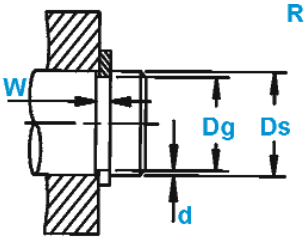
Axially Assembled, External, Metric

The increased shoulder offered by the teeth is partucularly effective in retaining applications with large radii or chamfers.

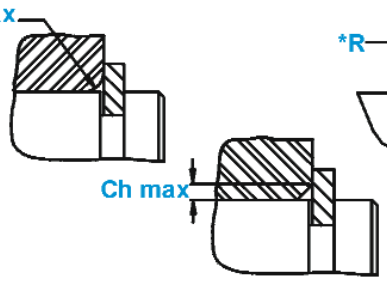
(DIN 983) DST Rings



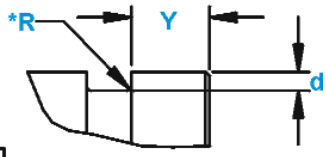
Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions



Maximum Corner Radius & Chamfer



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

RING NO.	SHAFT DIAMETER	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		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	-0,25	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		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	+0,39	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	-0,90	7,2	4,8	2,5	8,70	3,8	49,5	30,00	2,0	9,5	10000
DST-48	48	45,5		1,85	1,25	1,75		44,5		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		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

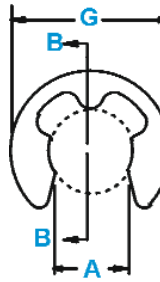
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	HV	HRC
DST	16-48	470-580	47-54
	50-140	435-530	44-51

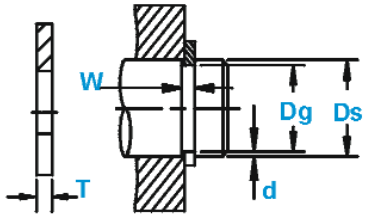
DE Rings (DIN 6799)

Radially Assembled, External, Metric

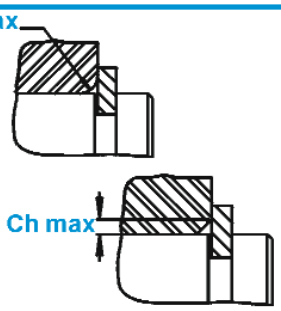
The three prongs of this ring make contact with the bottom of the groove for effective retention of an assembly.



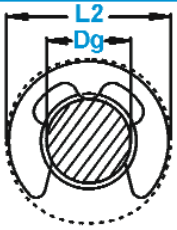
Ring Measurements



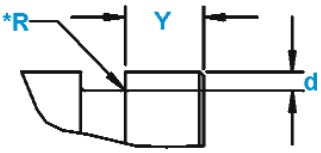
Shaft Diameter & Groove Dimensions



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.	INSTALLED IN GROOVE	EDGE MARGIN	Thrust Load Ring*	THRUST LOAD (at shaft Ds')		Allowable 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	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	2,9	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	3,9	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	11,8	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	13,8	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	22,7	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	51,3	52,6	4,5	23,00	16,50	36,0	3,5	5,30	4200

*SHARP CORNER ABUTMENT.
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 (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
DE	0,8-1,9	15N	82.5-86*
	2,3-6	30N	63-69.5
	7-30	C	44-51

*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
DE	0,8-1,9	15N	79-82*
	2,3-6	30N	56.5-62
	7,30	C	37-43

*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
DE	0,8-1,9	15N	83.5-87.5*
	2,3-6	30N	65-72
	7-30	C	46-54

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

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

RING TYPE	SIZE RANGE	HV	HRC
DE	0,8-30	435-530	44-51

HARDNESS RANGES: BERYLLIUM COPPER RINGS

RING TYPE	SIZE RANGE	HV	HRC
DE	0,8-30	360-415	37-43

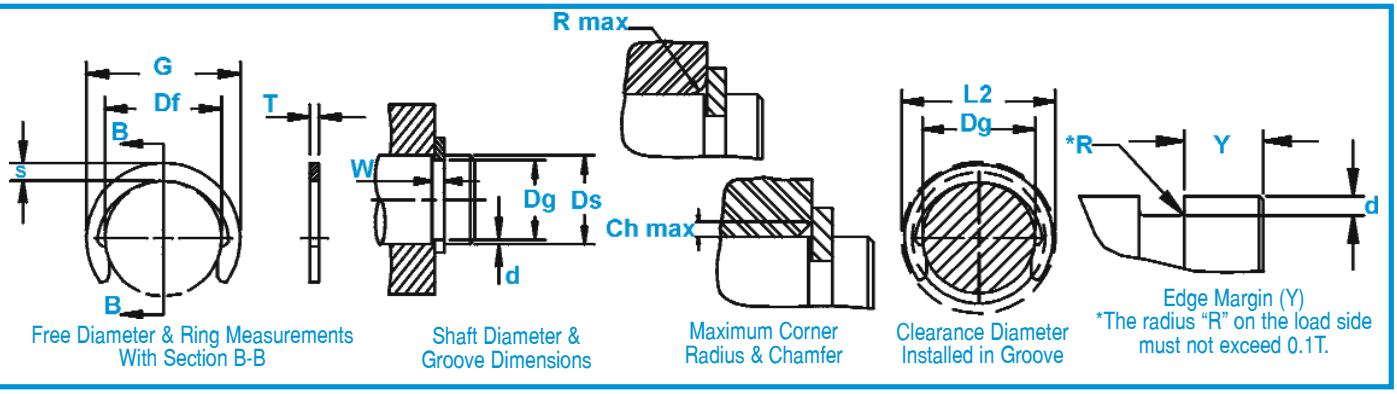
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	HV	HRC
DE	0,8-30	460-580	46-54

Radially Assembled, External, Metric

Ideal for low clearance applicatons where radial installation is preferred.

DC Rings



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	GROOVE SIZE				RING SIZE & WEIGHT					CLEARANCE			SUPPLEMENTARY DATA					
	DIA. (mm)	DIAMETER		WIDTH	DEPTH	THICKNESS ***		FREE DIAMETER		MAX. SEC.	WEIGHT	FREE O.D.	INSTALLED IN GROOVE	EDGE MARGIN	THRUST LOAD	THRUST LOAD	Allowable Rad/Cham	Max Load (lbs.)	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		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		1,30	0,95	1,20	-0,06	17,55		2,55	0,87	22,65	23,2	2,9	9,40	4,70	1,20	3,00	20000
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		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) MINIMUM.

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

RING TYPE	SIZE RANGE	HV	HRC
DC	3-55	435-530	44-51

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

RING TYPE	SIZE RANGE	HV	HRC
DC	3-55	485-545	48-52

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

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

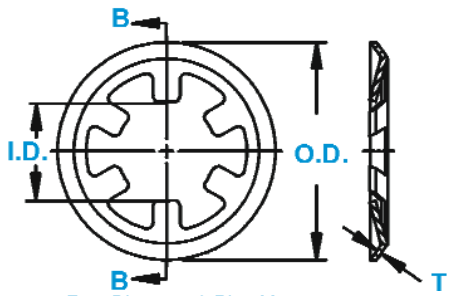
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
DC	3-4	15N	84.5-86.5
	5-19	30N	66.5-70.0
	20-55	C	48-52

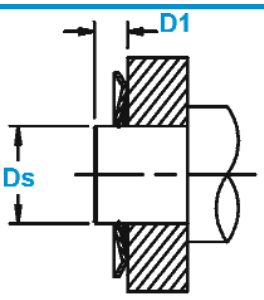
DTX Rings

Self-Locking, External, Metric

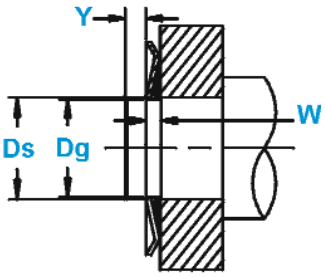
Prongs dig into shaft when a load is introduced to the other side.



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-2,0	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-3,0	3,0	-0,060	2,90		0,4	2,80	8,0	4	0,25	0,066	1,5	200	1,0
DTX-3,5	3,5		3,40		0,5	3,30	8,2	4	0,40	0,104	2,0	210	1,0
DTX-4,0	4,0	+0,00	3,90	-0,075	0,4	3,80	9,0	4	0,25	0,078	2,0	220	1,0
DTX-5,0	5,0	-0,075	4,90		0,4	4,80	10,0	4	0,25	0,082	2,0	230	1,0
DTX-6,0	6,0		5,90		0,4	5,80	11,0	4	0,25	0,094	2,5	240	1,5
DTX-7,0	7,0		6,90		0,4	6,80	12,0	5	0,25	0,110	2,5	250	1,5
DTX-8,0	8,0	+0,00	7,85	-0,090	0,4	7,75	13,0	4	0,25	0,122	2,5	250	1,5
DTX-9,0	9,0	-0,090	8,85		0,6	8,75	14,0	5	0,30	0,208	2,5	300	1,5
DTX-10,0	10,0		9,85		0,6	9,75	16,0	6	0,30	0,232	3,0	320	1,5
DTX-12,0	12,0		11,85		0,6	11,70	18,0	6	0,30	0,255	3,0	350	1,5
DTX-14,0	14,0		13,80	-0,110	0,6	13,70	20,5	6	0,30	0,310	3,0	400	1,5
DTX-15,0	15,0	+0,00	14,80		1,0	14,60	23,0	8	0,50	0,750	3,0	600	2,0
DTX-16,0	16,0	-0,110	15,80		1,0	15,60	24,5	8	0,40	0,710	3,0	700	2,0
DTX-17,0	17,0		16,80		1,0	16,60	26,0	8	0,50	0,950	3,5	800	2,0
DTX-18,0	18,0		17,80		1,0	17,60	27,0	8	0,40	0,810	3,5	850	2,0
DTX-19,0	19,0		18,80		1,0	18,60	28,0	8	0,50	0,950	3,5	900	2,0
DTX-20,0	20,0		19,75		1,0	19,50	29,0	8	0,50	1,090	3,5	950	2,0
DTX-22,0	22,0		21,75		1,0	21,50	31,0	8	0,50	1,150	3,5	1000	2,0
DTX-23,0	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-25,0	25,0	-0,130	24,75		1,0	24,50	34,0	8	0,50	1,490	4,0	1100	2,0
DTX-28,0	28,0		27,75		1,0	27,50	37,0	8	0,50	1,550	4,0	1200	2,0
DTX-30,0	30,0		29,75		1,0	29,50	40,0	8	0,50	1,630	4,0	1300	2,0
DTX-35,0	35,0	+0,00	34,75		1,0	34,50	46,0	8	0,50	2,100	4,0	1400	2,0
DTX-45,0	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 (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
DTX	1,5-45,0	15N	82.5-86

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

RING TYPE	SIZE RANGE	HV	HRC
DTX	1,5-45,0	435-530	44-51

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

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
DTX	1,5-45,0	15N	83-85.5

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

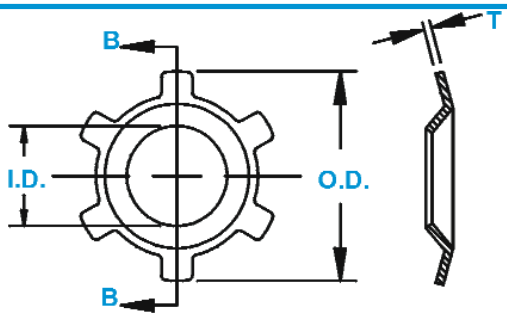
RING TYPE	SIZE RANGE	HV	HRC
DTX	1,5-45,0	450-520	45-50

* HARDNESS CANNOT BE CHECKED DIRECTLY WITH ANY DEGREE OF ACCURACY FOR RINGS LESS THAN 0,38 mm THICK.

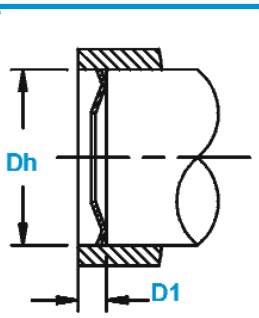
Self-Locking, Internal, Metric

The ends create interference with the housing when this ring is installed and a load introduced on the other side.

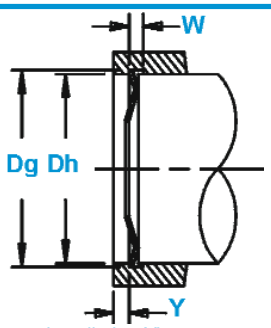
DTI Rings



Free Diameter & Ring Measurements With Section B-B



Installation View Without Groove



Installation View With Groove

Ring No.	HOUSING		GROOVE SIZE			RING DIMENSIONS				SUPPLEMENTARY DATA			
	DIAMETER		DIMENSIONS					No. Of Prongs	THICK-NESS ***	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-8,0	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-10,0	10,0	-0,00	10,10		0,4	5,0	10,20	6	0,25	0,068	2,0	350	1,0
DTI-12,0	12,0		12,10		0,4	6,0	12,25	6	0,25	0,112	2,5	450	1,0
DTI-14,0	14,0		14,10		0,5	8,0	14,25	6	0,30	0,172	2,5	500	1,0
DTI-15,0	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-16,0	16,0	-0,00	16,15		0,5	10,0	16,30	6	0,30	0,206	2,5	600	1,5
DTI-17,0	17,0		17,15		0,5	11,0	17,30	8	0,30	0,236	3,0	650	1,5
DTI-18,0	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-20,0	20,0		20,20	+0,110	0,8	11,0	20,35	8	0,40	0,512	3,5	800	1,5
DTI-22,0	22,0	+0,13	22,20		1,0	13,0	22,35	8	0,50	0,680	3,5	800	2,0
DTI-25,0	25,0	-0,00	25,20		1,0	16,0	25,35	10	0,50	0,810	3,5	800	2,0
DTI-26,0	26,0		26,20		1,0	17,0	26,40	10	0,50	0,856	3,5	850	2,0
DTI-28,0	28,0		28,20		1,0	19,0	28,40	10	0,50	0,922	3,5	850	2,0
DTI-30,0	30,0		30,20		1,0	21,0	30,40	8	0,50	1,010	4,0	900	2,0
DTI-32,0	32,0		32,20		1,0	22,5	32,40	12	0,50	1,210	4,0	900	2,0
DTI-35,0	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-40,0	40,0	-0,00	40,20		1,0	30,0	40,40	12	0,50	1,720	4,0	950	2,0
DTI-45,0	45,0		45,20		1,0	35,0	45,40	12	0,50	1,830	4,0	950	2,0
DTI-46,0	46,0		46,20		1,0	36,0	46,50	12	0,50	1,870	4,0	1000	2,0
DTI-50,0	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 (PH 15-7MO)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
DTI	8,0-50,0	15N	82.5-86

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

RING TYPE	SIZE RANGE	HV	HRC
DTI	8,0-50,0	435-530	44-51

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

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
DTI	8,0-50,0	15N	83-85.5

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

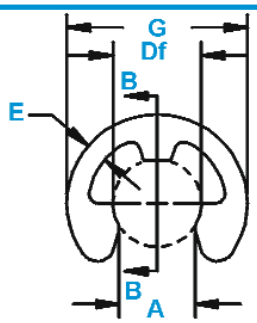
RING TYPE	SIZE RANGE	HV	HRC
DTI	8,0-50,0	485-545	48-52

NOTE: HARDNESS CANNOT BE CHECKED DIRECTLY WITH ANY DEGREE OF ACCURACY FOR DTI RINGS WITH 0,25 THICKNESS.

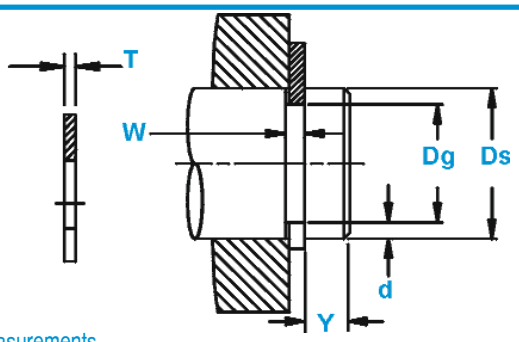
JE Rings (JIS B 2805)

Radially Assembled, External, JIS

The three prongs of this ring make contact with the bottom of the groove for effective retention on an assembly.



Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions

RING NO.	SHAFT Ds (mm)		GROOVE SIZE				RING SIZE									
			DIAMETER		WIDTH		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	0,8	+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	1,2		0.4	+0,05	0,6	1,2		0,3	±0,025	1		0.4	3	
JE-1,5	2,0	2,5	1,5	+0,06	0.5		0,8	1,5	-0,09	0,4		1.3	-0.25	0.6	4	
JE-2	2,5	3,2	2.0		0.5		1,0	2		0,4	±0,03	1.7		0.7	5	
JE-2,5	3,2	4,0	2,5		0.5		1,0	2,5		0,4		2.1		0.8	6	
JE-3	4,0	5,0	3,0		0.7		1,0	3		0,6		2.6		0.9	7	
JE-4	5,0	7,0	4,0	+0,075	0.7		1,2	4		0,6		3.5		1.1	9	
JE-5	6,0	8,0	5,0		0.7		1,2	5	-0,12	0,6		4.3	-0.30	1.2	11	±0,2
JE-6	7,0	9,0	6,0		0.9	+0,10	1,2	6		0,8	±0,04	5.2		1.4	12	
JE-7	8,0	11,0	7,0		0.9		1,5	7		0,8		6.1		1.6	14	
JE-8	9,0	12,0	8,0	+0,09	0.9		1,8	8	-0,15	0,8		6.9	-0.35	1.8	16	
JE-9	10,0	14,0	9,0		0.9		2,0	9		0,8		7.8		2.0	18	
JE-10	11,0	15,0	10,0		1.15		2,0	10		1,0	±0,05	8.7		2.2	20	
JE-12	13,0	18,0	12,0	+0,11	1.15	+0,14	2,5	12	-0,18	1,0		10.4		2.4	23	
JE-15	16,0	24,0	15,0		1.65		3,0	15		1,5	±0,06	13.0	-0.45	2.8	29	±0,3
JE-19	20,0	31,0	19,0	+0,13	1.65		3,5	19		1,5		16.5		4.0	37	
JE-24	25,0	38,0	24,0		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 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
JE	0,8-2,5	15N	79-82*
	3-9	30N	56.5-62
	10-24	C	37-43

*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
JE	0,8-2,5	15N	82.5-87
	3-9	30N	63-71
	10-24	C	44-53

ANSI Metric Tapered Section Retaining Rings/ Circlips

www.rotorclip.com

Axially Assembled, ANSI Metric Retaining Rings

MHO Page 104-107

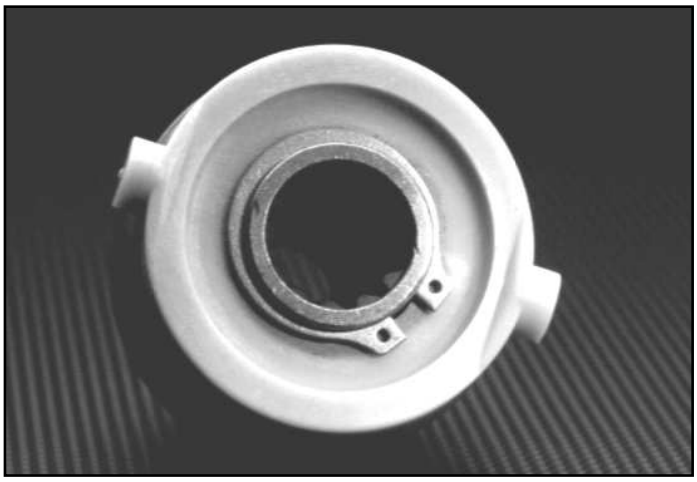
Internal ANSI Metric Housing ring. Once installed in the groove of a housing/bore, the portion of the ring protruding from the groove (also called a "shoulder") holds an assembly in place.

MSH Page 108-111

External ANSI Metric Shaft ring. 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.

MSR Page112-113

External ANSI Metric Shaft Reinforced ring. 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.



MSH ANSI Metric ring retaining the pinion gear of a starter motor.

Radially Assembled, ANSI Metric Retaining Rings

ME Page 114-115

External ANSI Metric E ring. 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

MC Page 116-117

External ANSI Metric Crescent ring. Ideal for low clearance applications where radial installation is preferred.

MRE Page 118-119

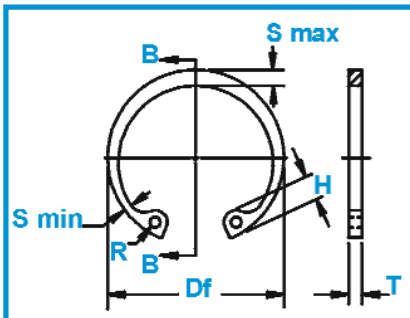
External ANSI Metric Reinforced E ring. The MRE retaining ring is a reinforced version of the ME ring, which will accommodate higher thrust loadings and RPM. MRE rings function in the same size grooves as regular E rings, so that you can change from one to the other without re-engineering the application.

FOR TOOLS SEE PAGE 157-168
FOR MATERIALS SEE PAGE 16
FOR FINISHES SEE PAGE 18
FOR PACKAGING SEE PAGE 5

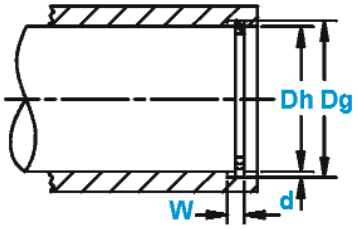
MHO Rings

Axially Assembled, Internal, ANSI Metric

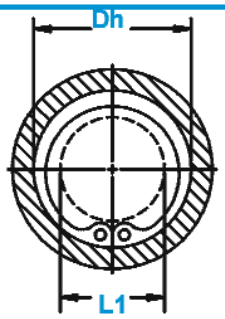
Once installed in the groove of a housing/bore, the shoulder holds an assembly in place.



