

# Ring Introduction

## Advantages of Spirolox® Retaining Rings

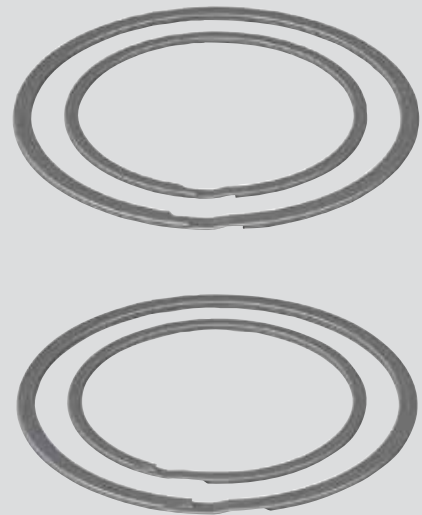
Spirolox Retaining Rings have No Ears to Interfere in your assembly! Spirolox Rings are manufactured by coiling the ring from flat wire. This unique process produces a retaining ring that has no protruding ears or burrs to interfere with your assembly. Because coiling produces a retaining ring with no scrap, the Spirolox Ring can be economically produced in carbon steel, stainless steel, coppers, and many other alloys.

Smalley offers over 6,000 standard parts, which are readily available in both carbon and stainless steel. If you require custom designs, take advantage of Smalley's No-Tooling-Cost process; a process perfect for large runs, prototypes and midstream design changes. Whatever your application, Smalley has the cost-effective and innovative design solution.



## Spirolox Retaining Rings offer many advantages over stamped retaining rings

- No gap - 360° retaining surface
- No protruding ears to interfere with mating components (uniform cross-section)
- Economically produced in stainless steel because the coiling process produces no scrap
- **No-Tooling-Charge** on custom designs
- Easy installation and removal



### Request FREE samples

Get free samples of any standard catalog item at [www.smalley.com/samples](http://www.smalley.com/samples).

Or use form on page 131 of this catalog. Requests typically processed within 24 hours.

## Other Ring Types & Custom Designs



### Constant Section Rings

Another popular choice of retaining ring configurations is the well known Constant Section Ring. Produced by edgewinding with no special tooling charges, Constant Section Rings have been specified for many years in the automotive and heavy equipment industries as a standard choice of engineers.

Smalley has hundreds of standard Constant Section Rings in stock, in carbon steel and stainless steel and in both inch and metric sizes. Special or custom designs can be produced quickly and economically utilizing Smalley's precision No-Tooling-Cost manufacturing process.

Constant Section Rings can withstand high forces and impact loads and are easily installed and removed from their internal or external groove for field servicing your product.



### WaveRing®

The WaveRing is a spiral retaining ring with an axial wave form. It acts like a standard retaining ring with the additional feature of compressibility. It compensates for the overall length tolerance of stacked components, while still acting as a retaining ring. Once assembled the WaveRing will reduce looseness and vibration in the assembly.

Designed to fit into a groove, the WaveRing applies pressure in two directions: against the groove wall and against the assembly components. Single, double or multiple turns in the WaveRing are possible as well as a choice of materials, including our standard 17-7 PH stainless and carbon steel.



### Custom Rings

A major segment of Smalley manufacturing is in "custom" or prototype retaining rings. Common Smalley customs include balanced, multi-turn (4,5,6 turns and more) and special ends in diameters from .200 in – 120 in (5 mm – 3,000 mm) and larger. Smalley engineers are on hand to help you design a ring specific to your application. Because there are no tooling costs, no job is too big or too small. Prototypes can be quickly and economically produced to test a design; in days, not weeks.

### Get CAD downloads

Simplify your design process by downloading CAD models of standard retaining rings and wave springs at [www.smalley.com/cad-models](http://www.smalley.com/cad-models).

## Retaining Ring Selection Guide

# 1

**STEP 1:** Do you need to meet any specifications?

**YES**

**NO**

Specification	Smalley Series
Military MIL- DTL-27426/3 .....	<b>WH</b>
Military MIL- DTL-27426/1 .....	<b>WS</b>
Military MIL- DTL-27426/4 .....	<b>WHM</b>
Military MIL- DTL-27426/2 .....	<b>WSM</b>
Aerospace AS4299, AS3217, AS3219 .....	<b>WH</b>
Aerospace AS4299, AS3218, AS3219 .....	<b>WS</b>
Aerospace AS4299, AS3215, AS3219 .....	<b>WHM</b>
Aerospace AS4299, AS3216, AS3219 .....	<b>WSM</b>
Metric Aerospace MA 4017 .....	<b>EH</b>
Metric Aerospace MA 4016 .....	<b>ES</b>