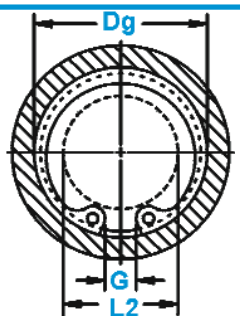
Free Diameter & Ring Measurements With Section B-B



Housing Diameter & Groove Dimensions



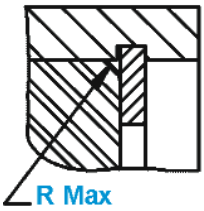
Clearance Diameter Compressed In Housing



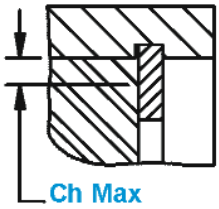
Clearance Diameter & Gap Width Released In Groove

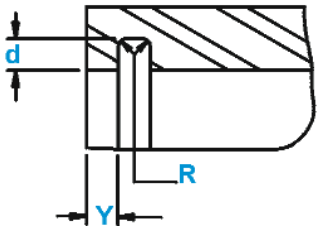
RING NO.	HOUSING DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD (kN) Sqr. corner abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wt. Per 1000 pcs.	Com-pressed in housing	Re-leased in Groove	Ring (Safety Factor of 4)	Groove (Safety Factor of 2)
	Ds mm	Ds 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		0.15	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	+0.20	0.15	1.40		1.20	42.15		1.3		3.0	28.0	30.4	46.0	26.4
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	1.75	+0.20	1.35	51.05	-0.65	1.6	±0.08	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

*** 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.**

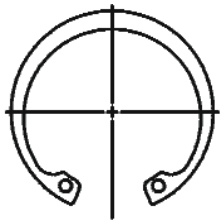


Allowable Corner Radius & Chamfer

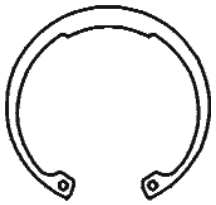




Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.10 for ring sizes -8 thru -17; 0.2 for ring sizes -18 thru -30; 0.3 for ring sizes -32 thru -55
0.4 for ring sizes -56 thru -250



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



Alternate Design (Manufacturer's Option)

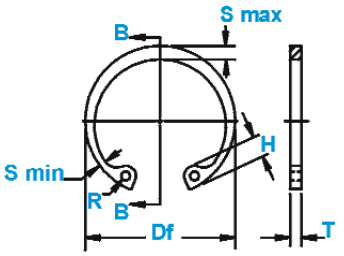
RING NO.	LUG HEIGHT	MAXIMUM SECTION	MINIMUM SECTION	HOLE DIAMETER	GAP WIDTH Ring in Groove	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max	EDGE MARGIN
	H nom	S max/Ref.	S min/Ref.	R min	G	R max	Ch max	P'r	Y
MHO-8	1.7	0.85	0.45	0.8	1.40	0.4	0.3	0.8	0.6
MHO-9	2.1	1.25	0.65	1.0	1.50	0.5	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
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

FOR HARDNESS SPECIFICATIONS, SEE END OF THE SECTION.

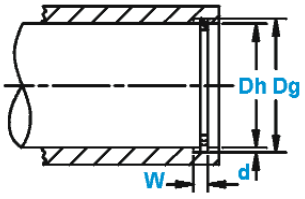
MHO Rings

Axially Assembled, Internal, ANSI Metric

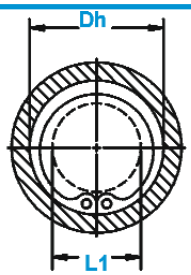
Once installed in the groove of a housing/bore, the shoulder holds an assembly in place.



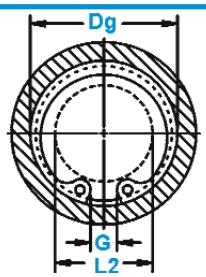
Free Diameter & Ring Measurements With Section B-B



Housing Diameter & Groove Dimensions



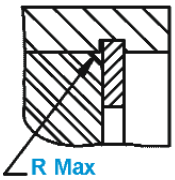
Clearance Diameter Compressed In Housing



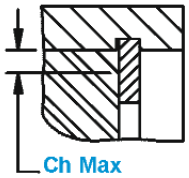
Clearance Diameter & Gap Width Released In Groove

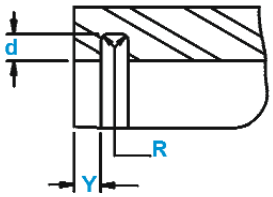
RING NO.	HOUSING DIAMETER		GROOVE SIZE						RING SIZE & WEIGHT					CLEARANCE DIA.		î THRUST LD (kN) Sqr. corner abutment	
			DIAMETER			WIDTH		DEPTH	FREE DIAMETER		THICKNESS***		Wt. Per 1000 pcs.	Com-pressed in housing	Re-leased in Groove	Ring (Safety Factor of 4)	Groove (Safety Factor of 2)
	Ds mm	Ds INCH	Dg	tol	F.I.M.*	W	tol	d	Df	tol	T	tol	kg	L1	L2	Pr	Pg
MHO-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	+0.20	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		0.20	2.55		2.10	75.70		2.4		15.9	52.0	56.2	156.0	82.0
MHO-70	70	2.756	74.40	+0.30	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
MHO-95	95	3.740	101.00		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		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		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.**

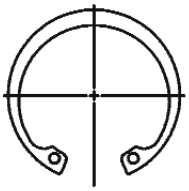


Allowable Corner Radius & Chamfer

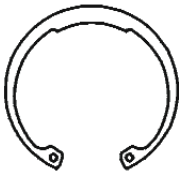




Exploded Groove Profile & Edge Margin (Y)
Maximum bottom radii (R), 0.10 for ring sizes -8 thru -17; 0.2 for ring sizes -18 thru -30; 0.3 for ring sizes -32 thru -55
0.4 for ring sizes -56 thru -250



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-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
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

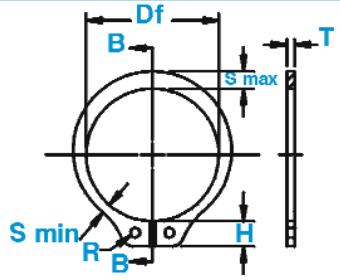
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

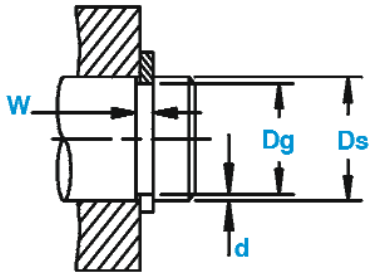
MSH Rings

Axially Assembled, External, ANSI Metric

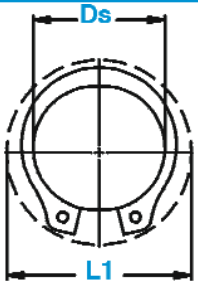
Once installed in the groove of a shaft, the shoulder holds an assembly in place.



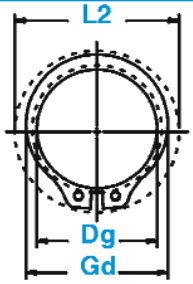
Free Diameter & Ring Measurements
Free Diameter & Ring Measurements With Section B-B



Shaft Diameter &
Shaft Diameter & Groove Dimensions



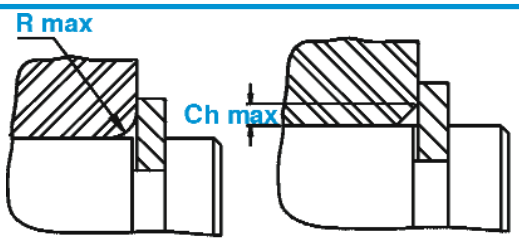
Clearance Diameter
Clearance Diameter Expanded Over Shaft



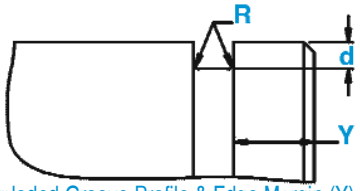
Clearance Diameter & Gaging Diameter Released In Groove

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		0.15	1.75		1.25	39.65		1.60		6.7	57.0	54.0	55.0	26.4
MSH-45	45	1.772	42.40		0.15	1.75		1.30	41.60		1.60		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	+0.35	1.60		7.3	60.0	56.8	59.0	30.4
MSH-48	48	1.890	45.20	-0.30	0.15	1.75	+0.20	1.40	44.40	-0.50	1.60	±0.08	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

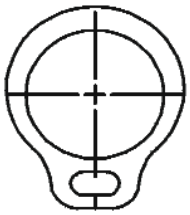
*SIZES -4 THRU -6 STANDARD MATERIAL- CARBON STEEL; OPTIONAL MATERIAL- BERYLLIUM COPPER.
** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & SHAFT.
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL.
FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST 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.



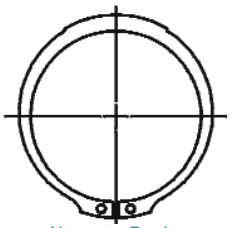
Allowable Corner Radius & Chamfer



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)

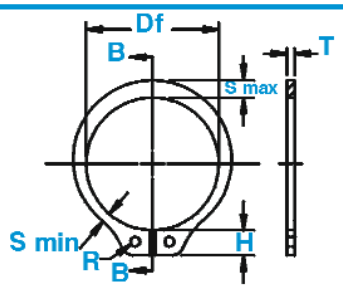
RING NO.	LUG HEIGHT	MAXIMUM SECTION	MINIMUM SECTION	HOLE DIAMETER	GAGING DIA.	ALLOWABLE CORNER RADII & CHAMFERS		MAX. LOAD w/ R max or Ch max (kN)	EDGE MARGIN	R.P.M. LIMITS Standard Material
	H nom	S max/Ref.	S min/Ref.	R min	Gd	R max	Ch max	P'r	Y	RPM
MSH-4*	1.35	0.65	0.40	0.6	4.90	0.35	0.25	0.2	0.3	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.

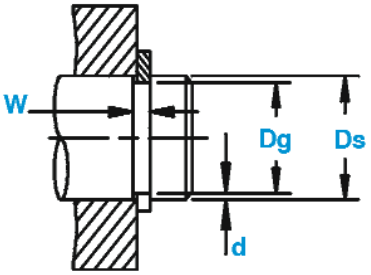
MSH Rings

Axially Assembled, External, ANSI Metric

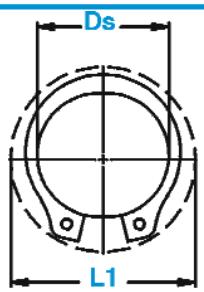
Once installed in the groove of a shaft, the shoulder holds an assembly in place.



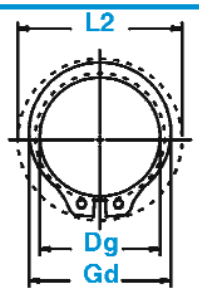
Free Diameter & Ring Measurements
Free Diameter & Ring Measurements With Section B-B



Shaft Diameter &
Shaft Diameter & Groove Dimensions



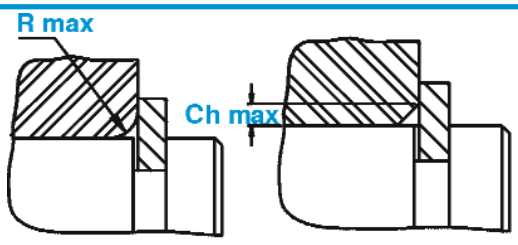
Clearance Diameter
Clearance Diameter Expanded Over Shaft



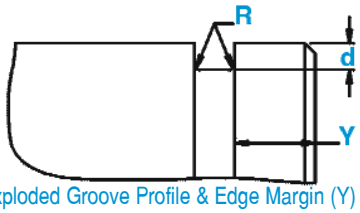
Clearance Diameter & Gaging Diameter Released In Groove

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		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	+0.35	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	-0.65	2.00	±0.08	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		1.80	64.60		2.40		19.3	88.1	83.9	136.0	62.0
MSH-72	72	2.835	68.30	-0.40	0.20	2.55	+0.20	1.85	66.60	+0.50	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	-0.75	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		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		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

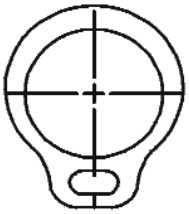
** F.I.M. (FULL INDICATOR MOVEMENT)- MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE & SHAFT.
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL.
FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
***FOR PLATED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



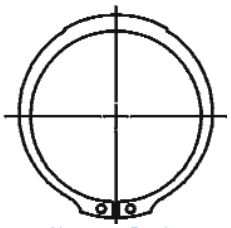
Allowable Corner Radius & Chamfer



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

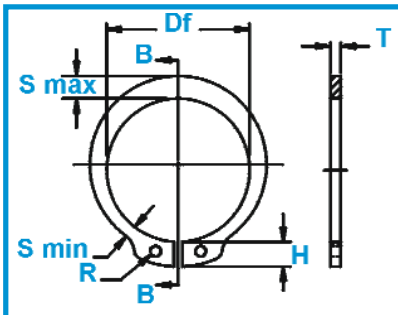
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

RING TYPE	SIZE RANGE	SCALE	ROCKWELL HARDNESS
MSH	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

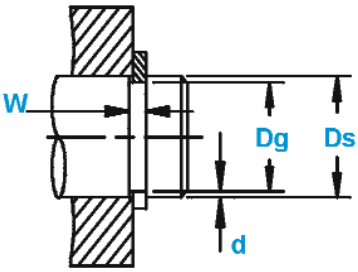
MSR Rings

Axially Assembled, External, ANSI Metric

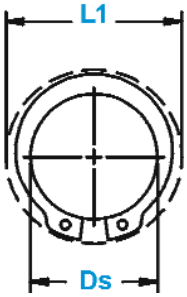
This heavy duty ring affords the user higher thrust load capacity due to its extra thickness and increased section height.



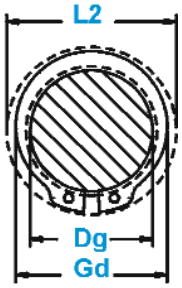
Free Diameter & Ring Measurements With Section B-B



Shaft Diameter & Groove Dimensions



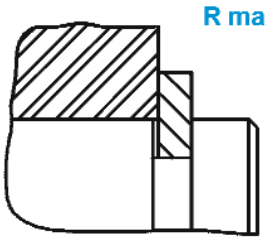
Clearance Diameter Expanded Over Shaft



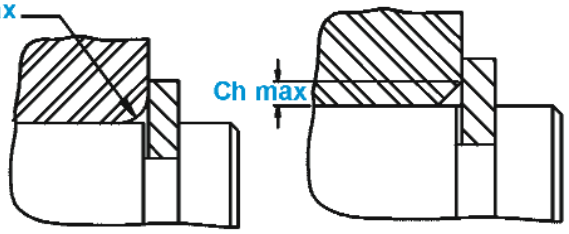
Clearance Diameter & Gaging Diameter Released In Groove

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

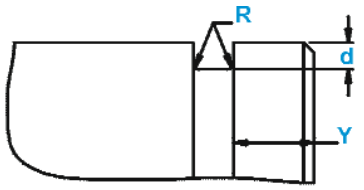
*** F.I.M.(FULL INDICATOR MOVEMENT)-MAXIMUM ALLOWABLE DEVIATION OF CONCENTRICITY BETWEEN GROOVE AND SHAFT.**
î BASED ON HOUSINGS/SHAFTS MADE OF COLD ROLLED STEEL. FOR AN EXPLANATION OF FORMULAS USED TO DERIVE THRUST LOAD AND OTHER PERFORMANCE DATA, CONTACT THE ROTOR CLIP ENGINEERING DEPARTMENT.
***** 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	13.2	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

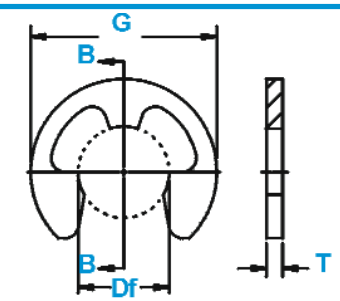
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

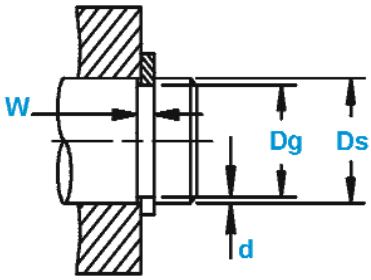
ME Rings

Radially Assembled, External, ANSI Metric

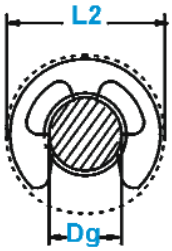
The three prongs of this ring make contact with the bottom of the groove for effective retention of an assembly.



Free Diameter & Ring Measurements With Section B-B



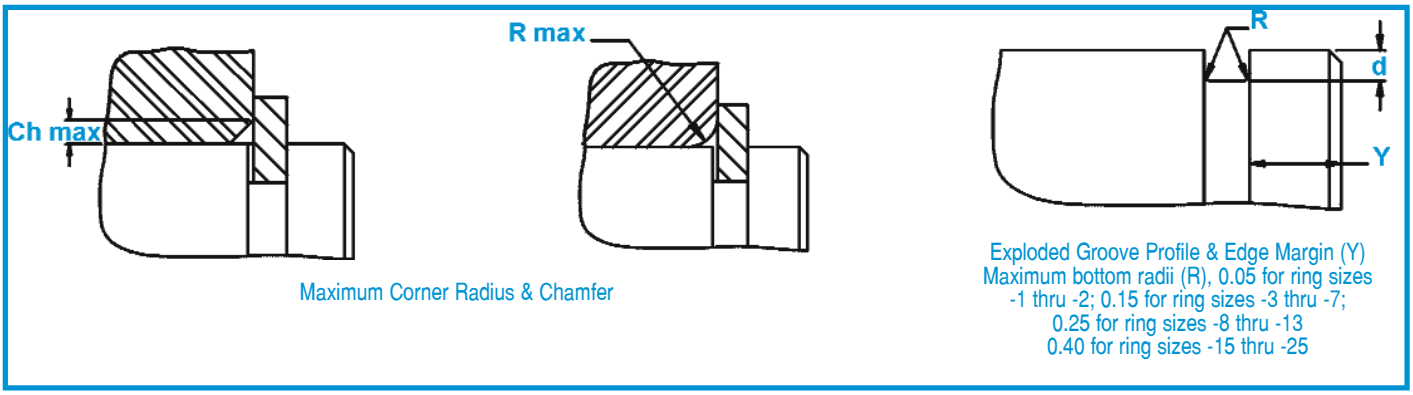
Shaft Diameter & Groove Dimensions



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 MAR-GIN	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 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
ME	1-3	15N	79-82*
	4-9	30N	56.5-68
	10-25	C	37-43

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

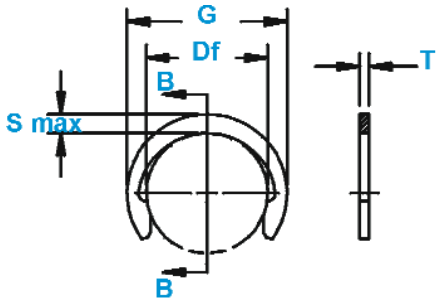
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

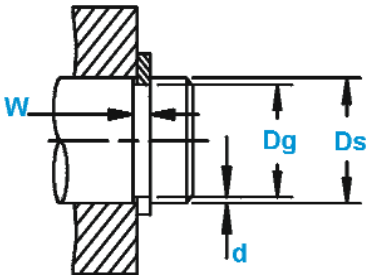
MC Rings

Radially Assembled, External, ANSI Metric

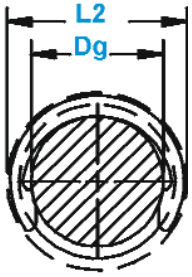
Ideal for low clearance applications where radial installation is preferred.



Free Diameter & Ring Measurements With Section B-B



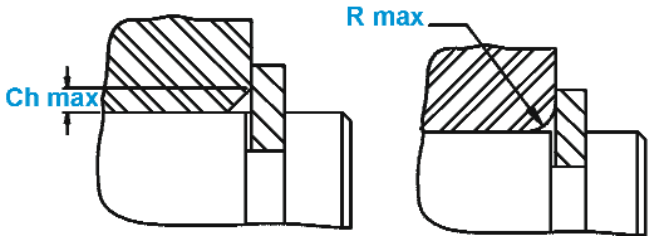
Shaft Diameter & Groove Dimensions



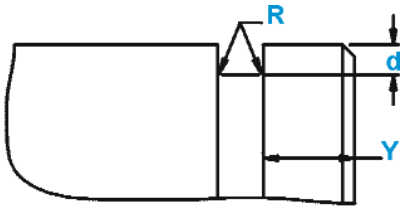
Clearance Diameter Installed In Groove

RING NO.	SHAFT DIAMETER		GROOVE SIZE DIAMETER			WIDTH		DEPTH	RING SIZE & WEIGHT FREE DIAMETER		THICKNESS***		Wt. Per 1000 Pcs.	CLEARANCE DIA. Free Out-Side Dia. Ref.	Re-leased In Groove	î THRUST LD (kN) Sqr. Corner Abutment 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	6.00		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 MARGIN	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

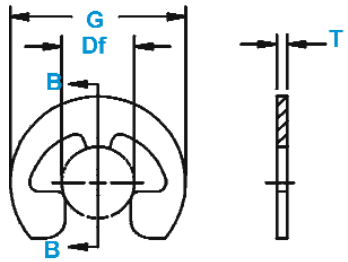
HARDNESS RANGES: CARBON STEEL RINGS (SAE 1060-1090)

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

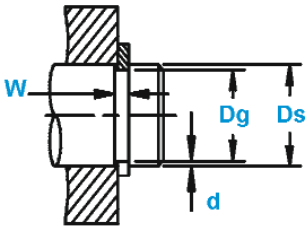
MRE Rings

Radially Assembled, External, ANSI Metric

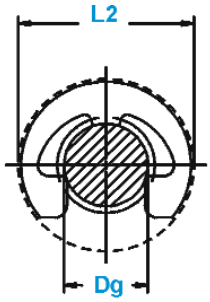
A reinforced version of the E ring wihch will accommodate higher thrust loadings and RPM.



Free Diameter & Ring Measurements With Section B-B



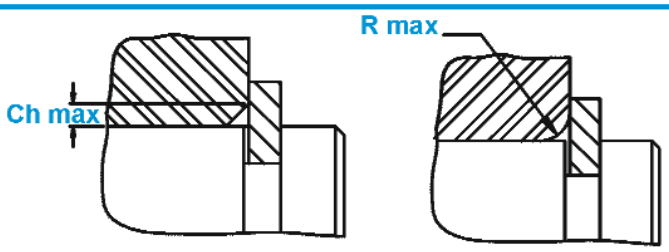
Shaft Diameter & Groove Dimensions



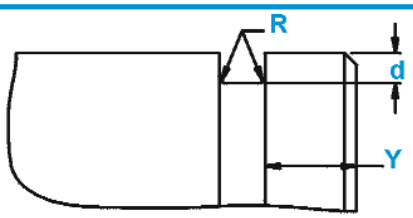
Clearance Diameter Installed in Groove

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

Inch Constant Section Retaining Rings/Circlips Internal/External

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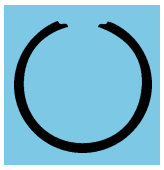
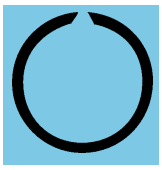
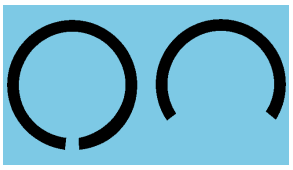


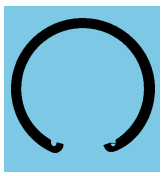
HN Page 125
Internal Constant Section Ring for Needle Bearings.
Cutoff Style E.



USC Page 130-131
External Constant Section Ring for Needle Bearings.
Cutoff Style C.

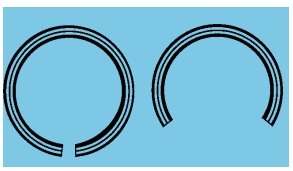


SLC/SLO
SHC/SHO Page 134
External Constant Section Ring, Square Section.
Cutoff Style H.

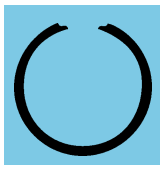


UHO Page 126-127
Internal Notched Constant Section Ring.
Cutoff Style A.

USH Page 132
External Notched Constant Section Ring.
Cutoff Style B.



RLC/RLO
RHC/RHO Page 135
External Constant Section Ring, Round Section.
Cutoff Style H.



UHB Page 128-129
Internal Constant Section Ring.
Cutoff Style E.

SNL Page 133
External Constant Section Ring for Needle Bearings.
Cutoff Style C.

Metric Constant Section Retaining Rings/Circlips Internal/External

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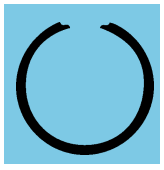
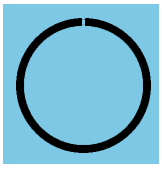


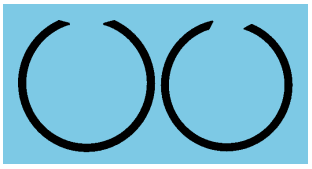
HBL, HBM, HBN
Page 136-137
Internal CS ring for SAE Standard Bearings (Metric Sizes).
Cutoff Style E.

CFS Page 140-141
External Constant Section Ring, Flat Wire, Metric Sizes.
Cutoff Style C & H.

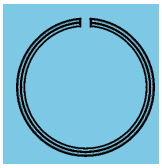


CBS Page 145
(DIN 5417)
External CS Ring for Bearings (Metric Sizes.)
Cutoff Style H.

SR Page 138
Internal Constant Section Ring for Needle Bearings.
Cutoff Style H.

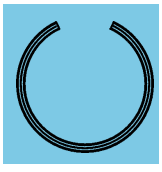


CFH Page 142-144
Internal Constant Section Ring, Flat Wire, Metric Sizes.



CRS Page 146
(DIN 7993)
External CS Ring, Round Wire, Metric.

SB Page 139
External CS Ring for SAE Standard Bearings (Metric Sizes).
Cutoff Style C.

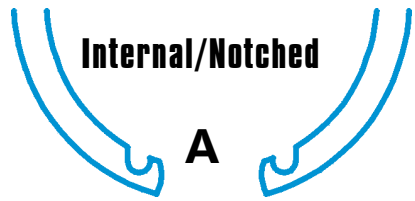


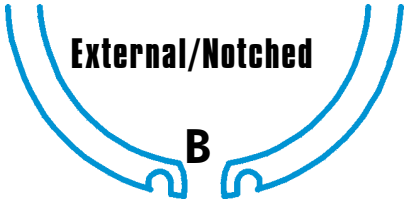
CRH Page 147
(DIN 7993)
Internal CS Ring, Round Wire, Metric.

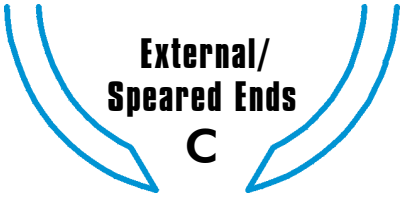
FOR TOOLS SEE PAGE 157-168
FOR MATERIALS SEE PAGE 16
FOR FINISHES SEE PAGE 18
FOR PACKAGING SEE PAGE 5

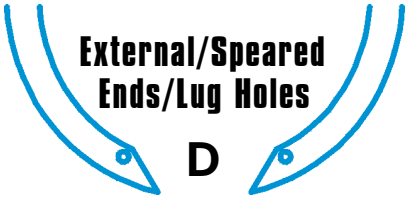
Constant Section Optional Cutoff Styles

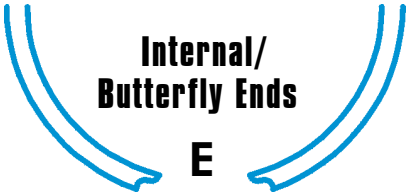
The following cutoff styles represent "specials" requested by the marketplace over a period of many years. One of these configurations may suit your application requirements and may be substitute d for any size ring listed in the catalog specification pages. Or, we can make any configuration your application requires. For more information, contact Rotor Clip technical sales: 1-800-557-6867, E-mail: tech@rotorclip.com.

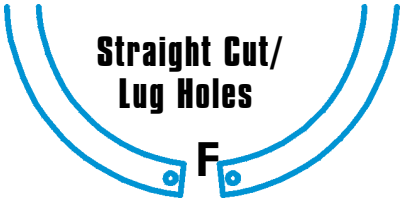


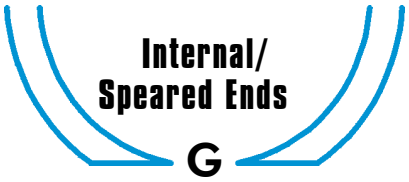


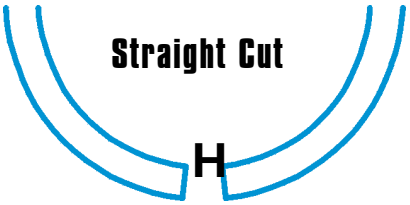


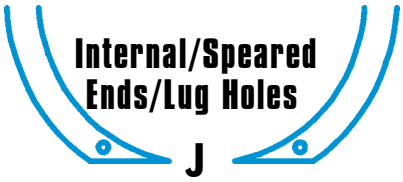


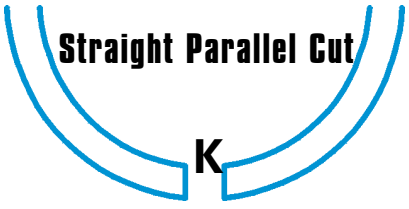


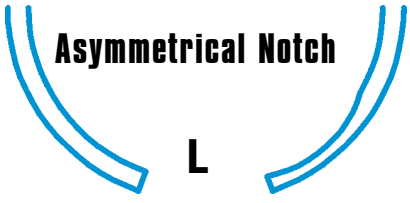


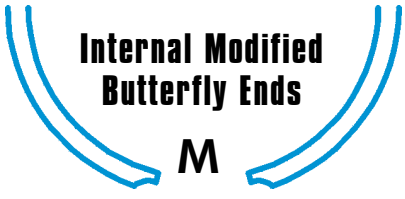


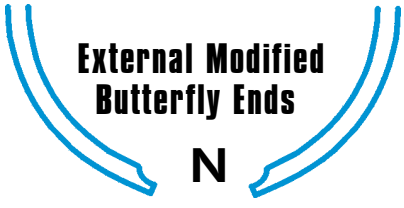












®"Kick-In" Feature

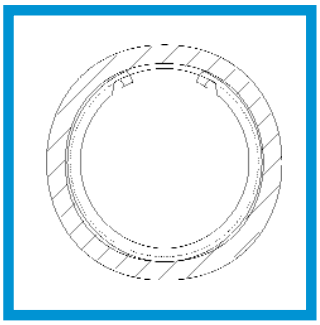
Constant Section retaining rings become elliptical when deformed making three-point contact with the groove (see drawing). Two of these contact points are the ends, which seat deeply into the groove making it extremely difficult to install/remove in an application.

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.

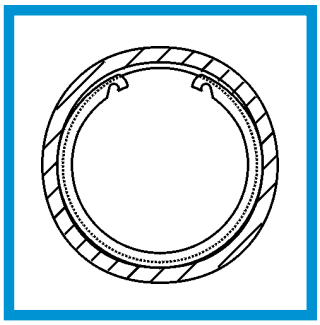
Rotor Clip's "kick-in/out" feature solves this problem. By kicking in the lugs, installation into a housing/bore (UHO) is much easier since the lugs are more accessible using a manual tool. The same is true for removing the ring.

By kicking out the lugs, installation onto a shaft (USH) is also easier due to the greater accessibility of the lugs.

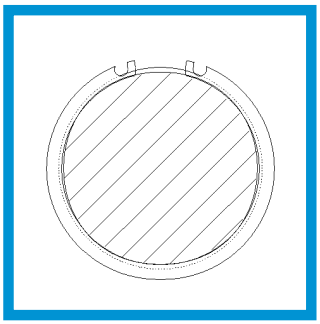
If you have any questions regarding this important feature, contact technical sales at 1-800-557-6867 (e-mail: tech@rotorclip.com).



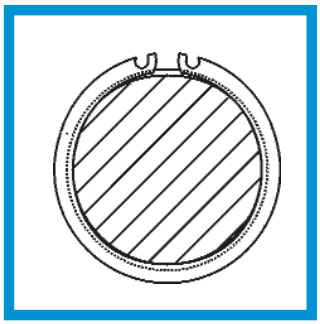
Internal (UHO) ring makes three-point contact with the groove of a housing.



"Kick in" feature renders lugs more accessible for easier installation and removal.



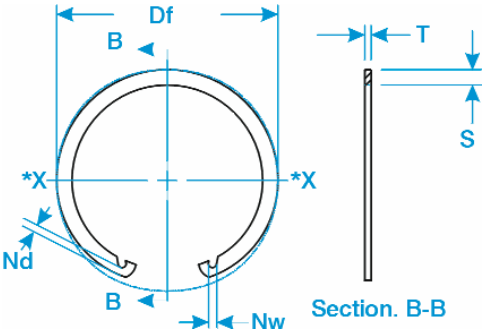
External (USH) ring makes three-point contact with the groove of a shaft.

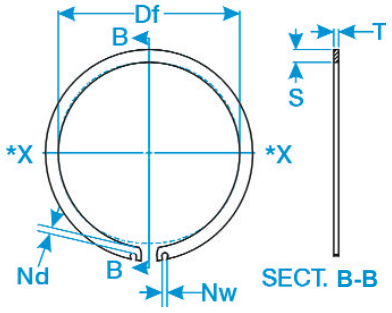


"Kick out" feature makes lugs more accessible for easier installation and removal.

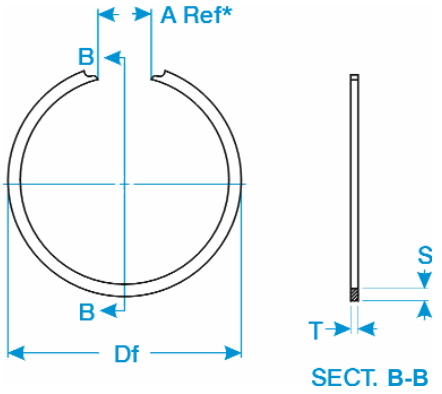
Inspection Procedures Constant Section Rings

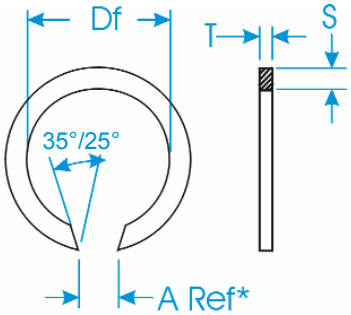
Measure the ring for the parameters indicated and compare them to the dimensions listed in the specification pages for that particular ring. **NOTE: ALL DIMENSIONS ARE TAKEN IN THE FREE STATE EXCEPT FOR THE GAP, WHICH IS MEASURED ONCE THE RING IS INSTALLED.**





*Df measured in this direction only.





*These dimensions are measured with the ring installed in the groove.

FOR MORE INFORMATION OR TECHNICAL ASSISTANCE,

CALL

1-800-557-6867

OR E-MAIL YOUR REQUEST TO:

tech@rotorclip.com

Standard material for Rotor Clip retaining rings is carbon spring steel (SAE 1060-1090/UNS G10600-G 10900). It is also possible to manufacture parts from pre-hardened wire. Consult Rotor Clip technical sales for more information on this option.

CARBON SPRING STEEL is known for its high strength and reliability and retaining ring applications offering the following advantages:

1. **High Strength** — the heat treating process assures the rings are wear resistant.

2. **Ductility** — the heat treating process also assures the spring characteristic of the ring, enabling it to return to its original shape after it is deformed.

3. **Corrosion Protection Option** — it is possible to apply a finish to carbon steel for corrosion resistance (see below).

FINISHES

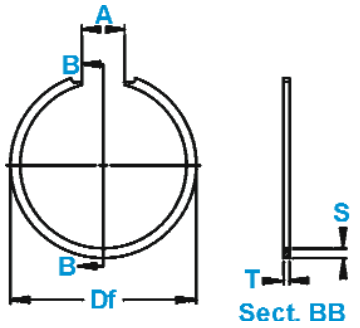
Corrosion protection is available for all Rotor Clip Constant Section rings. However, the most suitable finish for your applications depends upon the material you intend to use as well as the geometry of the part. We advise that you direct any finishing questions to our technical sales department before selecting a ring.

TOOLS

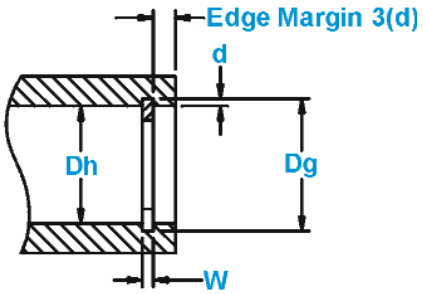
Rotor Clip ratchet pliers feature interchangeable tips to fit rings with "speared" ends.

For information on how to install all other Rotor Clip constant section rings, contact our technical sales department.

HN Constant Section



Free Diameter & Ring
Measurement with Section B-B



Housing Diameter &
Groove Dimensions

Material SAE 1060-1075

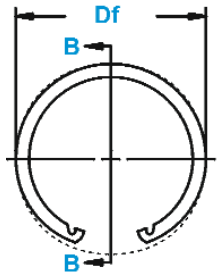
RING SIZE	HOUSING DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION		FREE GAP		
	Dh DEC	Dh FRACT.	Dh mm	Dg	TOL.	W	d	Df	TOL.	T ±.002	S	TOL.	A Min	A Max	
HN-112	1.125	1-1/8	28.58	1.181	±.005	.046 +.003 -.000	.028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

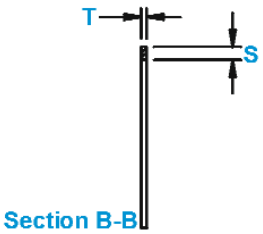
Hardness: All Ring Sizes-HRC 42-52

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

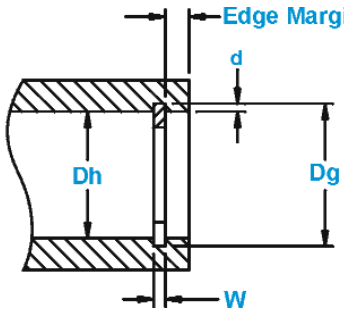
UHO Constant Section

Internal, Notched

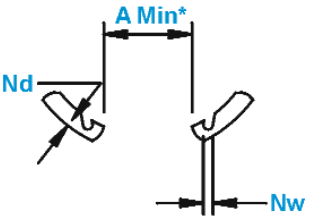




Free Diameter & Ring Measurement With Section B-B



Housing Diameter & Groove Dimensions



Material SAE 1060-1075

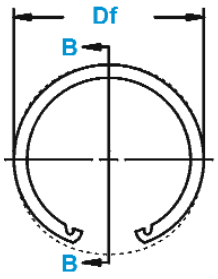
*Ring installed in groove

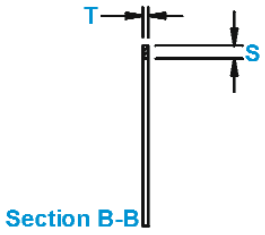
RING SIZE	HOUSING DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION	GAP	NOTCH DIMENSIONS		
	Dh DEC	Dh FRACT.	Dh mm	Dg	TOL.	W	d	Df	TOL.	T +/-.002	S +/-.005	A Min*	DEPTH Nd +0/-.030	WIDTH Nw REF	
UHO-175	1.750	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	.062	.156	.420	.078	.093	5350
UHO-206	2.047	-	52.0	2.171			.062	2.201	-.000	.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			.08	2.868	+.080	.093	.188	.530	.093	.093	10900
UHO-268	2.688	2-11/16	68.3	2.848			.08	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	.1	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.**

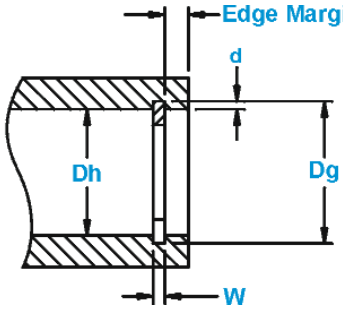
Hardness: All Ring Sizes-HRC 45-52

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

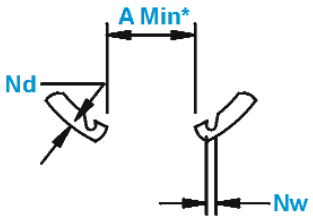




Free Diameter & Ring
Measurement With Section B-B



Housing Diameter &
Groove Dimensions



Material SAE 1060-1075

*Ring installed in groove

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	.12	4.300		.109	.250	.810	.125	.125	24430
UHO-412	4.125	4-1/8	104.8	4.365		-.000	.12	4.430		.109	.250	.810	.125	.125	25190
UHO-425	4.250	4-1/4	108.0	4.490			.12	4.555		.109	.250	.810	.125	.125	25960
UHO-433	4.331	-	110.0	4.571			.12	4.641		.109	.250	.810	.125	.125	26450
UHO-450	4.500	4-1/2	114.3	4.740			.12	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			.22	10.365		.187	.500	1.620	.250	.187	10900
UHO-100(	10.000	10	254.0	10.450			.225	10.630		.187	.500	1.750	.250	.187	114600

*Installed In Groove.