# 2

**STEP 2:** Do you need to match an alternative ring groove?

**YES**

**NO**

Manufacturer	Smalley Series
Truarc N5000 & 5008 .....	<b>WHM</b>
Truarc 5100 & 5108 .....	<b>WSM</b>
Eaton NAN .....	<b>WHT</b>
Eaton XAN .....	<b>WST</b>
Eaton I-N .....	<b>WHM</b>
Eaton E-N .....	<b>WSM</b>
Industrial RR 3000 & 4000 .....	<b>WHM</b>
Industrial RR 3100 & 4100 .....	<b>WSM</b>
Anderton N1300 .....	<b>WHM</b>
Anderton N1400 .....	<b>WSM</b>
Anderton D1300 .....	<b>DNH</b>
Anderton D1400 .....	<b>DNS</b>
European Specification DIN 472 .....	<b>DNH</b>
European Specification DIN 471 .....	<b>DNS</b>



# 3

**STEP 3A:** Choose by the Thrust Capacity needed OR see step 3B

Standard Units (inches)			
Series	Load <sup>1</sup>	Housing	Shaft
Light Duty	4100	<b>VH</b>	<b>VS</b>
Medium Duty	4950	<b>WH</b>	<b>WS</b>
Medium Heavy Duty	7070	<b>WHT</b>	<b>WST</b>
Heavy Duty	8340	<b>WHM</b>	<b>WSM</b>
Constant Section Rings	8341	<b>FHE</b>	<b>FSE</b>
WaveRing	—	<b>WHW</b>	<b>WSW</b>

<sup>1</sup> Representative example shows the load capacity (lb) for a 2" ring.

Metric Units (mm)			
Series	Load <sup>1</sup>	Housing	Shaft
Light Duty	18.03	<b>VHM</b>	<b>VSM</b>
DIN Series <sup>2</sup>	36.55	<b>DNH</b>	<b>DNS</b>
Aerospace Series	38.96	<b>EH</b>	<b>ES</b>
Constant Section Rings	36.53	<b>FH</b>	<b>FS</b>

<sup>1</sup> Representative example shows the load capacity (kN) for a 50 mm ring.

<sup>2</sup> Manufactured to DIN groove specifications.

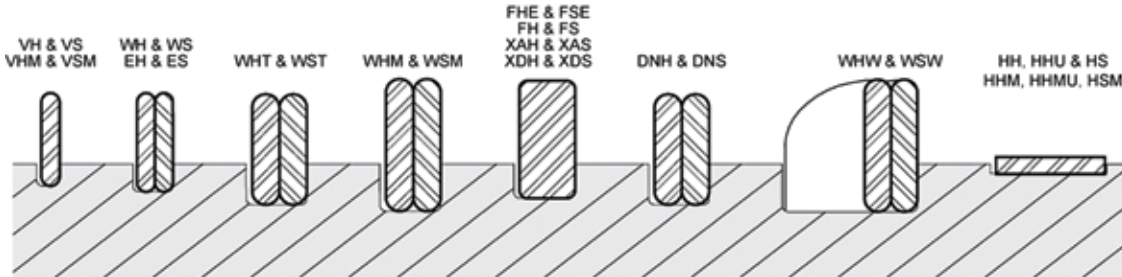
**STEP 3B:** Still not sure?

Use Smalley's most popular series, Medium Duty WH (internal) or WS (external).

Ask for a free sample.

## Relative proportions of rings in grooves

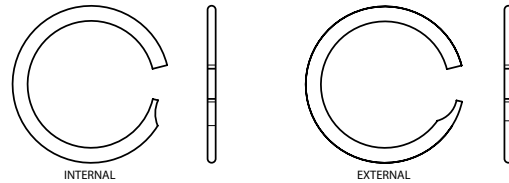
A cross-section of each Spirolox Retaining Ring configuration is illustrated, comparing groove and ring sections in the same diameter bore or shaft. The heavier retaining ring cross-sections are in deeper and wider grooves, to provide significantly greater thrust capacity.



### Ring Types

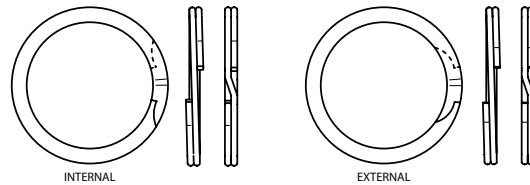
#### Spirolox Retaining Rings—Single Turn (1-Turn)

VH & VS — Light Duty, inch  
VHM & VSM — Light Duty, metric



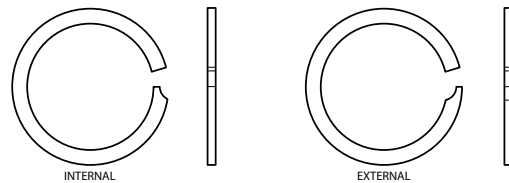
#### Spirolox Retaining Rings—2-Turn

WH & WS — Medium Duty, inch  
WHT & WST — Medium Heavy Duty, inch  
WHM & WSM — Heavy Duty, inch  
EH & ES — Medium Duty, Metric Aerospace  
DNH & DNS — Heavy Duty DIN, metric



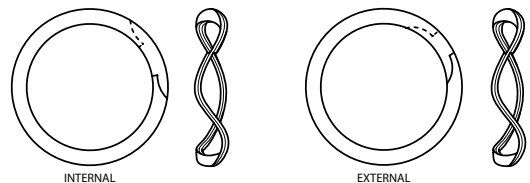
#### Constant Section Rings

FHE & FSE — Heavy Duty, inch  
FH & FS — Heavy Duty, metric  
\*XAH & XAS — Eaton Style, inch  
\*XDH & XDS — Eaton Style, inch