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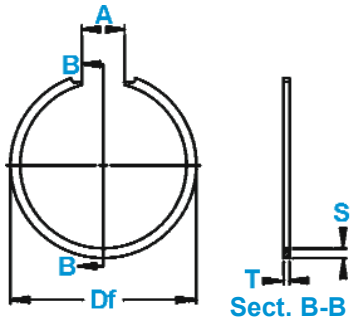
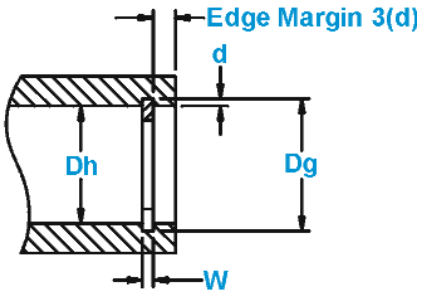
UHB Constant Section



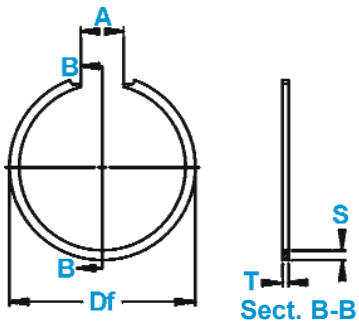
Free Diameter & Ring
Measurement with Section B-B



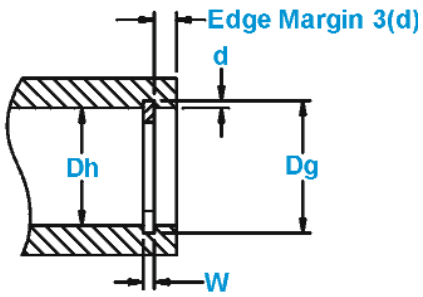
Housing Diameter &
Groove Dimensions

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 -	.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		-.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	+/-.005		.040	1.668		.062	.125		.437	.687	3060
UHB-162	1.625	1-5/8	41.3	1.709			.042	1.736		.062	.141		.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			.044	1.804		.062	.156		.437	.687	3370
UHB-175	1.750	1-3/4	44.4	1.842			.046	1.870		.062	.156		.437	.687	3510
UHB-181	1.812	1-13/16	46.0	1.904		.068	.046	1.933		.062	.156		.437	.687	3640
UHB-185	1.850	-	47.0	1.946		+.004	.048	1.975		.062	.156		.437	.687	3710
UHB-187	1.875	1-7/8	47.6	1.971		-.000	.048	2.000		.062	.156		.437	.687	3760
UHB-193	1.938	1-15/16	49.2	2.038			.050	2.068		.062	.156		.500	.750	3870
UHB-196	1.968	1-31/32	50.0	2.068			.050	2.098		.062	.156		.500	.750	3935
UHB-200	2.000	2	50.8	2.100			.050	2.131		.062	.156		.500	.750	4000
UHB-206	2.062	2-1/16	52.4	2.166			.052	2.197	+.046	.062	.156		.500	.750	4380
UHB-212	2.125	2-1/8	54.0	2.229			.052	2.260	-.000	.078	.156	+/-.005	.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		.078	.171		.500	.750	5630
UHB-231	2.312	2-5/16	58.7	2.424		+.005	.056	2.459		.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		.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	+.062	.093	.187		.562	.812	8950
UHB-281	2.812	2-13/16	71.4	2.945		-.000	.066	2.985	-.000	.093	.187		.625	.875	9100
UHB-283	2.835	-	72.0	2.966			.066	3.006		.093	.187		.625	.875	9250



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	
UHB-287	2.875	2-7/8	73.0	3.011		.103 +.005 -.000	.068	3.056		.093	.187		.625	.875	9400
UHB-300	3.000	3	76.2	3.136			.068	3.181	+.062 -.000	.093	.187		.625	.875	9550
UHB-306	3.062	3-1/16	77.8	3.202			.070	3.247		.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		.120 +.006 -.000	.072	3.442		.109	.218		.718	1.062	11120
UHB-334	3.346	3-11/32	85.0	3.490			.072	3.539		.109	.218		.718	1.062	11450
UHB-346	3.469	3-15/32	88.1	3.613			.072	3.663		.109	.218		.718	1.062	11870
UHB-350	3.500	3-1/2	88.9	3.648			.074	3.700		.109	.250		.718	1.062	11970
UHB-354	3.543	-	90.0	3.691			.074	3.745		.109	.250		.718	1.062	12120
UHB-356	3.562	3-9/16	90.5	3.710	+/-.006		.074	3.766	+.078 -.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
UHB-387	3.875	3-7/8	98.4	4.027			.076	4.089		.109	.250		.718	1.062	12820
UHB-393	3.938	3-15/16	100.0	4.094			.078	4.156		.109	.250		.718	1.062	13230
UHB-400	4.000	4	'101.6	4.156		.120 +.006 -.000	.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			.080	4.485		.109	.250		.875	1.312	14540
UHB-433	4.331	-	110.0	4.490			.080	4.565	+.093 -.000	.109	.250	+/-.005	.875	1.312	14960
UHB-443	4.436	4-7/16	112.7	4.596			.080	4.670		.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	.25		.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 +.006 -.000	.095	5.660		.125	.312		1.000	1.500	21110
UHB-550	5.500	5-1/2	139.7	5.696	+/-.007		.098	5.796	+.125 -.000	.125	.312		1.000	1.500	21790
UHB-575	5.750	5-3/4	146.0	5.950			.100	6.050		.125	.312		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 +.006 -.000	.106	6.832		.156	.343		1.125	1.812	30610
UHB-662	6.625	6-5/8	168.3	6.845			.110	6.975	+.156 -.000	.156	.343		1.125	1.812	31400
UHB-675	6.750	6-3/4	171.4	6.970			.110	7.100		.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 +.006 -.000	.145	8.665		.187	.437		1.625	2.500	43320
UHB-850	8.500	8-1/2	215.9	8.790			.145	8.915	+.187 -.000	.187	.437		1.625	2.500	44710
UHB-875	8.750	8-3/4	222.2	9.080			.165	9.205		.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

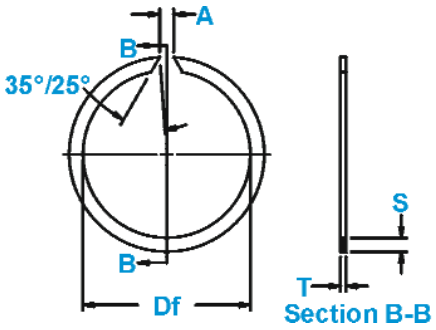
*Installed In Groove.

Material: SAE 1060/1075 carbon spring steel		
Hardness:	Ring Size	HRc
	125-700	42-52
	725-1000	40-47

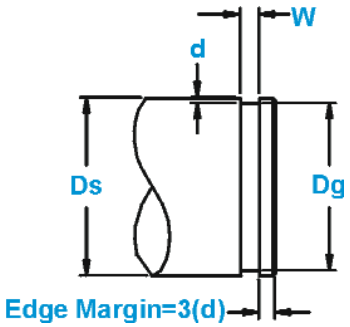
NOTE: Rotor Clip can produce any size ring you require. Call Technical Sales- 1-800-557-6867.

USC Constant Section

External, for Needle Bearings



Free Diameter & Ring Measure

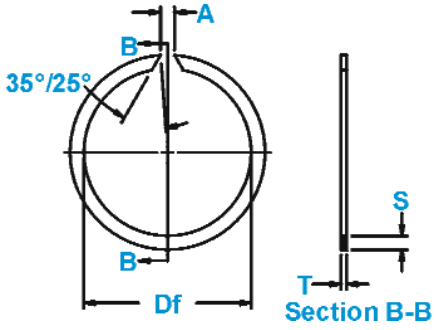


Shaft Diameter & Groove Dimensions

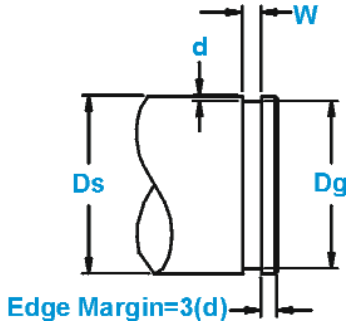
Material: SAE 1060-1075

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	+/-.003	.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		.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	11.125	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			.026	1.121		.050	.093		.156	.312	1990
USC-125	1.250	1-1/4	31.75	1.194		.056	.028	1.179		.050	.093		.156	.312	2090
USC-131	1.312	1-5/16	33.32	1.25		+.004	.031	1.232		.050	.093		.156	.312	2100
USC-137	1.375	1-3/8	34.93	1.309		-.000	.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
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	+/-.004		.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			.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	+/-.005	.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	+/-.006	+.005	.055	2.235		.078	.187		.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

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



Free Diameter & Ring Measurement



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 +/-.005	TOL.	A Min*	A Max	
USC-262	2.625	2-5/8	66.70	2.505		.086	.060	2.475	+.000	.078	.187		.156	.375	6800
USC-268	2.688	2-11/16	68.30	2.565		+.005-.000	.061	2.535	-.046	.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			.070	2.830	+.000	.093	.218		.187	.437	9230
USC-306	3.062	3-1/16	77.80	2.920		.103	.071	2.890	-.062	.093	.218		.187	.437	9420
USC-312	3.125	3-1/8	79.40	2.981		+.005	.072	2.951		.093	.218		.187	.437	9630
USC-315	3.156	3-5/32	80.20	3.010		-.000	.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
USC-350	3.500	3-1/2	88.9	3.340	+/-.006		.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	6.576			.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	+/-.005	.250	.656	13650
USC-425	4.250	4-1/4	108.0	4.066			.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		.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		.125	.375		.250	.750	23625
USC-600	6.000	6	152.4	5.746			.127	5.687		.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	+.000	.156	.437		.250	.750	33760
USC-675	6.750	6-3/4	171.4	6.466		+.008	.142	6.386	-.125	.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

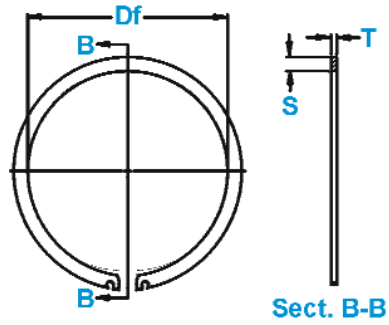
*Installed In Groove.

Material: SAE 1060/1075 carbon spring steel		
Hardness:	Ring Size	HRc
	137-700	42-53
	725-1000	40-47

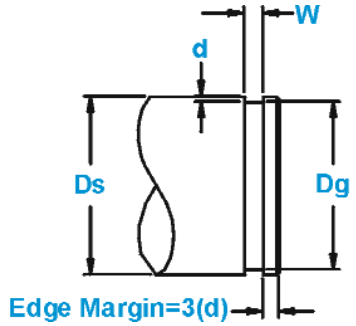
NOTE: Rotor Clip can produce any size ring you require. Call Technical Sales- 1-800-557-6867.

USH Constant Section

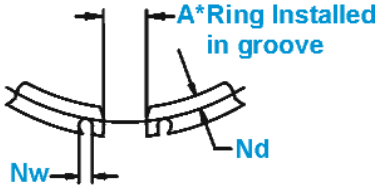
External, Notched



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

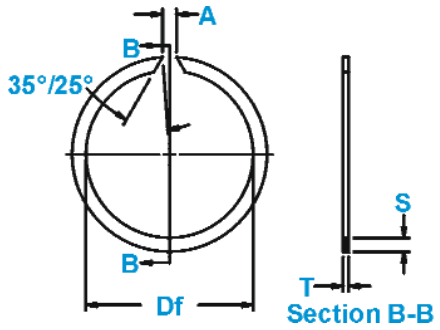
*Installed In Groove.

Material: SAE 1060/1075 carbon spring steel		
Hardness:	ALL Ring Sizes	HRc 47-53

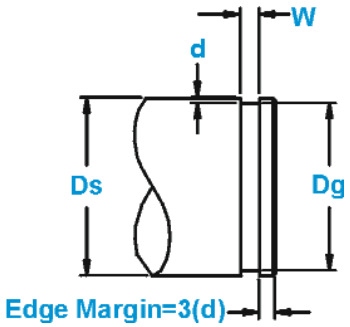
NOTE: Rotor Clip can produce any size ring you require. Call Technical Sales- 1-800-557-6867.

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

SNL Constant Section



Free Diameter &
Ring Measurements



Shaft Diameter &
Groove Dimensions

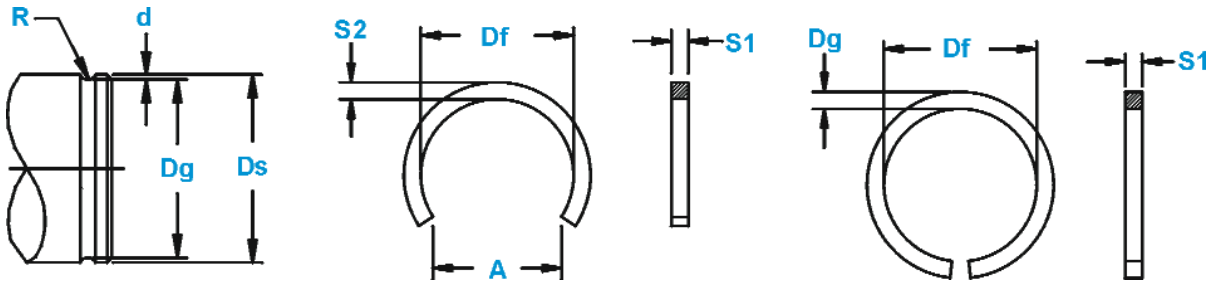
Material: SAE 1060-1075

RING SIZE	SHAFT DIAMETER			GROOVE SIZE				RING DIMENSIONS							ALLOWABLE STATIC THRUST LOAD (Lbs.)
				DIAMETER		WIDTH	DEPT	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	1.06		.042	.125		.125	.281	1600
SNL-118	1.187	1-3/16	30.15	1.135			.026	1.12	+.000	.042	.125		.125	.281	1700
SNL-125	1.250	1-1/4	31.75	1.194			.028	1.17	-.031	.042	.125		.125	.281	1800
SNL-131	1.312	1-5/16	33.32	1.252		.046	.030	1.23		.042	.125		.125	.281	1900
SNL-137	1.375	1-3/8	34.93	1.309		+.003	.033	1.28		.042	.125		.125	.281	2010
SNL-143	1.437	1-7/16	36.50	1.369	±.004	-.000	.034	1.34		.042	.125		.125	.281	2120
SNL-150	1.500	1-1/2	38.10	1.430			.035	1.41		.042	.125		.125	.281	2260
SNL-162	1.625	1-5/8	41.28	1.545			.040	1.52		.042	.156		.156	.437	2800
SNL-168	1.687	1-11/16	42.85	1.607			.040	1.58		.042	.156		.156	.437	2900
SNL-175	1.750	1-3/4	44.45	1.670			.040	1.64		.042	.156		.156	.437	3000
SNL-193	1.937	1-15/16	49.20	1.857			.040	1.83	+.000	.042	.156	±.005	.156	.437	3100
SNL-200	2.000	2	50.80	1.920			.040	1.89	-.062	.042	.156		.156	.437	3200
SNL-218	2.187	2-3/16	55.55	2.107			.040	2.08		.042	.156		.156	.437	3400
SNL-225	2.250	2-1/4	57.15	2.170			.040	2.14		.042	.156		.156	.437	3500
SNL-237	2.375	2-3/8	60.33	2.295			.040	2.27		.042	.156		.156	.437	3600
SNL-250	2.500	2-1/2	63.50	2.420			.040	2.39		.042	.156		.156	.437	3650
SNL-275	2.750	2-3/4	69.85	2.626			.062	2.59		.062	.187		.156	.468	5790
SNL-293	2.937	2-15/16	74.60	2.813			.062	2.78		.062	.187		.156	.468	6150
SNL-300	3.000	3	76.20	2.876	±.006	.068	.062	2.84	+.000	.062	.187		.156	.468	6250
SNL-312	3.125	3-1/8	79.38	3.000		+.004	.062	2.96	-.078	.062	.187		.156	.468	6400
SNL-325	3.250	3-1/4	82.55	3.125		-.000	.062	3.09		.062	.187		.156	.468	6500
SNL-337	3.375	3-3/8	85.73	3.250			.062	3.21		.062	.187		.156	.468	6600
SNL-350	3.500	3-1/2	88.90	3.375			.062	3.34		.062	.187		.156	.468	6700
SNL-375	3.750	3-3/4	95.25	3.610			.070	3.57		.078	.218		.187	.562	8800
SNL-400	4.000	4	101.60	3.860		.086	.070	3.82		.078	.218		.187	.562	9000
SNL-425	4.250	4-1/4	107.95	4.110		+.005	.070	4.07	+.000	.078	.218		.187	.562	9200
SNL-450	4.500	4-1/2	114.30	4.360		-.000	.070	4.32	-.093	.078	.218		.187	.562	9400
SNL-475	4.750	4-3/4	120.65	4.610			.070	4.56		.078	.218		.187	.562	9200
SNL-500	5.000	5	127.00	4.860			.070	4.80		.078	.218		.187	.562	9000
SNL-550	5.500	5-1/2	139.70	5.340		.103	.080	5.28		.093	.250		.218	.750	13000
SNL-600	6.000	6	152.40	5.840		+.005	.080	5.77	+.000	.093	.250		.218	.750	9000
SNL-650	6.500	6-1/2	165.10	6.340		-.000	.080	6.27	-.125	.093	.250		.218	.750	7500
SNL-700	7.000	7	177.80	6.840	±.008		.080	6.76		.093	.250		.218	.750	6100
SNL-750	7.500	7-1/2	190.50	7.320		.120	.090	7.24	+.000	.109	.281		.218	.812	
SNL-800	8.000	8	203.24	7.820		+.005 -.000'	.090	7.74	-.156	.109	.281		.218	.812	

Hardness: All Ring Sizes - HRC 42-52

SHC/SLC - SHO/SLO Constant Section

External, Square Section



Shaft Diameter & Groove Dimensions

Free Diameter & Ring Measurements

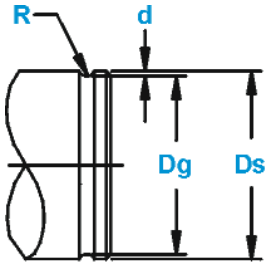
Material: SAE 1060-1075

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

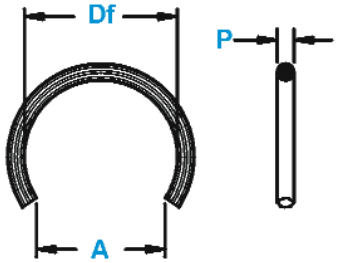
*NOTE: H=HEAVY; L=LIGHT
Hardness: All Ring Sizes - 46-53

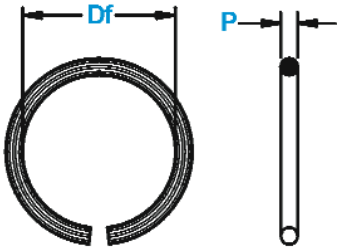
For alternate cutoff styles, contact Rotor Clip Technical Sales at 1-800-557-6867 (E-mail: tech@rotorclip.com)

RHC/RLC - RHO/RLO Constant Section



Shaft Diameter & Groove Dimensions





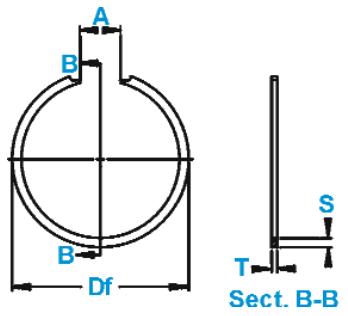
Free Diameter & Ring Measurement

RING NUMBER		SHAFT DIAMETER		GROOVE SIZE				RING DIMENSIONS			
				DIAMETER		WIDTH	DEPTH	FREE DIAMETER		SECTION	FREE GAP
CLOSED*	OPEN*	Ds DEC	Ds mm	Dg	TOL.	W	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

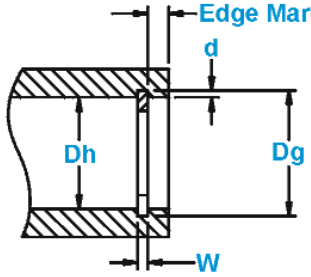
*NOTE: H=HEAVY; L=LIGHT
Hardness: All Ring Sizes - HRC 46-53

HBL/HBM/HBH Constant Section

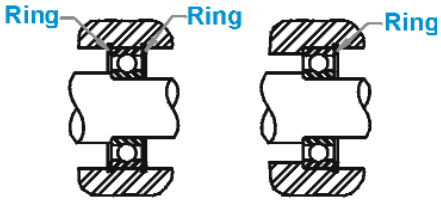
Internal, for SAE Standard Bearings (Metric Sizes)



Free Diameter & Ring Measurement with Section B-B



Housing Diameter & Groove Dimensions

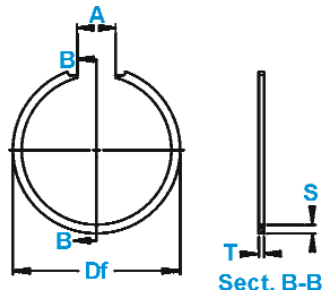


Ring Depicted retaining outer race of bearing in two directions (left) and in one direction (right).

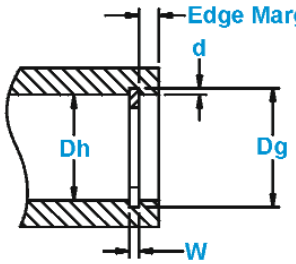
Material: SAE 1060-1075

RING NUMBER	BEARING NUMBER			HOUSING		GROOVE SIZE					RING DIMENESIONS					
						DIAMETER		WIDTH		DEPTH	FREE		THICKNESS	SECTION		FREE GAP at Min. Df
	LIGHT	MED.	HEAVY	Dh DEC	Dh mm	Dg	TOL.	W	TOL.	d	Df	TOL.	T ±.002	S	TOL.	A min.
HBL-30	200			1.181	29.93	1.24		.035		.031	1.265		.031	.100	±.003	
HBM-30				1.181	29.93	1.25		.046		.036	1.265		.042	.125	±.005	
HBH-30				1.181	29.93	1.25		.068		.035	1.271		.062	.109	±.003	
HBL-32	201			1.259	31.93	1.32		.035		.031	1.349	+.031	.031	.100		.375
HBM-32				1.259	31.93	1.33		.046		.036	1.343	-.000	.042	.125	±.005	+.080
HBH-32				1.259	31.93	1.32		.068		.035	1.365		.062	.109	±.003	-.000
HBL-35	202			1.378	34.92	1.44		.035		.031	1.468		.031	.100		
HBM-35		300		1.378	34.92	1.45		.046		.036	1.468		.042	.125	±.005	
HBH-35				1.378	34.92	1.45		.068		.040	1.486		.062	.140		
HBL-37				1.456	36.92	1.51	±.005	.035		.031	1.546		.031	.100	±.003	
HBM-37		301		1.456	36.92	1.52		.046		.036	1.546		.042	.125		
HBH-37				1.456	36.92	1.53		.068		.040	1.564		.062	.140		
HBL-40	203			1.574	39.91	1.65		.046		.040	1.687		.042	.125		
HBM-40				1.574	39.91	1.66		.046		.047	1.703		.042	.156		
HBH-40				1.574	39.91	1.66		.068		.047	1.703		.062	.156		
HBL-42				1.653	41.90	1.73		.046		.040	1.765		.042	.125		
HBM-42		302		1.653	41.90	1.74		.046		.047	1.781	+.046	.042	.156		.437
HBH-42				1.653	41.90	1.74		.062		.047	1.781	-.000	.062	.156		+.093
HBL-47	204			1.850	46.89	1.93		.046		.040	1.968		.042	.125		-.000
HBM-47		303		1.850	46.89	1.94		.046		.047	1.968		.042	.156		
HBH-47				1.850	46.89	1.95		.068		.050	1.976		.062	.172		
HBL-52	205			2.047	51.88	2.13		.046	+.004	.045	2.171		.042	.156		
HBM-52		304		2.047	51.88	2.14		.046	-.000	.047	2.171		.042	.156		
HBH-52				2.047	51.88	2.14		.068		.050	2.179		.062	.172		
HBL-62	206			2.440	61.86	2.53		.068		.045	2.562		.062	.156	±.005	
HBM-62		305		2.440	61.86	2.54		.068		.052	2.562		.062	.156		
HBH-62			403	2.440	61.86	2.56		.103		.062	2.593		.093	.187		
HBL-72	207			2.834	71.83	2.93	±.006	.068		.050	2.968		.062	.156		
HBM-72		306		2.834	71.83	2.95		.068		.062	2.984		.062	.187		
HBH-72			404	2.834	71.83	2.95		.103		.062	3.000		.093	.187		.562
HBL-80	208			3.149	79.82	3.24		.068		.050	3.281	+.062	.062	.156		+.093
HBM-80		307		3.149	79.82	3.27		.068		.062	3.296	-.000	.062	.187		-.000
HBH-80			405	3.149	79.82	3.27		.103		.062	3.312		.093	.218		
HBL-85	209			3.346	84.81	3.44		.068		.050	3.484		.062	.156		
HBM-85				3.346	84.81	3.47		.068		.062	3.500		.062	.187		
HBH-85				3.346	84.81	3.47		.103		.062	3.500		.093	.218		

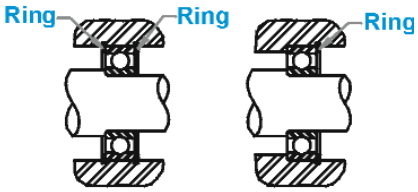
For alternate cutoff styles, contact Rotor Clip Technical Sales at 1-800-557-6867 (E-mail: tech@rotorclip.com)



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

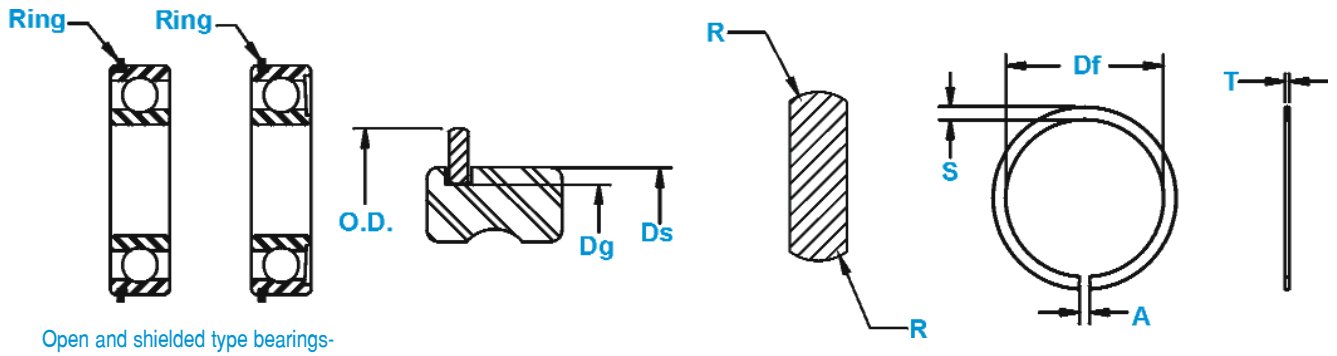
RING NUMBER	BEARING NUMBER			HOUSING		GROOVE SIZE						RING DIMENESIONS						
						DIAMETER		WIDTH		DEPT		FREE		THICKNESS	SECTION			FREE GAP at Min. Df
	LIGHT	MED.	HEAV	Dh DEC	Dh mm	Dg	TOL.	W	TOL.	d		Df	TOL.	T ±.002	S	TOL.		A min.
HBL-30	200			1.1811	29.93	1.243		.035		.031		1.265		.031	.100	±.003		
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	+.04	.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	+.00	.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	+.06	.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			

RING NUMBER	BEARING NUMBER			HOUSING		GROOVE SIZE						RING DIMENESIONS						
						DIAMETER		WIDTH		DEPT		FREE		THICKNESS	SECTION			FREE GAP at Min. Df
	LIGHT	MED.	HEAV	Dh DEC	Dh mm	Dg	TOL.	W	TOL.	d		Df	TOL.	T ±.002	S	TOL.		A min.
HBL-90	210			3.5433	89.79	3.643		.103		.050		3.68		.093	.156			

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

SR Constant Section

External, For Grooves In Outer Tracks of Ball or Roller Bearings



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

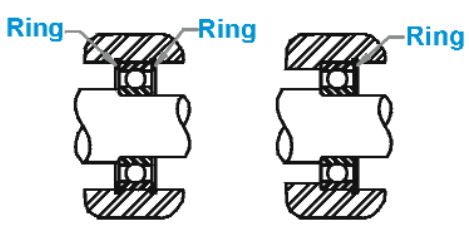
RING NUMBER	SHAFT		BEARING NUMBER				GROOVE SIZE			RING DIMENSIONS								WEIGHT PER M (lbs.)
							DIAMETER		ASSEMBLED	FREE DIAMETER		THICKNESS		SECTION		FREE GAP	Radius	
	Ds mm	Ds DEC.	EXTRA LIGHT	LIGHT	MED.	HEAVY	Dg	TOL.	O.D.	Df	TOL.	T	TOL.	S	TOL.	A	Max. R	
SR-22	22	.8661	--	37-	--	--	.8125		1.000	.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	8.608		9.328	8.578	+.000	.120		.375		15/32±3/32	.090	349.0
SR-230	230	9.0551	--	226	--	--	8.805		9.562	8.775	-.156	.120		.375		15/32±3/32	.090	362.0
SR-240	240	9.4488	132	--	322	--	9.198		9.953	9.168		.120		.375		15/32±3/32	.090	375.4

Hardness: All Ring Sizes - HRC 40-50

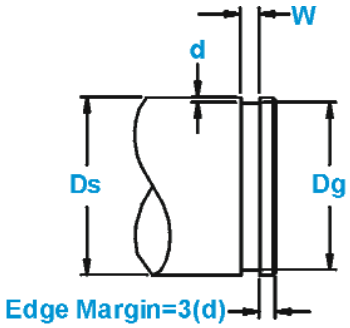
For alternate cutoff styles, contact Rotor Clip Technical Sales at 1-800-557-6867 (E-mail: tech@rotorclip.com)

External, For SAE Standard Bearings (Metric Sizes)

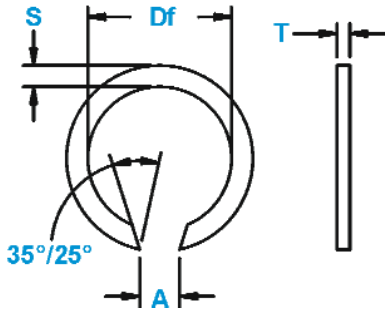
SB Constant Section



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



Shaft Diameter & Groove Dimensions



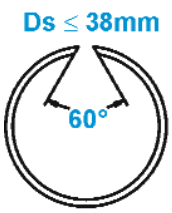
Free Diameter & Ring Measurements

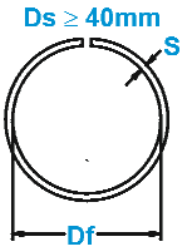
RING NUMBER	SHAFT		BEARING NUMBER			GROOVE DIAMETER				RING DIMENSIONS					
						DIAMETER		WIDTH	DEPTH	FREE DIAMETER		THICKNESS	SECTION	FREE GAP	
	Ds DEC	Ds mm				Dg	TOL.	W	d	Df	Tol.	T ±.002	S	A Min.	A Max.
SB-12	.4724	12.00	201	301	--	.436	±.002	.046 +.003 -.000	.018	.421	+.000 -.020	.042	.062 ±.003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

Hardness: All Ring Sizes - HRC 42-52

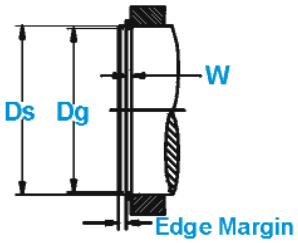
For alternate cutoff styles, contact Rotor Clip Technical Sales at 1-800-557-6867 (E-mail: tech@rotorclip.com)

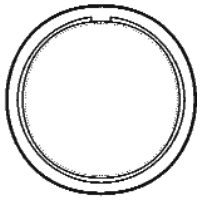
CFS Constant Section





Free Diameter & Ring Dimensions



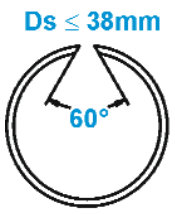


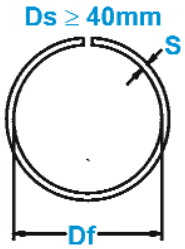
Shaft Diameter & Groove Dimensions

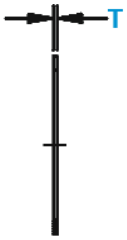
RING SIZE	SHAFT DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				SUPPLEMENTARY DATA		
	Ds	Ds	DIAMETER		WIDTH	FREE DIAMETER	THICKNESS	SECTION	WEIGHT			R.P.M.
	DEC	mm	Dg	TOL.	W min	Df max	T -0,1	S -0,1	kg/1000	Pg (kN)	Pr (kN)	X1000 (1/min)
CFS-4	0.1575	4	3,8		0,6	3,7	0,5	0,80	0,02	0,20	1,25	275,0
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		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	-0,16	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
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		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

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

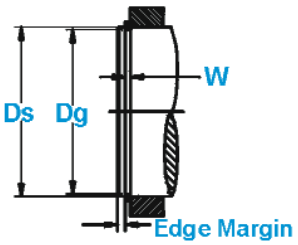
For alternate cutoff styles, contact Rotor Clip Technical Sales at 1-800-557-6867 (E-mail: tech@rotorclip.com)

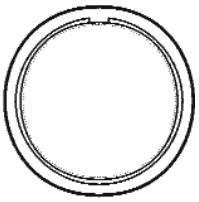






Free Diameter & Ring Dimensions



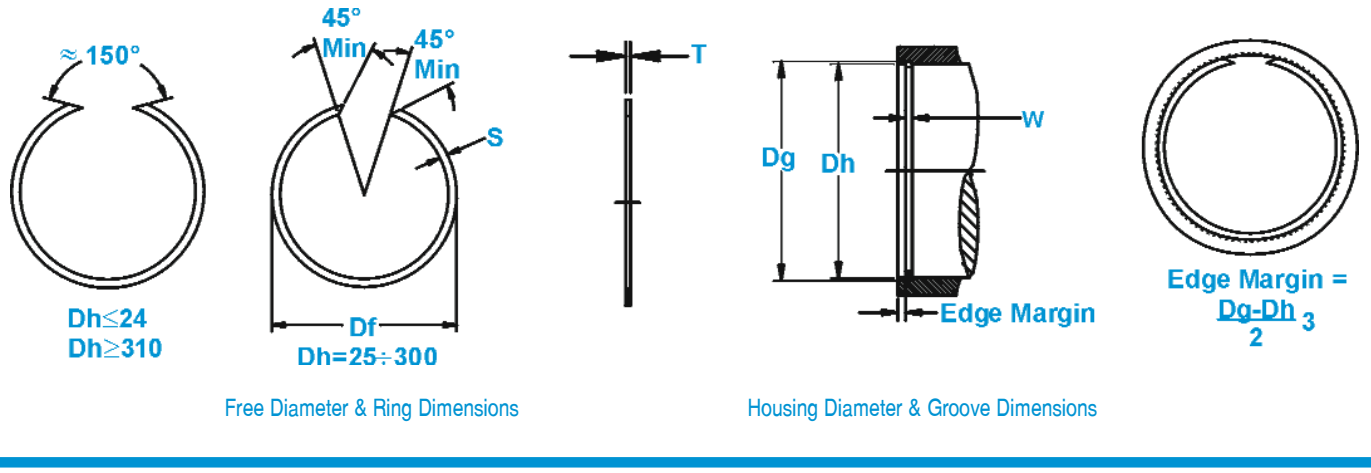


Shaft Diameter & Groove Dimensions

RING SIZE	SHAFT DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				SUPPLEMENTARY DATA		
	Ds	Ds	DIAMETER		WIDTH	FREE DIAMETER	THICKNESS	SECTION	WEIGHT			R.P.M.
	DEC	mm	Dg	TOL.	W min	Df max	T -0,1	S -0,1	kg/1000	Pg (kN)	Pr (kN)	X1000 (1/min)
CFS-72	2.8346	72	70,2	-0.19	2,2	69,4	2,0	2,80	8,80	33,70	37,60	3,0
CFS-73	2.8740	73	71,2		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	-0,22	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		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	-0,25	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		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
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		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	-0,29	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		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	-0,32	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		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	-0,36	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		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

CFH Constant Section

Internal, Metric, Flat Wire



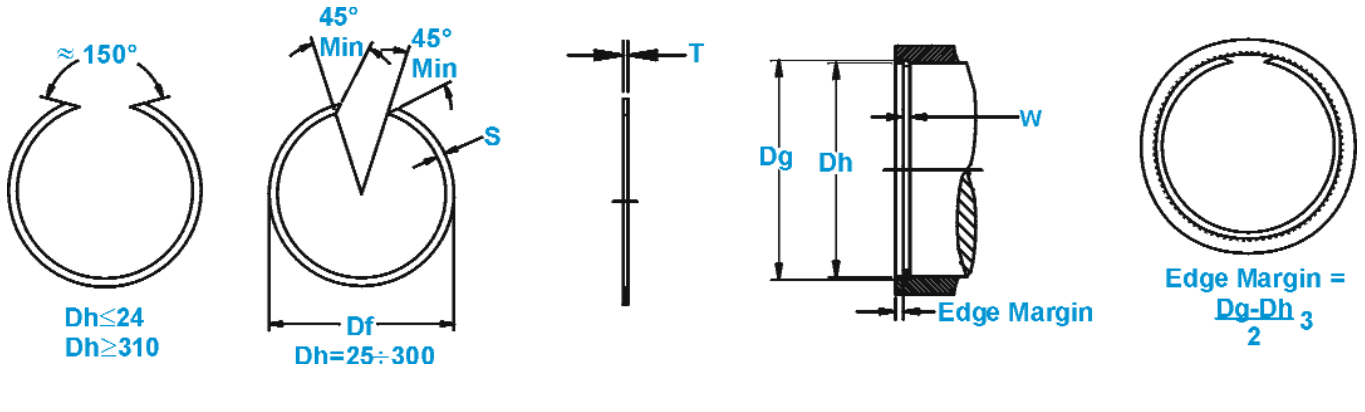
Free Diameter & Ring Dimensions

Housing Diameter & Groove Dimensions

RING SIZE	HOUSING DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				THRUST LOAD	
	Dh	Dh	DIAMETER		WIDTH	FREE DIAMETER	THICKNESS	SECTION	WEIGHT		
	DEC	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		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	+0,16	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
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		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	+0,19	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

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

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

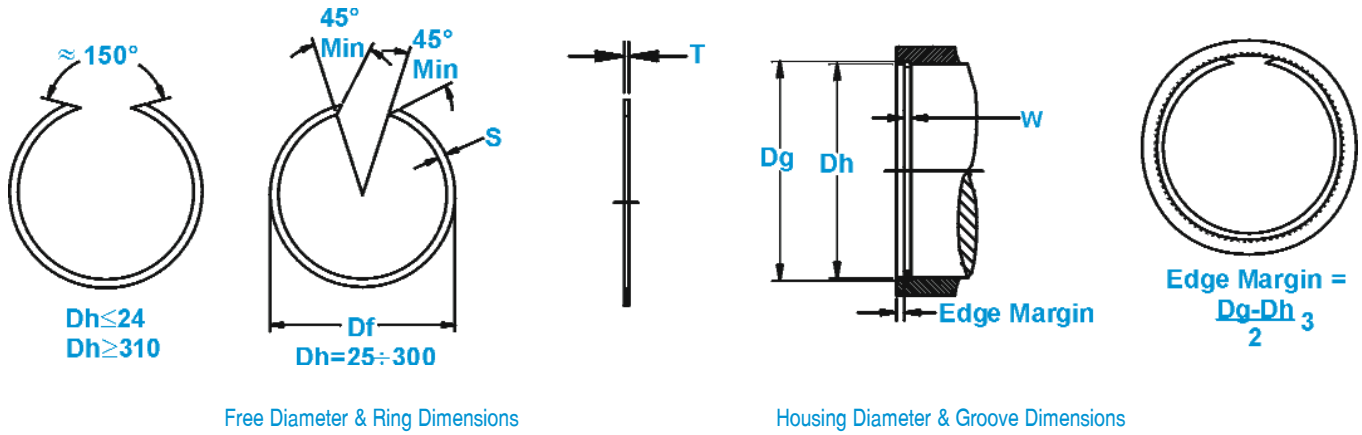


Free Diameter & Ring Dimensions

Housing Diameter & Groove Dimensions

RING SIZE	HOUSING DIAMETER Dh DEC	Dh mm	GROOVE DIMENSIONS DIAMETER Dg	TOL.	WIDTH W min	RING DIMENSIONS & WEIGHT FREE DIAMETER Df min	THICKNESS T -0,1	SECTION S -0,1	WEIGHT kg/1000	THRUST LOAD Pg (kN)	Pr (kN)
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		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	+0,19	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		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	+0,22	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
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		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	+0,25	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		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 Constant Section



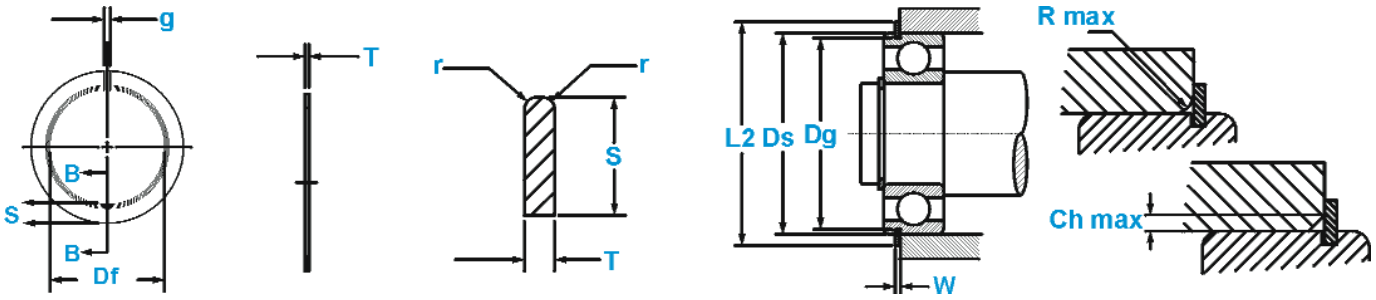
Free Diameter & Ring Dimensions

Housing Diameter & Groove Dimensions

RING SIZE	HOUSING DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				THRUST LOAD	
	Dh	Dh	DIAMETER		WIDTH	FREE DIAMETER	THICKNESS	SECTION	WEIGHT		
	DEC	mm	Dg	TOL.	W min	Df min	T -0,1	S -0,1	kg/1000	Pg (kN)	Pr (kN)
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	+0,25	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		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
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	+0,29	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		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

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

CBS Constant Section
DIN 5417



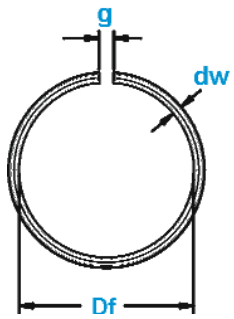
Free Diameter & Ring Dimensions With Section B-B

Shaft Diameter & Groove Dimensions

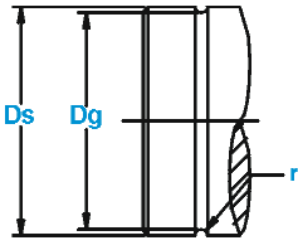
Maximum Corner Radius & Chamfer

RING SIZE	SHAFT DIAMETER		GROOVE DIMENSIONS				RING DIMENSIONS & WEIGHT									SUPPLEMENTARY DATA					
	Ds	Ds	DIAMETER		WIDTH		THICKNESS		SECTION		FREE DIAMETER		GAP	RADIUS	WEIGHT						R.P.M.
	DEC	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	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		1,12		4,04		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	+0,3	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		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	-0,1	4,85	-0,15	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-130	5.1181	130	125,22		3,10		2,82		7,21		123,6		7	0,7	65,6	139,7	166,0	124,7	4,0	17,30	1,0
CBS-140	5.5118	140	135,23	-0,50	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		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		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		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		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

CRS Constant Section
DIN 7993



Free Diameter & Ring Dimensions

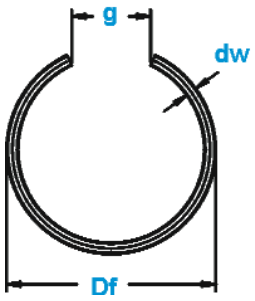


Shaft Diameter & Groove Dimensions

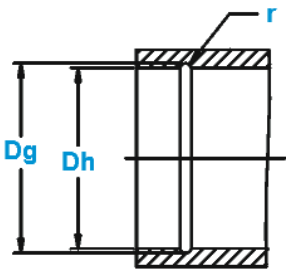
RING SIZE	SHAFT DIAMETER Ds DEC	Ds mm	GROOVE DIMENSIONS DIAMETER Dg	TOL.	RADIUS r	RING DIMENSIONS & WEIGHT WIRE DIA. dw	FREE DIAMETER Df	TOL.	GAP g	WEIGHT kg/1000	R.P.M. X1000 (1/min)
CRS-4	0.1575	4	3,2		0,5	0,8	3,1		1	0,044	175
CRS-5	0.1969	5	4,2		0,5	0,8	4,1	-0.2	1	0,057	112
CRS-6	0.2362	6	5,2		0,5	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 1-800-557-6867 (E-mail: tech@rotorclip.com)

CRH Constant Section
DIN 7993



Free Diameter & Ring Dimensions



Housing Diameter & Groove Dimensions

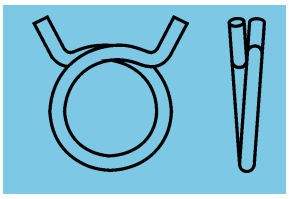
RING SIZE	HOUSING DIAMETER		GROOVE DIMENSIONS			RING DIMENSIONS & WEIGHT				
	Dh	Dh	DIAMETER		RADIUS	WIRE DIA.	FREE DIAMETER		GAP	WEIGHT
	DEC	mm	Dg	TOL.	r	dw	Df	TOL.	(g)	kg/1000
CRH-7	0.2756	7	7,80	±0,05	0,5	0,8	7,9	+0,3	4	0,071
CRH-8	0.3150	8	8,80		0,5	0,8	8,9		4	0,083
CRH-10	0.3937	10	10,80		0,5	0,8	10,9		4	0,108
CRH-12	0.4724	12	13,00		0,6	1,0	13,2	+0,4	6	0,196
CRH-14	0.5512	14	15,00		0,6	1,0	15,2		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	±0,10	1,1	2,0	22,3	+0,5	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		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		1,1	2,0	32,3		10	2,100
CRH-32	1.2598	32	34,50		1,4	2,5	34,9	+0,6	12	3,470
CRH-35	1.3780	35	37,50		1,4	2,5	37,9		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	+0,8	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		16	5,510
CRH-55	2.1654	55	58,20	±0,15	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	+1,0	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		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		1,8	3,2	94,0		25	16,400
CRH-95	3.7402	95	98,20		1,8	3,2	99,0	+1,2	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		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

Hose Clamps - Self-Compensating

www.rotorclamp.com

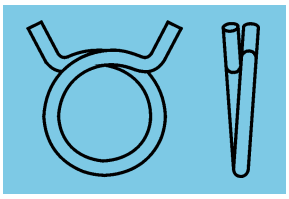
Self-Compensating Hose Clamps.