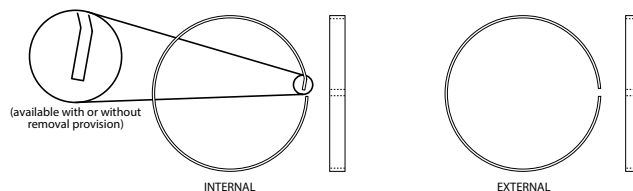
#### WaveRings

WHW & WSW — inch



#### Hoopster Rings

HH, HHU & HS — inch  
HHM, HHMU & HSM — metric



\*End configurations vary by size; see page 126 for Constant Section Ring end configurations.

# Selection Guide

## Interchange Listing

Smalley Retaining Rings are interchangeable with both inch and metric retaining ring grooves. Smalley offers free samples of all stock retaining rings to test in your application.

Cross reference a standard stamped ring or snap ring to find the appropriate Smalley Retaining Ring to fit your application.

SMALLEY®	SPIROLOX® SERIES	MILITARY MIL-DTL-27426	AEROSPACE AS3219	METRIC AEROSPACE MA 4035	EUROPEAN SPECIFICATION DIN	WALDES TRUARC	EATON	INDUSTRIAL RETAINING RING	OTHER RINGS	ANDERTON
VH	UR	---	---	---						
VS	US	---	---	---						
WH	RR	/3	AS4299 AS3217	---						
WS	RS	/1	AS4299 AS3218	---						
WHT	RRT	---	---	---	---	---	NAN	---	UHB	---
WST	RST	---	---	---	---	---	XAN	---	USC	---
WHM	RRN	/4	AS4299 AS3215	---	---	N5000 5008	IN	3000 4000	HO HOI UHO	N1300
WSM	RSN	/2	AS4299 AS3216	---	---	5100 5108	EN	3100 4100	SH SHI USH	N1400
DNH	---	---	---	---	DIN 472	---	---	---	DHO	D1300
DNS	---	---	---	---	DIN 471	---	---	---	DSH	D1400
EH	---	---	---	MA 4017	---	---	---	---	---	---
ES	---	---	---	MA 4016	---	---	---	---	---	---
FH	---	---	---	---	DIN 472	---	---	---	DHO	D1300
FS	---	---	---	---	DIN 471	---	---	---	DSH	D1400
XAH	---	---	---	---	---	---	NAN	---	UHB	---
XAS	---	---	---	---	---	---	XAN	---	USC	---
XDH	---	---	---	---	---	---	ND	---	HN	---
XDS	---	---	---	---	---	---	XD	---	SNL	---
XNH	---	---	---	---	---	---	IN	---	UHO	---
XNS	---	---	---	---	---	---	EN	---	USH	---

**Groove Interchange Only**  
Use a Smalley Retaining Ring to fit into the same groove of these stamped Retaining Rings (circlips).



**A. Rubber Boot**  
A 2-Turn Spirolox Retaining Ring clamps the rubber boot onto the groove making for a nearly perfect seal when the boot is filled with grease. The ring has been deburred so it will not tear into the rubber.

**B. Pneumatic Fitting**  
An economical (without removal notches or offset) 2-Turn Spirolox Retaining Ring creates an ID/OD lock, permitting the 360° rotation of the nut. This permanent assembly is commonly used to hold two components together.

**C. Conduit Connector**  
In this unique application, a Dished Retaining Ring was designed with sharp edges, to bite into the conduit it holds in place. The clamping force of the ring to the conduit (not shown) is achieved by screwing the nut. This decreases the ring's diameter as it advances in a tapered bore.

**D. Gear Bracket**  
The worm gear shaft is held in place and pre-loaded using a 2-Turn Smalley WaveRing. The WaveRing fits an internal groove and the waveform in the ring allows the gear/shaft to float axially as the gear rotates.

**E. Ratchet Wrench**  
This Single-Turn (it is actually 1 1/2 turns) External Retaining Ring retains the internal mechanical components of the ratchet wrench. The additional 1/2 turn provides that little extra strength needed to prevent the ring from dislodging when the wrench is dropped.

**F. Cylinder Housing**  
The Hoopster Retaining Ring in this application allows for a shallow groove in the cylinder housing without compromising the ability to have high forces applied to the Hoopster. Because the cylinder is thin, a normal retaining ring groove could not be used.