Rotor Clamp Self-Compensating Hose Clamps are easier to install and less expensive than the standard screw/worm type clamps, and are extremely effective for low pressure applications.



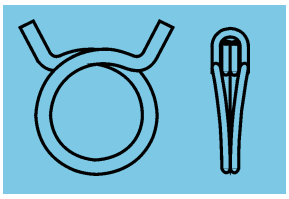
HC **Page 150**

Single Wire Self-Compensating Hose Clamp. Carbon Steel. Conforms to SAE spec. J1508.



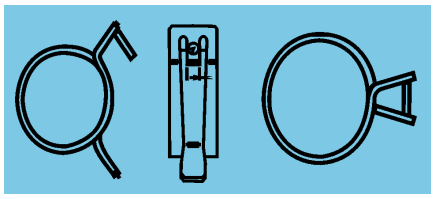
HW **Page 151**

Slim Clamps Self-Compensating Hose Clamp. Carbon Steel.



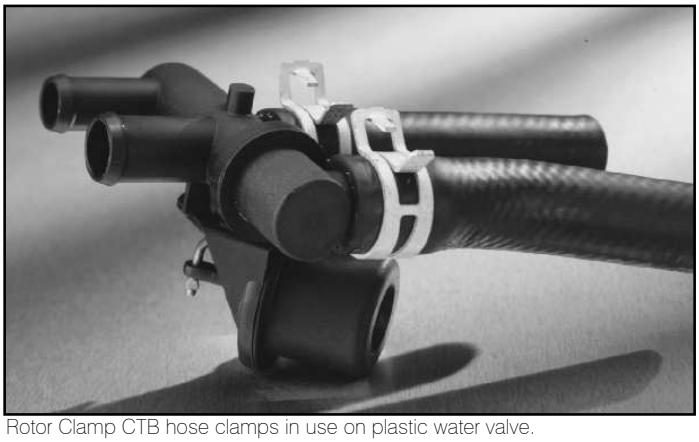
DW **Page 152**

Double Wire Self-Compensating Hose Clamp. Carbon Steel. Conforms to SAE spec. J1508.

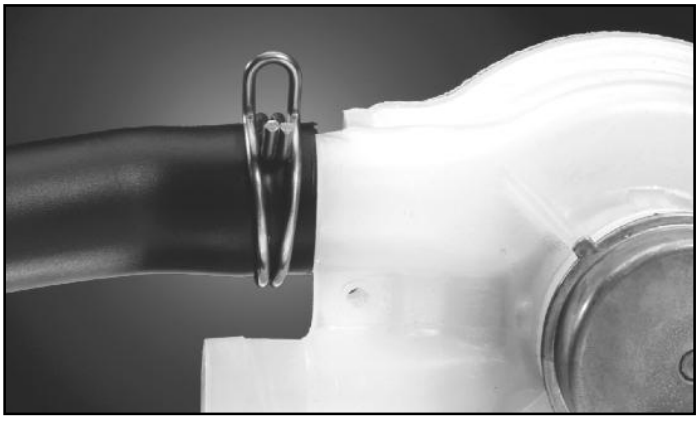


CTB **Page 153**

Constant Tension Band Self-Compensating Hose Clamp. Carbon Steel. Conforms to SAE spec. J1508.

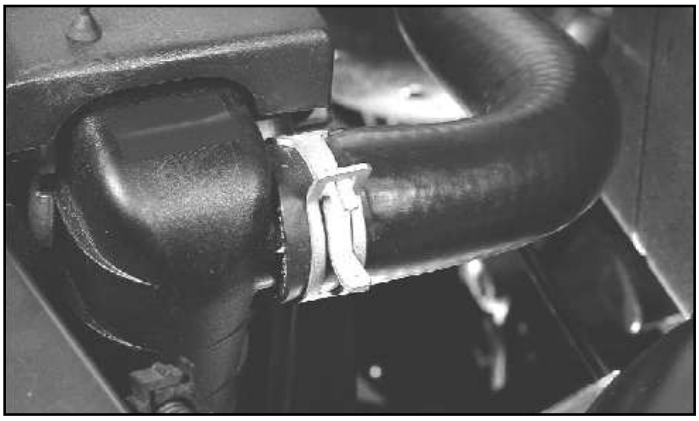


Rotor Clamp CTB hose clamps in use on plastic water valve.
(Photo Courtesy of Eaton Corporation, Automotive Controls Division).



Double Wire Clamp on an appliance pump.

CTB Clamp on automotive cooling system overflow tank.



CTB Clamp on an automotive cooling system.

FOR TOOLS SEE PAGE 149

Hose Clamp Tools

INSTALL/REMOVE ROTOR CLAMP HOSE CLAMPS WITH THESE DURABLE, QUALITY ENGINEERED TOOLS.

Pneumatic Hose Clamp Tools

Helps Eliminate Carpal Tunnel Syndrome

Single Wire (HC/HW) Hose Clamp Pneumatic Tool (PWS)*

*Designations for individual HC sizes are listed on page 166.

Double Wire (DW) Hose Clamp Pneumatic Tool (PWD)*

*Designations for individual DW sizes are listed on page 166.

Constant Tension Band (CTB) Pneumatic Tool (PBC-1) (Right)**

**Specify PBC-1 for any Rotor Clamp CTB Hose Clamp you are installing. One size fits all.

PNEUMATIC TOOL FEATURES:

- Tangs of the clamp fit in the jaws of the tool and are compressed for installation or removal on the hose. Uses a compressed air line of 90 psi.
- Activated by a simple lever reducing stress on the hand from repeated assembly/disassembly.

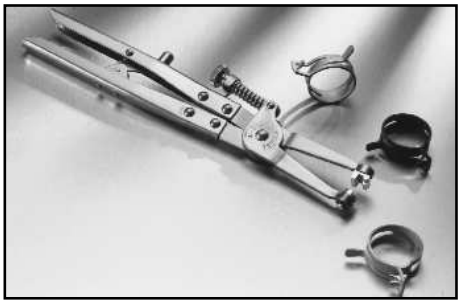
Manual Hose Clamp Tools

For Ease Of Hose Clamp Installation/Removal

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.

Please wear protective eyewear when installing/removing hose clamps.



Constant Tension Band (CTB) 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.

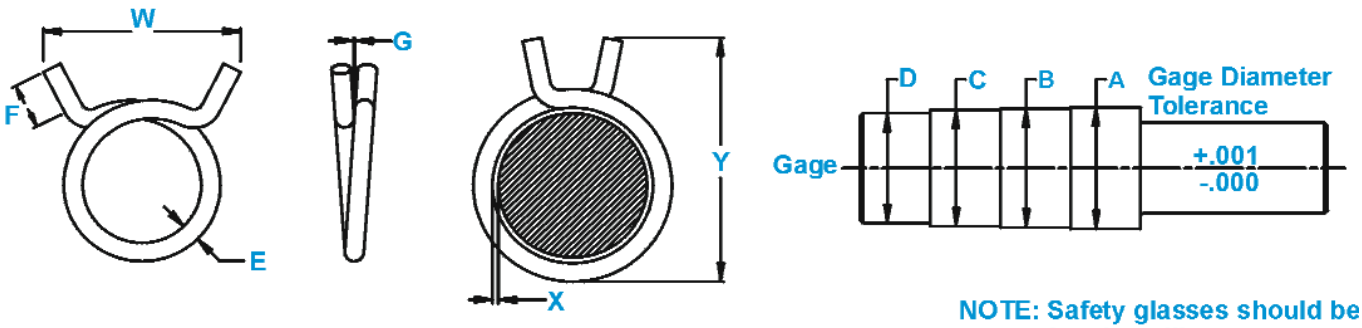
MANUAL TOOL FEATURES:

- Rugged Construction.
- Ease of Use.
- Designed for Efficiency.

Single Wire Hose Clamp Plier Heavy Duty (HAZ-2)

A heavy duty version of the Single Wire Plier, left. 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.

HC Hose Clamps - single Wire



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.

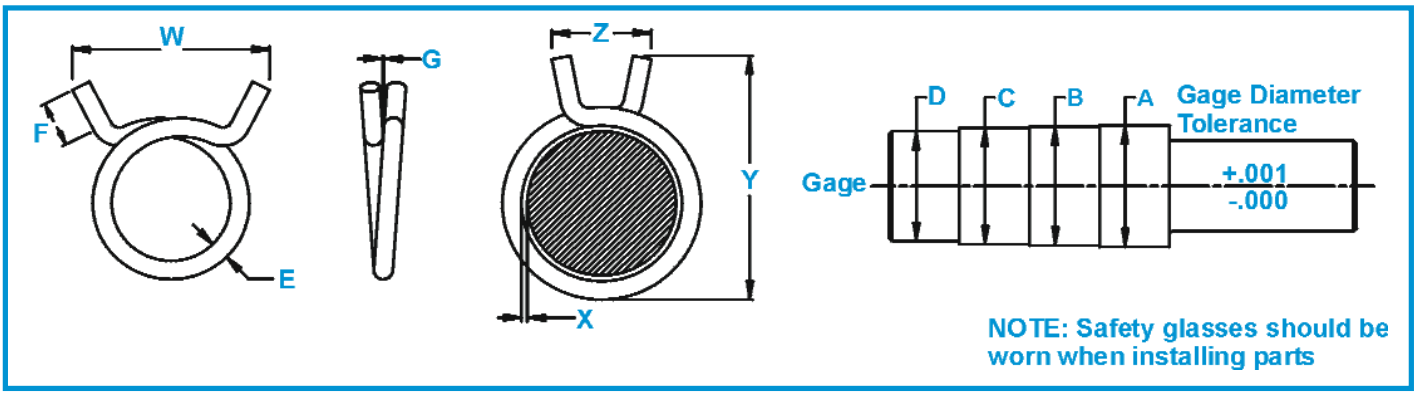
FINISH: Peen-Plate Zinc (non-electrolytic process) .0002 minimum thickness plus dichromate treatment.
MATERIAL: Specially processed premium grade spring wire, hardened and austempered to meet the performance requirements specified.

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	.202	3/8		.093	2.63	.012	3.88	D	PWS-46
	HC-50	400	53.8	3.218	3.125	3.032	2.844	.202	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 Clamps



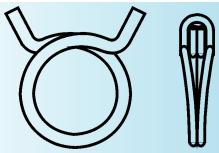
EFFECTIVE CLAMPING RANGE: After expanding to no greater than "A" diameter of the gage, the clamp in relaxed condition shall not pass over "D" diameter. When clamp is assembled on "A", "B" or "C" diameter of gage, a wire of "X" diameter shall not pass between gage and clamp when inserted in a direction parallel to the axis of the gage.

FINISH: Peen-Plate Zinc (non-electrolytic process) .0002 minimum thickness plus dichromate treatment.
MATERIAL: Specially processed premium grade spring wire, hardened and austempered to meet the performance requirements specified.

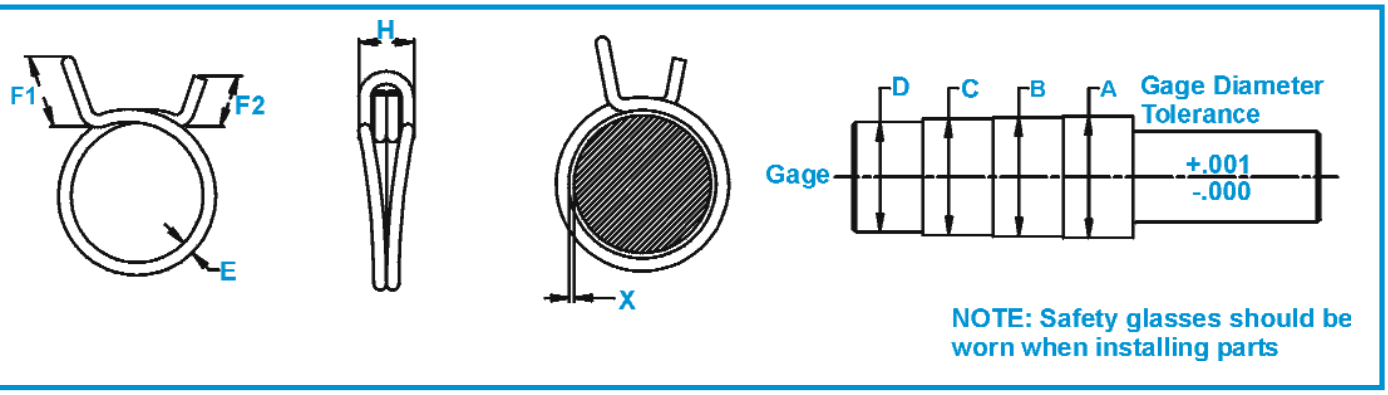
Note: All Dimensions are in inches.

Rotor Clamp HC 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)



DW Hose Clamps - Double Wire



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.

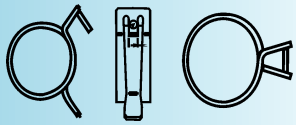
FINISH: Peen-Plate Zinc (non-electrolytic process) .0002 minimum thickness plus dichromate treatment.
MATERIAL: Specially processed premium grade spring wire, hardened and austempered to meet the performance requirements specified.

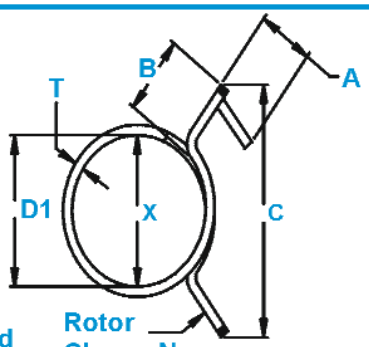
Note: All Dimensions are in Inches. Conforms to SAE spec. J1508.

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	.59'	.010	S	PWD-36

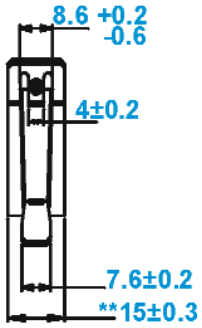
*** G-Green, R-Red, D-Dichromate (Yellow). NOTE: SELECTED SIZES AVAILABLE IN STAINLESS STEEL. INQUIRE FOR AVAILABILITY.**
**** MANUAL INSTALLATION TOOLS ALSO AVAILABLE.**

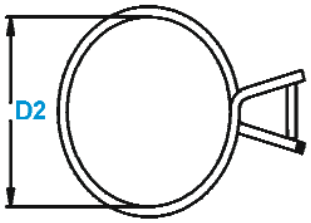
CTB Hose Clamps - Constant Tension Band





D1 To be measured along "X" direction.





NOTE: Safety Glasses should be worn when installing parts.

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.*)

Note: All Dimensions are in Millimeters. Conforms to SAE spec. J1508.

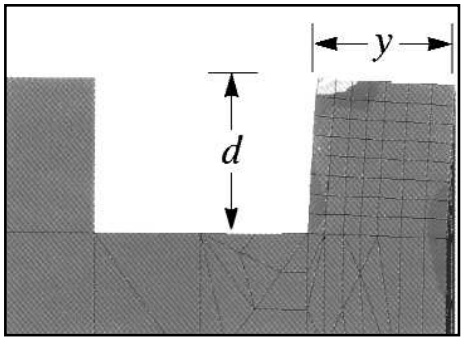
Rotor Clamp CTB No. (mm)	Case Qty. min 1 case	Weight Per m (lbs.)	Weight Per Case (lbs.)	D1 Free Dia. Max. (mm)	D2 Full Open Dia. Min. (mm)	Material Thickness T 0.08 -0.02	Reference Dimensions (All Sizes Listed In mm) A (mm) Tab Height	B (mm) Ear Length	C (mm) Ear Span
CTB-13	2500	8.5	21.250	12.0	14.2	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 Dorrlflake finish offers five times the corrosion protection over traditional zinc plating. It is available in Black, Silver, Brown, Tan, Blue, Green and Red (Mechanical Zinc is also available along with other finishes. Inquire for more information).**
Dorrlflake meets the following automotive specifications: General Motors: GM-7111-M; GM-7112-M;
Ford Motor Company: ESA-M21P5A; Ford World Wide: WSD-21P11-B1, WSD-21P11-B2; Chrysler Corporation: PS-7626.

For Technical Assistance, Call 1-800-55-ROTOR (1-800-557-6867)

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.



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.

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 (Pg)-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:

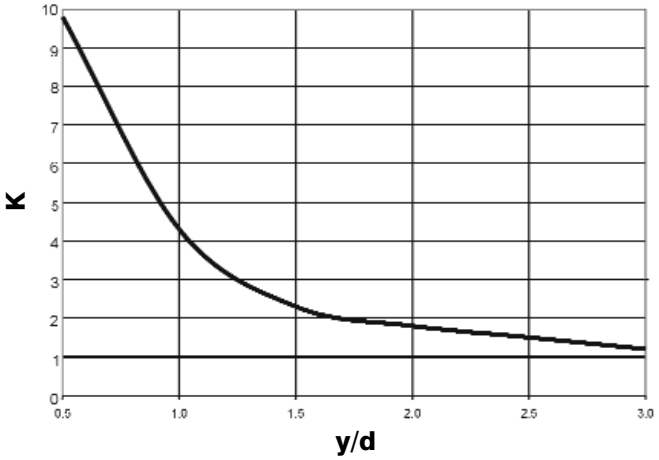
$$Pg = \frac{(1)\ .5 \times .016 \times 3.14 \times 45{,}000}{2.20\ (2)}$$

$$= \frac{1130.4}{4.40}$$

$$= 256.9 \text{ lbs.}$$

Maximum Thrust Load for reduced edge margin

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_y = Tensile Yield Strength of groove material, psi

For Technical Assistance, Call 1-800-55-ROTOR (1-800-557-6867)

Beveled Retaining Rings ®

Beveled rings are designed to function in the groove when positioned within a range of seating depths from the bottom of the groove (maximum insertion) to a recommended position of half way up the groove depth (minimum insertion). The complementary groove and ring bevel allow the ring to function like a wedge when it makes contact with the retained part. The ring exerts an axial force against the retained part, taking up the play and, consequently, reducing the clearance between parts to zero.

If the sum of the assembly tolerances consisting of the retained part width (B), the groove location (A) and the ring beveled edge (U) exceed the end play take-up capacity of the ring, two conditions may potentially occur:

1. The ring will be seated less than half way down the groove depth, compromising the thrust load capacity of the assembly.
2. The ring will be seated at the groove bottom and play will be present.

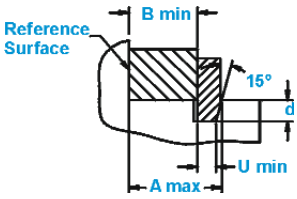
GROOVE LOCATION (REFER TO THE ABOVE DRAWINGS)

The outer groove wall with the beveled edge locates the groove. The distance from a fixed shoulder to the outer beveled groove wall is A. The machining tolerance associated with locating the groove is ΔA. The width of the retained part/parts is B. U is the beveled thickness at the base of the bevel and is specified in our VHO and VSH specification tables.

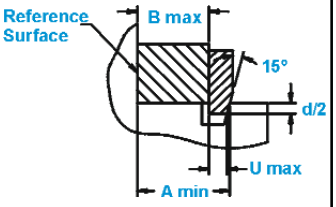
DETERMINING RING FEASIBILITY

The feasibility of a beveled ring should be evaluated first. The built-up tolerances of the system must be less than or equal to the take-up capacity of the ring. For example: A bearing must be retained on a 3" shaft using a VSH-300 Rotor Clip retaining ring. The bearing width is 1.000/0.995. Before the location can be determined, we would need to know the acceptable machining tolerance (ΔA), which we will designate as +.003/-.000 for the sake of this example. Compute the sum of the tolerances:

ΔB (Bearing Width Tolerance Range)= Bmax - B min	.005
ΔA (Acceptable Machining Tolerance Range)= Amax - Amin	.003
ΔU (Beveled End Thickness Tolerance Range from catalog spec) = Umax- Umin	.004
ΣΔ=	.012



Maximum insertion of a beveled retaining ring.



Minimum insertion of a beveled retaining ring.

The sum of the tolerances is less than the take-up capacity of the ring (.0135), confirming the fact that the ring will in all assemblies seat within the acceptable limits of half way down to all of the way down the groove.

COMPUTING GROOVE LOCATION

The following equations determine the distance from the defined shoulder (plane of reference) to the top of the far groove wall (A):

Amin ≥ Bmax + Umax + d/2 tan 15º
(Corresponding to minimum groove engagement)

Amax ≤ Bmin + Umin + d tan 15º
(Corresponding to maximum groove engagement)

Using the values from the above example, we compute Amin and Amax as follows:

Amin ≥ 1.000+.073 + .102/2 tan 15º
(Note: .073 U value and .102 d value, per catalog spec)

Amin ≥ 1.087

Amax ≤ .995 + .069 + .102 tan 15°

Amax ≤ 1.091

Anom = (Amax + Amin)/2 ± (Amax - Amin)/2

A ⇒ 1.089 ± .002

Reviewing our stack up of tolerances, we assumed .003" for machining. Our calculated groove location allows for more leniency (.004") in the tolerance. Checking the ΣΔ again, we find the assembly is still within the .0135 limit for end play take-up.

From known ring dimensions, retained part dimension(s), required groove depth and designated machining tolerance, the groove can be easily located for assemblies meeting the primary requirement ΣΔ≤d/2 tan 15.

Automated Assembly - For 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.