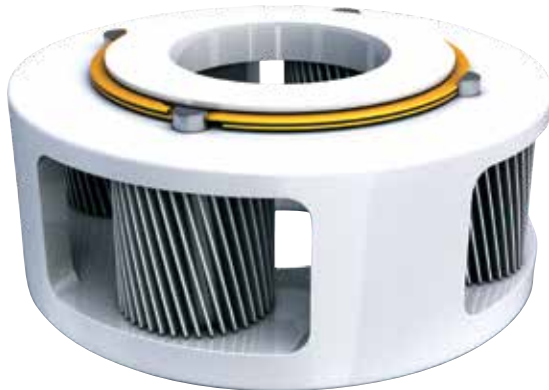


# Ring Applications

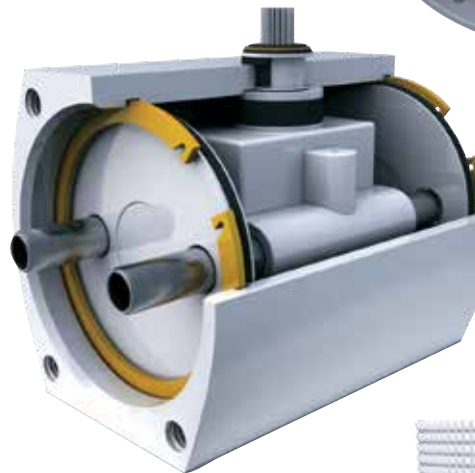


**G. Bike Lock**

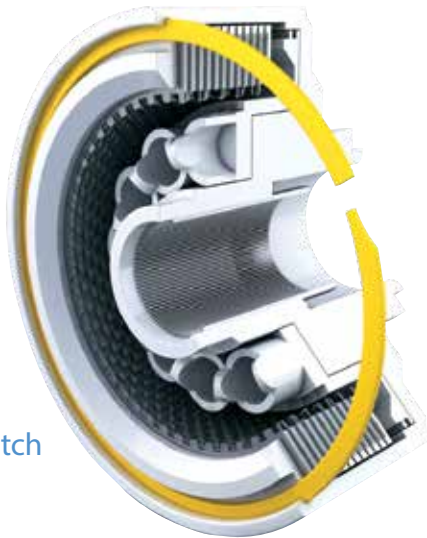
**H. Pressure Gauge**



**I. Gear Assembly**



**J. Actuator Valve**



**K. Pneumatic Clutch**



**L. Hose Fitting**

## **G. Bike Lock**

Tamper-proof ring holds the lock assembly within its housing. The ring is considered tamper-proof because of reversed removal notches. Also, having a heavy cross-section makes the ring nearly impossible to remove.

## **H. Pressure Gauge**

A retaining ring designed in a shallow groove exerts very light pressure on the glass lens in this pressure gauge. This single-turn retaining ring design provides the optimum load without breaking the glass.

## **I. Gear Assembly**

External 2-Turn retaining ring prevents the pinion shafts from spinning when the gears are rotating. The Spirolox ring snaps securely on the groove and the ring's radial wall is designed to extend radially outward, clearing the four flat pinion shaft pins by .020".

## **J. Actuator Valve**

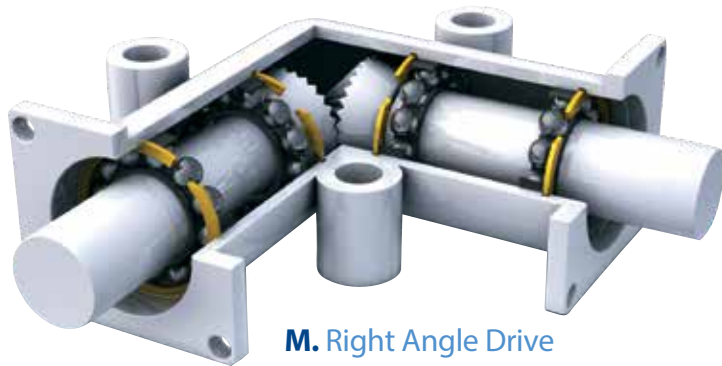
High thrust capacity was needed and a constant section ring was selected to absorb the occasional shock loading of the pistons.

## **K. Pneumatic Clutch**

The internal components of this clutch are held in the housing using a heavy-duty constant section ring ring. Field servicing was often necessary and the snap ring was the ideal solution to the design requirement.

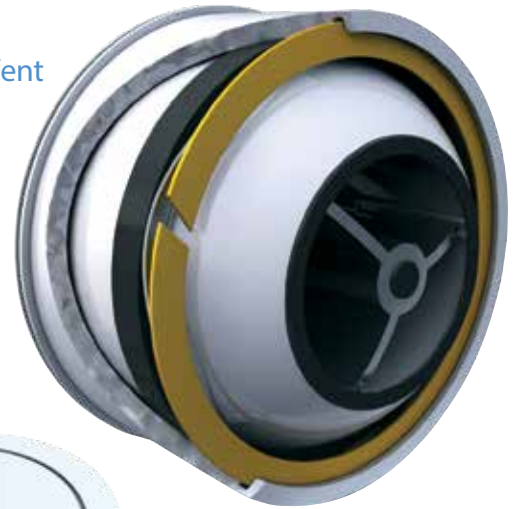
## **L. Hose Fitting**

To keep the cap on the fitting, a single-turn retaining ring is located in a shallow internal groove. The wall thickness of the cap is small, so the ring was designed with square corners to operate in a very shallow groove.



**M. Right Angle Drive**

**N. Air Vent**



**O. Pulley**



**P. Belt Pulley**



**Q. ID/OD Lock**



**R. Hip Replacement**

**M. Right Angle Drive**

Constant section rings secure the bearing assembly by providing removable shoulders in the bore. This simplifies the design of the gear box and replaces costly flanged end plates.