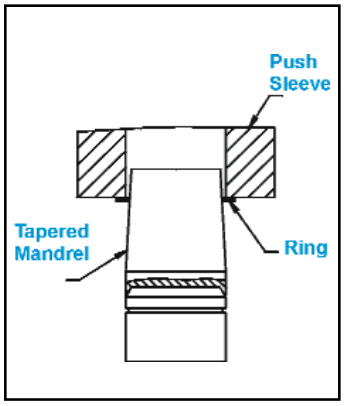
2. Feed parts onto the tapered mandrel or into the tapered housing using a "feed finger" mechanism. Make sure the rings are fed in the proper direction and in the proper manner as depicted to avoid sensitivity to ring pitch.

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%.)

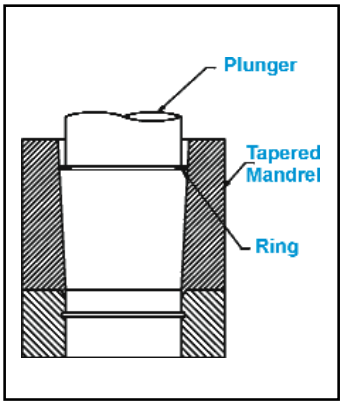
4. Limit shuttle distance to a minimum from feed mandrel to installation on assembly.

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).**

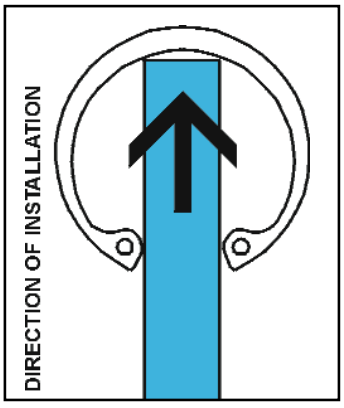


Figure A- This is the preferred way to transfer feed an internal ring into a tapered housing by inserting the mechanism between the lugs **(Note: Finger thickness should be 80% of the minimum ring thickness).**

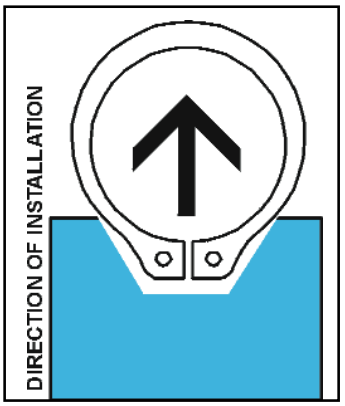


Figure B-This is the preferred way to transfer feed an external ring onto a tapered mandrel by using a slide with a complementary cut out for the lugs. **(Note: Finger thickness should be 80% of the minimum ring thickness).**

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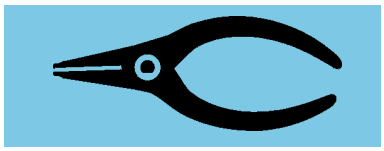
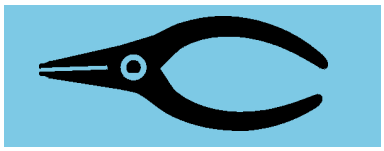
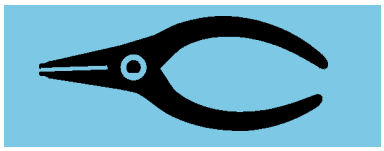


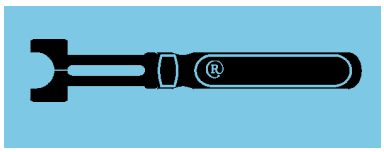
Standard Pliers
Page 159



Ratchet Pliers
Page 160

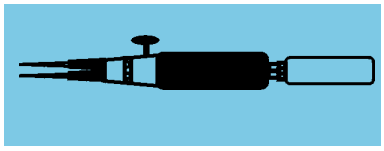


Convertible Pliers
Page 161



Applicators
Page 163-164

Dispensers
Page 165



Pneumatic Tools
Page 166

Plier Kits
Page 167

Retaining Ring Kits
Page 168

Rotor Clip provides full tool support for its full line of retaining rings and hose clamps.

Please wear protective eyewear while installing and removing retaining rings and hose clamps.

Pliers

Specifications for the following Rotor Clip Retaining Ring Pliers can be found on pages 159-162.

STANDARD RETAINING RING PLIERS

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.

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.)

CONVERTIBLE RETAINING RING PLIERS

Convert quickly and easily from internal to external pliers and back again.This two-in-one capablility 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.

DIMENSIONAL ILLUSTRATIONS

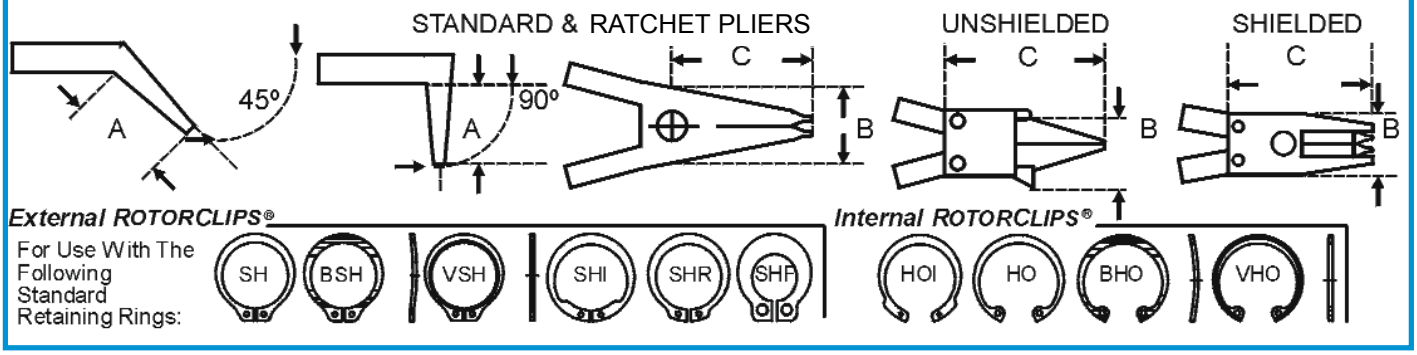


TABLE 1: INTERNAL PLIERS

Ring Series/Size Range HO-BHO-VHO FROM	Ring Series/Size Range HO-BHO-VHO THRU	Ring Series/Size Range HOI FROM	Ring Series/Size Range HOI THRU	ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	GENERAL DIMENSIONS (inches) Weight lbs.	Tip Dia.	Tip Length A	CLOSED POSITION Clearance B	Clearance C	Length Std. Tip	Width
-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

TABLE 2: EXTERNAL PLIERS

Ring Series/Size Range SH-BSH-VSH FROM	SH-BSH-VSH THRU	SHI FROM	SHI THRU	SHR FROM	SHR THUR	ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	GENERAL DIMENSIONS (inches) Weight lbs.	CLOSED POSITION Tip Dia.	Tip Length A	Clearance B	Clearance C	Length Std. Tip	Width
-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	-75	-98	RP-400	RP-404	RP-409	.19	.070	11/32	1	2-3/8	7	2-7/8
-150	-350	-215	-334	-	-	RP-600	RP-604	RP-609	.44	.115	7/16	1-1/4	3-1/16	9-1/8	4-1/4

TABLE 3: EXTERNAL PLIERS FOR SELF-LOCKING RINGS (SHF)

Ring Series/ Size Range SHF FROM	SHF THRU	ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	GENERAL DIMENSIONS (inches) Weight lbs.	Tip Dia.	Tip Length A	CLOSED POSITION Clearance B	Clearance C	Length Std. Tip	Width
-6	-9	RP-1520S	RP-1524S	RP-1529S	.16	.034	-	3/4	1-1/16	5-1/16	2-5/8
-12	-15	RP-1520M	RP-1524M	RP-1529M	.16	.040	-	3/4	1-1/16	5-1/16	2-5/8
-18	-25	RP-1520L	RP-1524L	RP-1529L	.16	.047	-	3/4	1-1/16	5-1/16	2-5/8
-31	-75	RP-1540	RP-1544	RP-1549	.34	.070	3/8	1	1-11/16	8-7/8	3-7/8

External pliers RP12, RP15 & RP18 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.

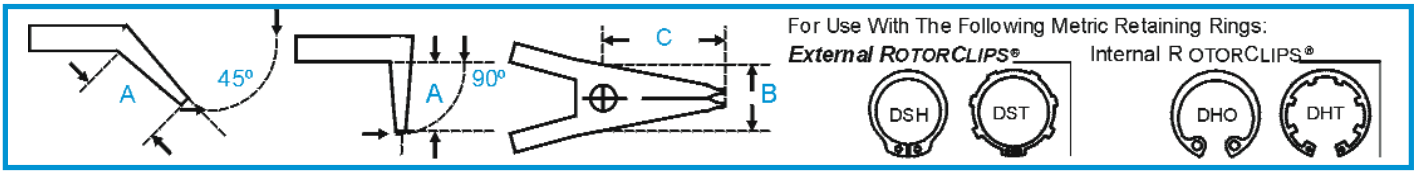


TABLE 10: METRIC EXTERNAL PLIERS

Ring Series/Size Range DSH (DIN 471), DST (DIN 983) FROM	THRU	ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	GENERAL DIMENSIONS (mm) Weight Kg	Tip Dia. mm	Tip Length A	CLOSED POSITION Clearance B	Clearance C	Length Std. Tip	Width
-3	-10	RPA-0	RPA-045	RPA-090	1.0	0.9	8.3	22.2	38.1	141.7	73
-10	-25	RPA-1	RPA-145	RPA-190	1.0	1.3	8.3	22.2	38.1	141.7	73
-19	-60	RPA-2	RPA-245	RPA-290	1.5	1.8	14.0	25.4	51.6	183.1	106.0
-40	-100	RPA-3	RPA-345	RPA-390	3.6	2.3	14.2	29.5	77.7	230.4	111.1
-85	-165	RPA-4	RPA-445	RPA-490	7.1	3.2	20.0	43.2	80.1	303.8	179.6

TABLE 11: METRIC INTERNAL PLIERS

Ring Series/Size Range DHO (DIN 472), DHT (DIN 984) FROM	THRU	ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	GENERAL DIMENSIONS (mm) Weight Kg	Tip Dia. mm	Tip Length A	CLOSED POSITION Clearance B	Clearance C	Length Std. Tip	Width
-3	-10	RPI-0	RPI-045	RPI-090	1.0	0.9	8.3	19.0	47.8	140.5	54.9
-10	-25	RPI-1	RPI-145	RPI-190	1.0	1.1	8.3	19.0	47.8	140.5	54.9
-19	-60	RPI-2	RPI-245	RPI-290	1.4	1.8	10.0	22.6	52.3	165.9	64.8
-40	-100	RPI-3	RPI-345	RPI-390	3.3	2.3	13.9	28.6	69.7	229.9	72.1
-85	-165	RPI-4	RPI-445	RPI-490	6.2	3.2	20.0	43.2	70.1	292.4	58.7

Please wear protective eyewear while installing and removing retaining rings and hose clamps.

Ratchet Pliers

DIMENSIONAL ILLUSTRATIONS

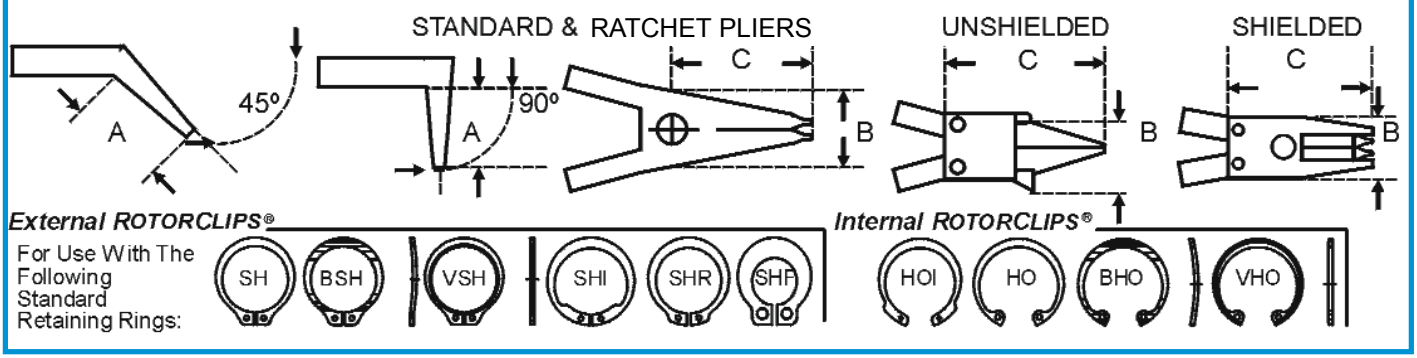


TABLE 6: RATCHET PLIERS INTERNAL**

Ring Series/Size Range				PLIERS W/OUT TIPS	STD. TIPS	45° TIPS	90° TIPS	TIP COLOR CODE	GENERAL DIMENSIONS (inches)						
HO-BHO-VHO		HOI										CLOSED POSITION			
												Clearance		Length Std.	
FROM	THRU	FROM	THRU						Weight lbs.	Tip Dia.	Tip Length A	B	C	Tip	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.

TABLE 7: RATCHET PLIERS EXTERNAL**

Ring Series/Size Range						PLIERS W/OUT TIPS	STD. TIPS	45° TIPS	90° TIPS	TIP COLOR CODE	GENERAL DIMENSIONS (inches)						
SH-BSH-VSH		SHI		SHR										CLOSED POSITION			
														Clearance		Length Std.	
FROM	THRU	FROM	THRU	FROM	THRU						Weight lbs.	Tip Dia.	Tip Length A	B	C	Tip	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.

Please wear protective eyewear while installing and removing retaining rings and hose clamps.

Convertible Pliers

DIMENSIONAL ILLUSTRATIONS

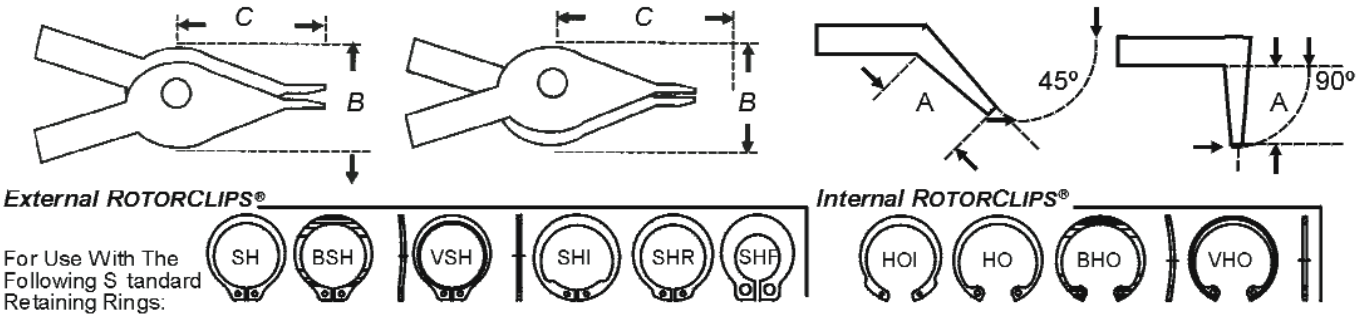


TABLE 4: CONVERTIBLE PLIERS, INTERNAL RING SERIES							GENERAL DIMENSIONS (inches)						
Ring Series/Size Range				ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	Weight lbs.	Tip Dia.	Tip Length A	CLOSED POSITION			
HO-BHO-VHO		HOI								Clearance		Length Std. Tip	Width
FROM	THRU	FROM	THRU							B	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

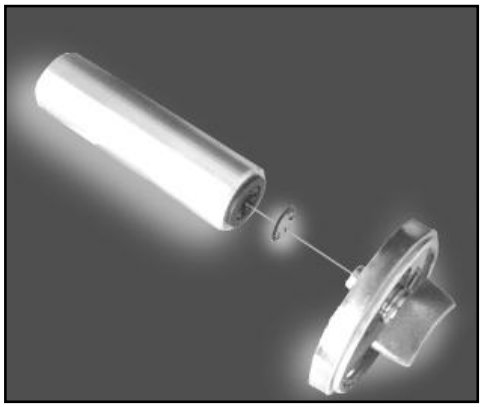
TABLE 5: CONVERTIBLE PLIERS, EXTERNAL RING SERIES*											GENERAL DIMENSIONS (inches)						
Ring Series/Size Range								ROTOR CLIP PLIERS	45° TIP PLIERS	90° TIP PLIERS	Weight lbs.	Tip Dia.	Tip Length A	CLOSED POSITION			
SH-BSH-VSH		SHI		SHR		SHF								Clearance			
FROM	THRU	FROM	THRU	FROM	THRU	FROM	THRU							B	C	Length	Width
-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-560	RP-564	.55	.090	5/8	1-7/8	3	9-1/4	4-1/2

*KIT CONTAINS PLIERS LISTED IN TABLES 4&5.

Please wear protective eyewear while installing and removing retaining rings and hose clamps.

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.



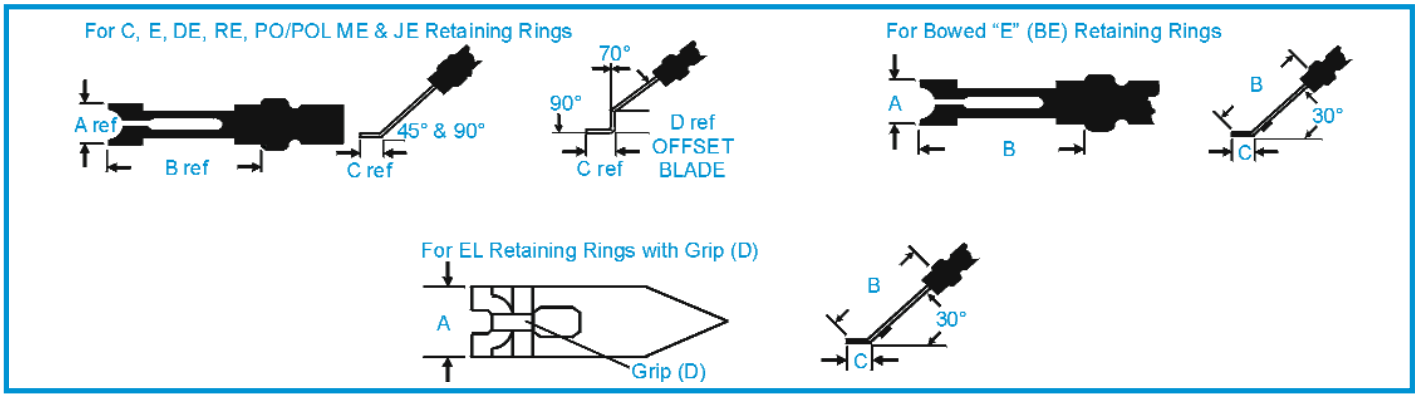
RING SIZE	EASY-GUIDE TX TOOL #	FOR SHAFT DIA.
TX-9	RP-21104	3/32"
TX-12	RP-21105	1/8"
TX-15	RP-21106	5/32"
TX-18	RP-21107	3/16"
TX-25	RP-21108	1/4"
TX-31	RP-21109	5/16"
TX-37	RP-21110	3/8"
TX-43	RP-21111	7/16"
TX-50	RP-21112	1/2"

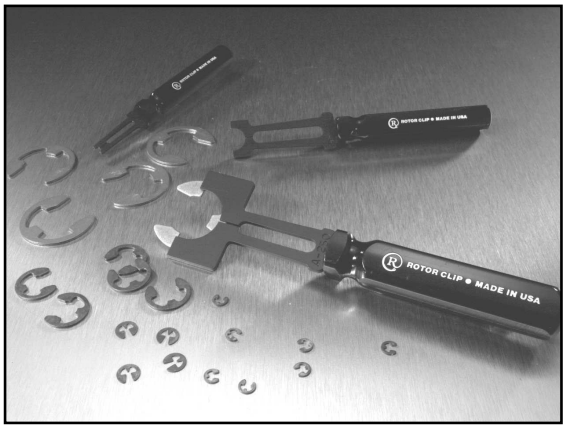
Each ring is assigned its own Easy Guide, producing maximum tool performance.

Please wear protective eyewear while installing and removing retaining rings and hose clamps.

For Technical Assistance, Call 1-800-55-ROTOR (1-800-557-6867)

Applicators





Applicators are designed to install standard radial retaining rings on a shaft. Used with Rotor Clip Dispensers, applicators enable operators to install rings quickly and correctly (ring "snaps" when properly seated in groove.)

- ***For assembly of Inch/Metric radial retaining rings.***
- ***Heat treated for strength.***
- ***Allows for installation without turning tool.***
- ***For use with Rotor Clip C, E, BE, RE, PO/POL, E, DE, ME and JE Retaining rings.***

***Applicators for Rotor Clip "C" Retaining Rings**

RING SIZE	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D
C-12	A-300	.264	1.438	.375	.375
C-15	A-080	.500	1.438	.375	.375
C-18	A-090	.500	1.438	.375	.375
C-21	A-310	.500	1.438	.375	.375
C-23	A-320	.500	1.438	.375	.375
C-25	A-330	.500	1.438	.375	.375
C-28	A-340	.500	1.438	.375	.375
C-31	A-350	.500	1.438	.375	.375
C-37	A-360	.812	2.218	.593	.625
C-40	A-370	.812	2.218	.593	.625
C-43	A-380	.812	2.218	.593	.625
C-50	A-290	.812	2.218	.593	.625
C-56	A-390	.812	2.218	.593	.625
C-62	A-400	1.125	2.390	.765	.625
C-68	A-410	1.125	2.390	.765	.625
C-75	A-280	1.125	2.390	.765	.625
C-81	A-420	1.125	2.390	.765	.625
C-87	A-430	1.125	2.390	.765	.625
C-93	A-440	1.562	2.625	.969	.625
C-100	A-450	1.562	2.625	.969	.625
C-112	A-460	1.562	2.625	.969	.625
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

Applicators for Rotor Clip "BE/BSE" Retaining 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

Please wear protective eyewear while installing and removing retaining rings and hose clamps.