**N. Air Vent**

Single-turn, light-duty retaining ring fits tightly in the internal groove of a plastic air vent. Ring ends are dimensioned close together, providing nearly complete 360° ring support.

**O. Pulley**

2-Turn retaining rings provide 360° side walls as sides of the timing belt pulley. Design eliminates costly pressed-on stamped side walls. For belt replacement one ring can be easily removed.

**P. Belt Pulley**

Three hold down screws and a 2-Turn Spirolox Ring form a bi-directional shoulder. The shaft is inserted through the pulley and the retaining ring rests on the pulley face securing the shaft in one direction. Movement is prevented in the other direction with the three screws clamping down on the ring.

**Q. ID/OD Lock**

Single-turn retaining ring operates in an internal and external groove at the same time, commonly referred to as an ID/OD Lock. In this application, the ring fits tight on the body (shaft) groove and extends radially into the nut (housing). This allows the nut to spin freely but not come off the body.

**R. Hip Replacement**

A titanium Spirolox Retaining Ring is used in this hip replacement application to secure the shell and the liner together to form the socket of the new hip. Smalley's manufacturing process allows for the economical production of special alloy products.



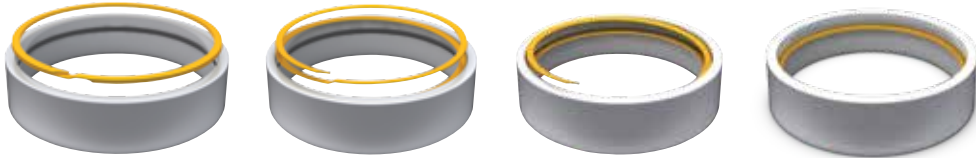
# Assembly Methods

## Manual Installation

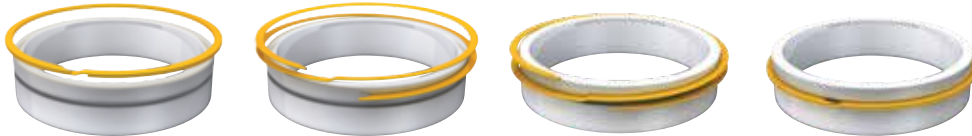
Manual installation on an individual or low production basis is accomplished as follows:

- Separate the ring coils and insert one end of the ring into the groove.
- Wind the ring by pressing down around the circumference until the entire ring is inserted into the groove.

Housing:

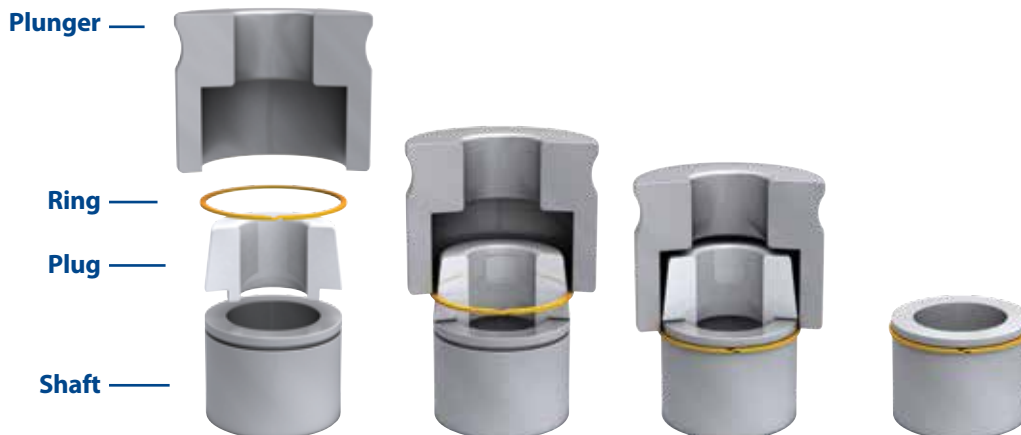


Shaft:

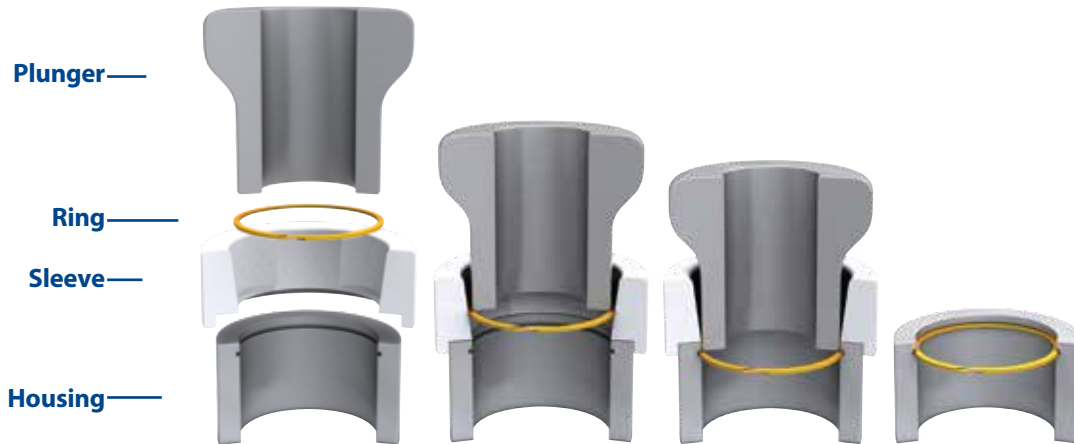


## Semi-Automated and Automated Installation

For higher speed and automated assembly operations, simple tooling or assembly fixtures can be designed. External installation on a shaft can be accomplished with a plunger and tapered plug. The plug, angled at approximately 6 degrees, is centered over the shaft end. A loose fitting plunger pushes the ring into position over the tapered plug. An arbor press or air cylinder is commonly used to automate this assembly operation.



Internal retaining ring installation is accomplished in a similar manner. A tapered bore, which acts as a ring contracting guide, and a plunger pushes the retaining ring into position. Tooling for ring installation should have hardened working surfaces to minimize wear.



Using Screwdriver



Using Dental Pick



## Removal

Smalley Retaining Rings are supplied standard with removal notches to enable easy extraction from a groove. The notch is provided to form a small gap between the ring end and the shaft or housing, permitting a blunt object to be inserted at the end of the ring to pry the free end out radially and up.

- Insert a screwdriver or dental pick behind the removal notch.
- Use the tool to pry out the first end of the ring.
- Manually spiral the ring around until it is free from the groove.

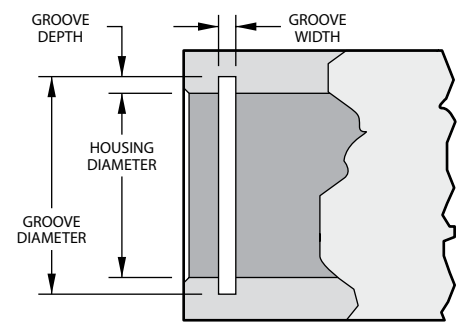
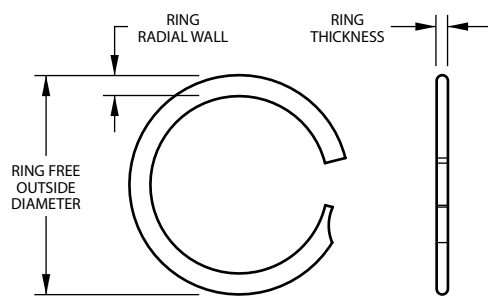
## Smalley Tooling

Smalley's Spirolox Retaining Ring Removal Tool, part number RT-107, fits between the layers of a multiple turn retaining ring in order to access the removal notch. The end of the tool bit is slotted for the tip of the notch end to pass through. Once inserted, the ring end may be pulled out radially and up.

Visit [www.smalley.com/retaining-rings/installation-and-removal](http://www.smalley.com/retaining-rings/installation-and-removal) for more information about installation and removal.

# VH Series - Light Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
VH-25 <sup>5,6</sup>	.250	.264	.020	.012	.262	.015	106	481
VH-31 <sup>5,6</sup>	.312	.329	.025	.015	.326	.018	154	750
VH-37 <sup>5,6</sup>	.375	.398	.030	.015	.395	.018	265	901
VH-43 <sup>6</sup>	.437	.466	.030	.015	.463	.018	402	1,050
VH-50	.500	.531	.045	.018	.528	.022	500	1,300
VH-56	.562	.593	.045	.018	.590	.022	560	1,460
VH-62	.625	.656	.045	.018	.653	.022	620	1,630
VH-68	.687	.719	.045	.018	.715	.022	680	1,790
VH-75	.750	.783	.045	.018	.779	.022	800	1,950
VH-81	.812	.862	.065	.021	.854	.026	1,210	2,460
VH-87	.875	.926	.065	.021	.917	.026	1,300	2,660
VH-93	.937	.989	.065	.021	.979	.026	1,390	2,840
VH-100	1.000	1.052	.065	.021	1.042	.026	1,480	3,040
VH-106	1.062	1.117	.088	.025	1.106	.031	1,650	3,500
VH-112	1.125	1.180	.088	.025	1.169	.031	1,750	3,710
VH-118	1.187	1.242	.088	.025	1.231	.031	1,850	3,920
VH-125	1.250	1.307	.088	.025	1.294	.031	1,940	4,120
VH-131	1.312	1.369	.088	.025	1.356	.031	2,040	4,330
VH-137	1.375	1.433	.088	.025	1.419	.031	2,140	4,540
VH-143	1.437	1.496	.088	.025	1.481	.031	2,240	4,740
VH-150	1.500	1.559	.088	.025	1.544	.031	2,330	4,950
VH-156	1.562	1.637	.118	.031	1.619	.039	3,200	6,390
VH-162	1.625	1.701	.118	.031	1.682	.039	3,330	6,650
VH-168	1.687	1.763	.118	.031	1.744	.039	3,460	6,900
VH-175	1.750	1.827	.118	.031	1.807	.039	3,590	7,160
VH-181	1.812	1.890	.118	.031	1.869	.039	3,710	7,410
VH-187	1.875	1.953	.118	.031	1.932	.039	3,840	7,670
VH-193	1.937	2.016	.118	.031	1.994	.039	3,970	7,920
VH-200	2.000	2.079	.118	.031	2.057	.039	4,100	8,180
VH-206	2.062	2.162	.158	.031	2.138	.039	5,540	8,430
VH-212	2.125	2.226	.158	.031	2.201	.039	5,710	8,690
VH-218	2.187	2.289	.158	.031	2.263	.039	5,870	8,950
VH-225	2.250	2.352	.158	.031	2.326	.039	6,040	9,200
VH-231	2.312	2.415	.158	.031	2.388	.039	6,210	9,460
VH-237	2.375	2.478	.158	.031	2.451	.039	6,380	9,720
VH-243	2.437	2.541	.158	.031	2.513	.039	6,550	9,970
VH-250	2.500	2.605	.158	.031	2.576	.039	6,720	10,230
VH-256	2.562	2.667	.158	.031	2.638	.039	6,880	10,480
VH-262	2.625	2.731	.158	.031	2.701	.039	7,050	10,740
VH-268	2.687	2.794	.158	.031	2.763	.039	7,220	10,990
VH-275	2.750	2.857	.158	.031	2.826	.039	7,390	11,250
VH-281	2.812	2.920	.158	.031	2.888	.039	7,550	11,500
VH-287	2.875	2.983	.158	.031	2.951	.039	7,720	11,760
VH-293	2.937	3.046	.158	.031	3.013	.039	7,890	12,010
VH-300	3.000	3.110	.158	.031	3.076	.039	8,060	12,270

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> No removal notch.

<sup>6</sup> Square edge wire.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
VH-306	3.062	3.188	.188	.039	3.154	.044	9,960	15,760
VH-312	3.125	3.251	.188	.039	3.217	.044	10,160	16,080
VH-318	3.187	3.314	.188	.039	3.279	.044	10,360	16,400
VH-325	3.250	3.377	.188	.039	3.342	.044	10,570	16,720
VH-331	3.312	3.440	.188	.039	3.404	.044	10,770	17,040
VH-337	3.375	3.504	.188	.039	3.467	.044	10,970	17,370
VH-343	3.437	3.566	.188	.039	3.529	.044	11,180	17,690
VH-350	3.500	3.630	.188	.039	3.592	.044	11,380	18,010
VH-356	3.562	3.692	.188	.039	3.654	.044	11,580	18,330
VH-362	3.625	3.756	.188	.039	3.717	.044	11,790	18,650
VH-368	3.687	3.819	.188	.039	3.779	.044	11,990	18,970
VH-375	3.750	3.882	.188	.039	3.842	.044	12,190	19,300
VH-381	3.812	3.945	.188	.039	3.904	.044	12,400	19,620
VH-387	3.875	4.009	.188	.039	3.967	.044	12,600	19,940
VH-393	3.937	4.071	.188	.039	4.029	.044	12,800	20,260
VH-400	4.000	4.135	.188	.039	4.092	.044	13,010	20,580
VH-412	4.125	4.279	.225	.046	4.235	.052	16,040	23,850
VH-425	4.250	4.405	.225	.046	4.360	.052	16,520	24,570
VH-437	4.375	4.531	.225	.046	4.485	.052	17,010	25,290
VH-450	4.500	4.658	.225	.046	4.610	.052	17,500	26,010
VH-462	4.625	4.784	.225	.046	4.735	.052	17,980	26,740
VH-475	4.750	4.910	.225	.046	4.860	.052	18,470	27,460
VH-487	4.875	5.036	.225	.046	4.985	.052	18,950	28,180
VH-500	5.000	5.163	.225	.046	5.110	.052	19,440	28,900
VH-525	5.250	5.435	.225	.061	5.381	.067	24,490	40,240
VH-550	5.500	5.694	.225	.061	5.638	.067	26,830	42,160
VH-575	5.750	5.953	.225	.061	5.894	.067	29,260	44,080
VH-600	6.000	6.212	.265	.061	6.150	.067	31,810	45,990
VH-625	6.250	6.470	.265	.061	6.406	.067	34,460	47,910
VH-650	6.500	6.730	.265	.061	6.663	.067	37,680	49,830
VH-675	6.750	6.988	.265	.061	6.919	.067	40,560	51,740
VH-700	7.000	7.247	.265	.061	7.175	.067	43,540	53,660
VH-725	7.250	7.505	.265	.061	7.431	.067	46,640	55,580
VH-750	7.500	7.765	.265	.061	7.688	.067	49,830	57,490
VH-775	7.750	8.023	.300	.061	7.944	.067	53,140	59,410
VH-800	8.000	8.282	.300	.061	8.200	.067	56,550	61,320
VH-825	8.250	8.541	.300	.061	8.456	.067	60,070	63,240
VH-850	8.500	8.800	.300	.061	8.713	.067	64,290	65,160
VH-875	8.750	9.059	.345	.076	8.969	.082	68,040	83,570
VH-900	9.000	9.317	.345	.076	9.225	.082	71,890	85,950
VH-925	9.250	9.576	.345	.076	9.481	.082	75,850	88,340
VH-950	9.500	9.835	.345	.076	9.738	.082	79,910	90,730
VH-975	9.750	10.094	.345	.076	9.994	.082	84,080	93,120
VH-1000	10.000	10.353	.345	.076	10.250	.082	88,360	95,500