***Applicators for Rotor Clip "RE" Retaining Rings**

RING SIZE	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D
RE-9	A-080	.500	1.438	.375	.375
RE-12	A-520	.500	1.438	.375	.375
RE-15	A-120	.500	1.438	.375	.375
RE-18	A-130	.500	1.438	.375	.375
RE-21	A-140	.812	2.218	.593	.625
RE-25	A-160	.812	2.218	.593	.625
RE-31	A-500	.812	2.218	.593	.625
RE-37	A-170	.812	2.218	.593	.625
RE-43	A-270	1.125	2.390	.765	.625
RE-50	A-200	1.125	2.390	.765	.625
RE-56	A-280	1.125	2.390	.765	.625

****Applicators for Rotor Clip "DE" Retaining Rings**

RING SIZE	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D
DE-0,8	A-708	.265	1.438	.375	.375
DE-1,2	A-712	.265	1.438	.375	.375
DE-1,5	A-715	.265	1.438	.375	.375
DE-1,9	A-719	.265	1.438	.375	.375
DE-2,3	A-723	.500	1.438	.375	.375
DE-3,2	A-310	.500	1.438	.375	.375
DE-4	A-340	.500	1.438	.375	.375
DE-5	A-605	.812	2.218	.593	.625
DE-6	A-606	.812	2.218	.593	.625
DE-7	A-607	.812	2.218	.593	.625
DE-8	A-608	.812	2.218	.593	.625
DE-9	A-609	1.125	2.390	.765	.625
DE-10	A-610	1.125	2.390	.765	.625
DE-12	A-612	1.562	2.625	.969	.625
DE-15	A-615	1.562	2.625	.969	.625
DE-19	A-619	1.875	2.844	1.188	.625

***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.)**

Applicators continued

****Applicators for Rotor Clip "PO/POL" Retaining Rings**

RING SIZE	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D
PO-15	A-815	.500	1.438	.375	.625
PO-18	A-818	.812	2.218	.593	.625
PO-25	A-825	.812	2.218	.593	.625
PO-31	A-831	.812	2.218	.593	.625
PO-37	A-837	1.125	2.390	.765	.625
PO-43	A-843	1.125	2.390	.765	.625
PO-50	A-850	1.125	2.390	.765	.625
POL-15	A-915	.500	1.438	.375	.625
POL-18	A-918	.812	2.218	.593	.625
POL-25	A-925	.812	2.218	.593	.625
POL-31	A-931	.812	2.218	.593	.625
POL-37	A-937	1.125	2.390	.765	.625
POL-43	A-943	1.125	2.390	.765	.625
POL-50	A-950	1.125	2.390	.765	.625

***Applicators for Rotor Clip "ME" Retaining**

RING SIZE	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D
ME-1	A-010	.265	1.438	.375	.375
ME-2	A-040	.265	1.438	.375	.375
ME-3	A-050	.500	1.438	.375	.375
ME-4	A-100	.500	1.438	.375	.375
ME-5	A-120	.500	1.438	.375	.375
ME-6	A-140	.812	2.218	.593	.625
ME-7	A-150	.812	2.218	.593	.625
ME-8	A-290	.812	2.218	.593	.625
ME-9	A-608	.812	2.218	.593	.625
ME-10	A-170	.812	2.218	.593	.625
ME-11	A-180	.812	2.218	.593	.625
ME-12	A-609	1.125	2.390	.765	.625
ME-13	A-200	1.125	2.390	.765	.625
ME-15	A-612	1.125	2.390	.969	.625
ME-16	A-210	1.125	2.390	.765	.625
ME-22	A-240	1.125	2.625	.969	.625

****Applicators for Rotor Clip "DC" Retaining Rings**

RING SIZE	APP. NO.	RING SIZE	APP. NO.
DC-3	A-545	DC-22	A-583
DC-4	A-546	DC-23	A-584
DC-5	A-723	DC-24	A-585
DC-6	A-548	DC-25	A-586
DC-7	A-549	DC-26	A-587
DC-8	A-570	DC-28	A-588
DC-9	A-571	DC-30	A-589
DC-10	A-572	DC-32	A-590
DC-11	A-573	DC-35	A-591
DC-12	A-290	DC-36	A-592
DC-13	A-575	DC-38	A-593
DC-14	A-576	DC-40	A-594
DC-15	A-577	DC-42	A-595
DC-16	A-578	DC-45	A-596
DC-17	A-579	DC-48	A-597
DC-18	A-580	DC-50	A-598
DC-19	A-581	DC-52	A-599
DC-20	A-582	DC-55	A-600

Please contact Technical Sales for DC applicator specifications. 1-800-557-6867.

***Applicators for Rotor Clip "E" Retaining Rings**

RING SIZE	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D
E-4	A-010	.265	1.438	.375	.250
SE-6	A-020	.265	1.438	.375	.375
YE-6	A-030	.500	1.438	.375	.375
E-6	A-040	.265	1.438	.375	.375
SE-9	A-050	.500	1.438	.375	.375
E-9	A-510	.500	1.438	.375	.375
SE-11	A-060	.500	1.438	.375	.375
E-12	A-050	.500	1.438	.375	.375
SE-14	A-080	.500	1.438	.375	.375
YE-14	A-090	.500	1.438	.375	.375
E-14	A-070	.500	1.438	.375	.375
E-15	A-100	.500	1.438	.375	.375
SE-17	A-110	.500	1.438	.375	.375
SE-18	A-130	.500	1.438	.375	.375
E-18	A-120	.500	1.438	.375	.375
SE-21	A-140	.812	2.218	.593	.625
E-25	A-150	.812	2.218	.593	.625
SE-31	A-160	.812	2.218	.593	.625
SE-37	A-290	.812	2.218	.593	.625
E-37	A-170	.812	2.218	.593	.625
E-43	A-180	.812	2.218	.593	.625
SE-43	A-190	.812	2.218	.593	.625
E-50	A-200	1.125	2.390	.765	.625
E-62	A-210	1.125	2.390	.765	.625
SE-74	A-220	1.562	2.625	.969	.625
E-75	A-230	1.562	2.625	.969	.625
E-87	A-240	1.562	2.625	.969	.625
SE-98	A-250	1.875	2.844	1.188	.625
SE-118	A-260	1.875	2.844	1.188	.625

****Applicators for Rotor Clip "EL" Retaining Rings**

RING SIZE	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C
EL-9	A-109	.438	2.188	.375
EL-12	A-112	.438	2.188	.375
EL-18	A-118	.625	2.188	.563
EL-25	A-125	.750	2.188	.625
EL-31	A-131	1.000	2.625	.750
EL-37	A-137	1.125	2.625	.813
EL-43	A-143	1.125	2.625	.938

**Replacement Grips For "EL" Applicators	
EL-9	A-109G
EL-12	A-112G
EL-18	A-118G
EL-25	A-125G
EL-31	A-131G
EL-37	A-137G
EL-43	A-143G

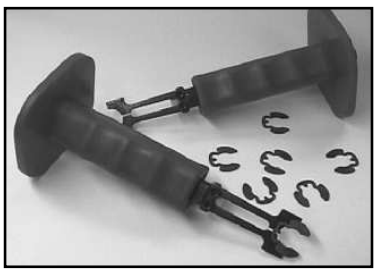
**** An EL applicator consists of a tool and a grip. Replacement grips may be purchased without replacing the tool by using these order numbers.**

****Applicators for Rotor Clip "JE" Retaining Rings**

RING SIZE	APP. NO.	BLADE WIDTH A	BLADE LENGTH B	TIP LENGTH C	OFFSET D
JE-2.5	A-050	.500	1.438	.375	.375
JE-3	A-070	.500	1.438	.375	.375
JE-4	A-340	.500	1.438	.375	.375
JE-5	A-605	.812	2.218	.593	.625
JE-6	A-606	.812	2.218	.593	.625
JE-7	A-607	.812	2.218	.593	.625
JE-8	A-608	.812	2.218	.593	.625
JE-12	A-612	1.562	2.625	.969	.625

Please wear protective eyewear while installing and removing retaining rings and hose clamps.

Heavy Duty Applicator Handles



For Installation of Large PO/POL Retaining Rings (Sizes -62 to -100)

Install large PO/POL retaining rings 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.

RING SIZE	APP. NO.	BLADE WIDTH
PO-62	A-862	1.125
PO-75	A-875	1.562
PO-100	A-810	1.875
POL-62	A-962	1.125
POL-75	A-975	1.562
POL-100	A-910	1.875

For Dispensing of Radially-Installed C, E/SE, RE, PO/POL, DE, ME and JE Retaining Rings.

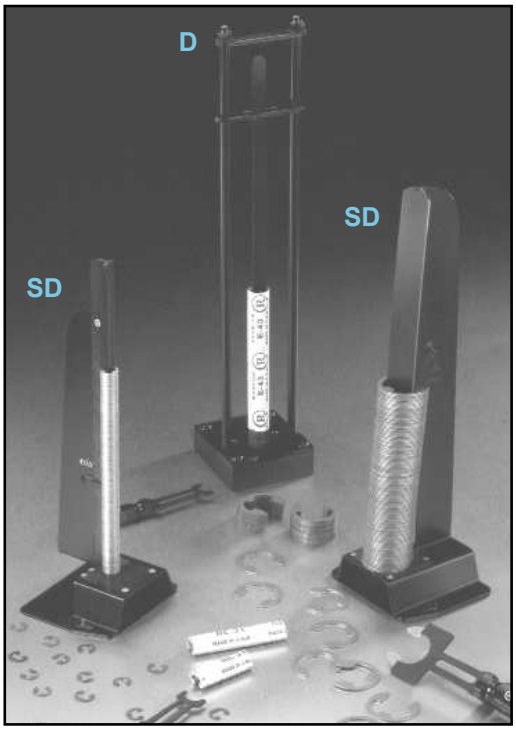
Rotor Clip retaining ring dispensers feature "rail" over which a stack of retaining rings can be slipped. Once in position, they can be "dispensed" one at a time using a retaining ring applicator for ease of installation. Two such models are available to meet you particular dispensing needs:

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.

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 Indentification of Tool and Corresponding Ring.
- Powder Metal Coating for a Durable, No-Rust Finish (Spring Rail Dispenser, Only.)



HEAVY-DUTY DISP.		SPRING-RAIL DISP.	
RING SIZE	DISP. NO.	RING SIZE	DISP. NO.
C-12	D-10	C-12	SD-10
C-15	D-20	C-15	SD-20
C-18	D-30	C-18	SD-30
C-21	D-40	C-21	SD-40
C-23	D-50	C-23	SD-50
C-25	D-60	C-25	SD-60
C-28	D-70	C-28	SD-70
C-31	D-80	C-31	SD-80
C-37	D-90	C-37	SD-90
C-40	D-100	C-40	SD-100
C-43	D-110	C-43	SD-110
C-50	D-120	C-50	SD-120
C-56	D-130	C-56	SD-130
C-62	D-140	C-62	SD-140
C-68	D-150	C-68	SD-150
C-75	D-160	C-75	SD-160
C-81	D-170	C-81	SD-170
C-87	D-180	C-87	SD-180
C-100	D-190	C-100	SD-190
C-112	D-200	C-112	SD-200

HEAVY-DUTY DISP.		SPRING-RAIL DISP.	
RING SIZE	DISP. NO.	RING SIZE	DISP. NO.
SE-6	D-390	SE-6	SD-390
YE-6	D-460	YE-6	SD-460
E-6	D-210	E-6	SD-210
SE-9	D-330	SE-9	SD-395
E-9	D-220	E-9	SD-220
SE-11	D-400	SE-11	SD-400
SE-12	D-231	SE-14	SD-405
SE-14	D-230	E-12	SD-230
E-12	D-230	YE-14	SD-465
YE-14	D-465	E-14	SD-240
E-14	D-240	E-15	SD-250
E-15	D-250	SE-17	SD-410
SE-17	D-410	SE-18	SD-415
SE-18	D-350	E-18	SD-260
E-18	D-260	SE-21	SD-416
SE-21	D-360	E-25	SD-270
E-25	D-270	SE-31	SD-420
SE-31	D-420	SE-43	SD-430
SE-37	D-608	E-37	SD-280
E-37	D-280	E-43	SD-290
E-43	D-290	SE-74	SD-440
SE-43	D-430	E-50	SD-300
E-50	D-300	E-62	SD-305
E-62	D-160	SE-98	SD-450
SE-74	D-440	E-75	SD-310
E-75	D-310	E-87	SD-320
E-87	D-320		
SE-98	D-450		

HEAVY-DUTY DISP.		SPRING-RAIL DISP.	
RING SIZE	DISP. NO.	RING SIZE	DISP. NO.
RE-9	D-330	RE-9	SD-330
RE-12	D-340	RE-12	SD-340
RE-15	D-350	RE-15	SD-350
RE-18	D-260	RE-18	SD-355
RE-21	D-360	RE-21	SD-360
RE-25	D-270	RE-25	SD-365
RE-31	D-370	RE-31	SD-370
RE-37	D-280	RE-37	SD-375
RE-43	D-380	RE-43	SD-380
RE-50	D-300	RE-50	SD-385
RE-56	D-150	RE-56	SD-386

HEAVY-DUTY DISP.	
RING SIZE	DISP. NO.
JE-2.5	D-330
JE-3	D-240
JE-4	D-757
JE-5	D-758
JE-6	D-759
JE-8	D-761
JE-12	D-730

HEAVY-DUTY DISP.	
RING SIZE	DISP. NO.
ME-2	D-210
ME-3	D-230
ME-4	D-250
ME-5	D-260
ME-6	D-360
ME-7	D-270
ME-8	D-370
ME-9	D-690
ME-10	D-280
ME-11	D-290
ME-12	D-660
ME-13	D-300
ME-15	D-672
ME-16	D-160
ME-22	D-320

HEAVY-DUTY DISP.		SPRING-RAIL DISP.	
RING SIZE	DISP. NO.	RING SIZE	DISP. NO.
PO-15	D-800	PO-15	SD-800
PO-18	D-810	PO-18	SD-810
PO-25	D-820	PO-25	SD-820
PO-31	D-830	PO-31	SD-830
PO-37	D-840	PO-37	SD-840
PO-43	D-850	PO-43	SD-850
PO-50	D-860	PO-50	SD-860
POL-15	D-900	POL-15	SD-900
POL-18	D-910	POL-18	SD-910
POL-25	D-820	POL-25	SD-920
POL-31	D-930	POL-31	SD-930
POL-37	D-840	POL-37	SD-940
POL-43	D-950	POL-43	SD-950
POL-50	D-960	POL-50	SD-960

HEAVY-DUTY DISP.		SPRING-RAIL DISP.	
RING SIZE	DISP. NO.	RING SIZE	DISP. NO.
DE-1,2	D-712	DE-1.5	SD-715
DE-1,5	D-715	DE-1,9	SD-719
DE-1,9	D-719	DE-2,3	SD-723
DE-2,3	D-723	DE-3,2	SD-732
DE-3,2	D-732	DE-4	SD-704
DE-4	D-410	DE-5	SD-705
DE-5	D-360	DE-6	SD-706
DE-6	D-360	DE-7	SD-707
DE-7	D-607	DE-8	SD-708
DE-8	D-608	DE-9	SD-709
DE-9	D-610	DE-10	SD-610
DE-10	D-610	DE-12	SD-612
DE-12	D-612		

For Technical Assistance, Call 1-800-55-ROTOR (1-800-557-6867)

Automatic Assembly Tools

Pneumatic Retaining Ring and Hose Clamp Tools for Automated Assembly

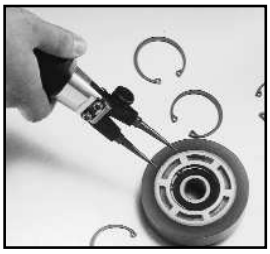
Pneumatic Retaining Ring Tool

These pneumatic hand tools automate assembly using a compressed air line (85 psi). Saves time while eliminiating injury. Pneumatic Retaining Ring Tools are designed to fit the following inch/metric retaining rings: HO, VHO, BHO, HOI, SH, VSH, BSH, SHI, SHR, DHO, DSH, DST, DHT.

Call **1-800-557-6867** for technical information. *Note: Power pack and tips must be purchased together for tool to operate.*

INTERNAL RING SERIES/SIZE RANGE		*TIP NUMBER	*POWER PACK
HO	125-287	TIP-70	PTI-1
VHO	125-287	TIP-70	PTI-1
BHO	125-287	TIP-70	PTI-1
HOI	81-250	TIP-70	PTI-1
DHO	26mm-98mm	TIP-70	PTI-1
DHT	16mm-21mm	TIP-47	PTI-1
	22mm-55mm	TIP-70	PTI-1

EXTERNAL RING SERIES/SIZE RANGE		*TIP NUMBER	*POWER PACK
SH	25-66	TIP-38	PTE-1
VSH	68-87	TIP-47	PTE-1
BSH	93-225	TIP-70	PTE-1
SHI	50-78	TIP-38	PTE-1
	81-100	TIP-47	PTE-1
	106-250	TIP-70	PTE-1
SHR	39-47	TIP-38	PTE-1
	50-66	TIP-47	PTE-1
	75-98	TIP-70	PTE-1
DSH	10mm-21mm	TIP-47	PTE-1
	21mm-55mm	TIP-70	PTE-1
DST	16mm-21mm	TIP-47	PTE-1
	22mm-55mm	TIP-70	PTE-1



Pneumatic SIngle Wire Hose Clamp Tool

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		

Pneumatic Double Wire Hose Clamp Tool

Rotor Clamp HC No.	Pneumatic Installation Tool	Rotor Clamp HC 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

RotorMatics Automated Assembly Retaining Ring Tool - "Rotor Kick Jr." (RKJ)

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.

Ring Series	
E	INQUIRE REGARDING SPECIFIC SIZES
RE	
C	
PO/POL	
RG	

NOTE: Rings must be purchased stacked for use with Rotor Kick tool. In addition to the above, this tool can be used with DE, DC, ME and MRE rings. Please inquire for availability.

Please wear protective eyewear while installing and removing retaining rings and hose clamps.

For Technical Assistance, Call 1-800-55-ROTOR (1-800-557-6867)

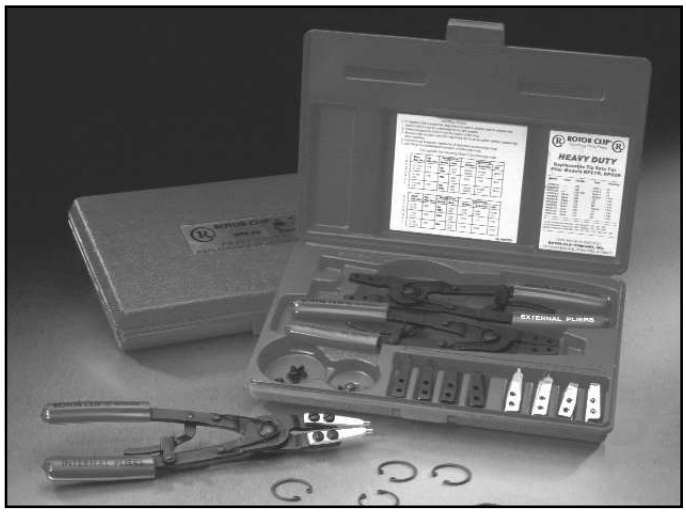
Retaining Ring Plier Kits

Convenient, Portable Rotor Clip 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.

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!



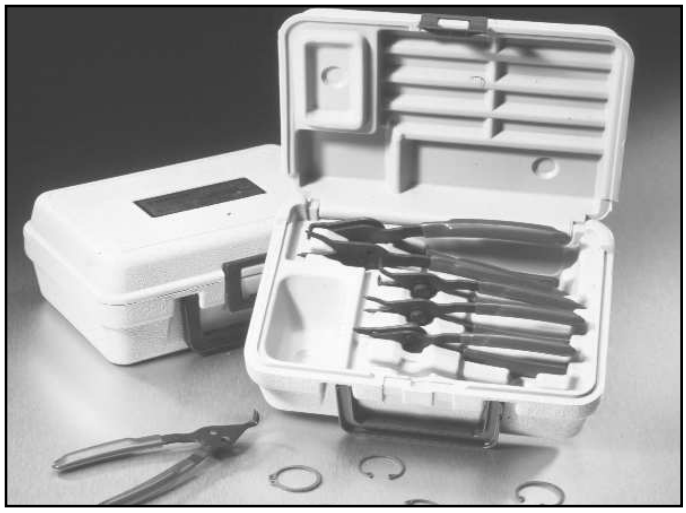
Ratchet Pliers Kit (RPK#2)

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.

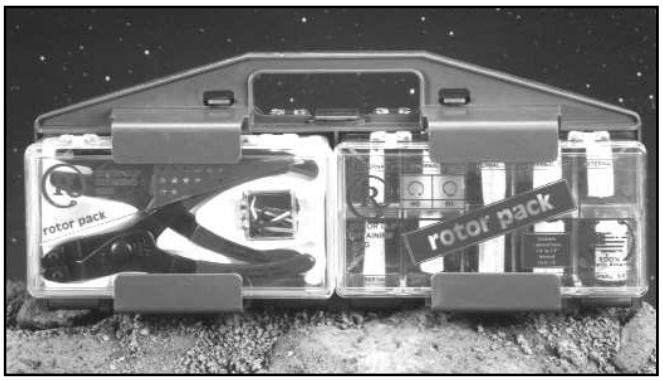
Retaining Ring Kits

Convenient, Portable Rotor Clip Retaining Ring Kits

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".



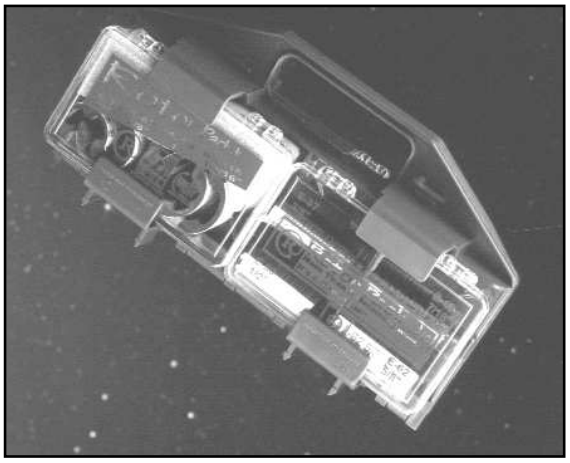
Rotor Pack - RPK#4

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

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 and hose clamps.

For Technical Assistance, Call 1-800-55-ROTOR (1-800-557-6867)

More Than A Retaining Ring...

It's A RotorClip®

Quality Retaining Rings for the Global Marketplace.

QA275 (9/02)