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

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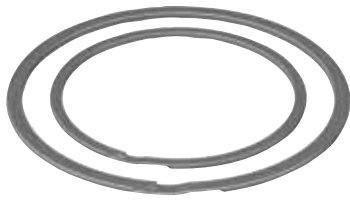
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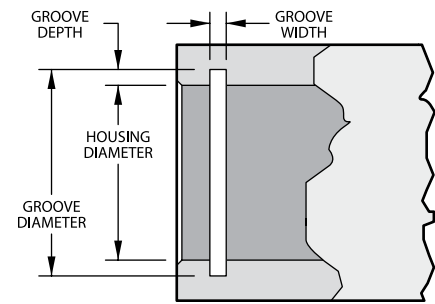
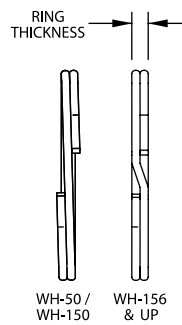
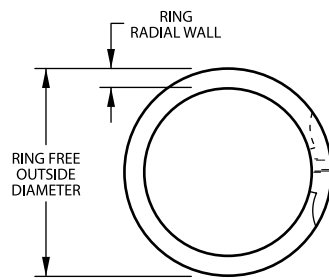
Simplify your design process by downloading CAD models of standard retaining rings and wave springs at [www.smalley.com/cad-models](http://www.smalley.com/cad-models).

# WH Series - Medium Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



AS3217, AS4299  
MIL-DTL-27426/3



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WH-50	.500	.532	.045	.025	.526	.030	460	2,000
WH-51	.512	.544	.045	.025	.538	.030	470	2,050
WH-53	.531	.564	.045	.025	.557	.030	490	2,130
WH-56	.562	.594	.045	.025	.588	.030	520	2,250
WH-59	.594	.626	.045	.025	.619	.030	550	2,380
WH-62	.625	.658	.045	.025	.651	.030	570	2,500
WH-65	.656	.689	.045	.025	.682	.030	600	2,630
WH-68	.687	.720	.045	.025	.713	.030	630	2,750
WH-71	.718	.751	.045	.025	.744	.030	660	2,870
WH-75	.750	.790	.065	.031	.782	.036	850	3,360
WH-77	.777	.817	.065	.031	.808	.036	880	3,480
WH-78	.781	.821	.065	.031	.812	.036	880	3,500
WH-81	.812	.853	.065	.031	.843	.036	920	3,640
WH-84	.843	.889	.065	.031	.880	.036	1,130	3,780
WH-86	.866	.913	.065	.031	.903	.036	1,160	3,880
WH-87	.875	.922	.065	.031	.912	.036	1,180	3,920
WH-90	.906	.949	.065	.031	.939	.036	1,220	4,060
WH-93	.938	.986	.065	.031	.975	.036	1,260	4,200
WH-96	.968	1.025	.075	.037	1.015	.042	1,440	5,180
WH-98	.987	1.041	.075	.037	1.030	.042	1,470	5,280
WH-100	1.000	1.054	.075	.037	1.043	.042	1,480	5,350
WH-102	1.023	1.078	.075	.037	1.066	.042	1,520	5,470
WH-103	1.031	1.084	.075	.037	1.074	.042	1,530	5,510
WH-106	1.062	1.117	.075	.037	1.104	.042	1,580	5,680
WH-109	1.093	1.147	.075	.037	1.135	.042	1,620	5,840
WH-112	1.125	1.180	.075	.037	1.167	.042	1,670	6,020
WH-115	1.156	1.210	.075	.037	1.198	.042	1,720	6,180
WH-118	1.188	1.249	.085	.043	1.236	.048	2,020	7,380
WH-121	1.218	1.278	.085	.043	1.266	.048	2,070	7,570
WH-125	1.250	1.312	.085	.043	1.298	.048	2,120	7,770
WH-128	1.281	1.342	.085	.043	1.329	.048	2,170	7,960
WH-131	1.312	1.374	.085	.043	1.360	.048	2,230	8,150
WH-134	1.343	1.408	.085	.043	1.395	.048	2,470	8,350
WH-137	1.375	1.442	.095	.043	1.427	.048	2,530	8,540
WH-140	1.406	1.472	.095	.043	1.458	.048	2,580	8,740
WH-143	1.437	1.504	.095	.043	1.489	.048	2,640	8,930
WH-145	1.456	1.523	.095	.043	1.508	.048	2,680	9,050
WH-146	1.468	1.535	.095	.043	1.520	.048	2,700	9,120
WH-150	1.500	1.567	.095	.043	1.552	.048	2,760	9,320
WH-156	1.562	1.634	.108	.049	1.617	.056	3,090	10,100
WH-157	1.574	1.649	.108	.049	1.633	.056	3,340	10,180
WH-162	1.625	1.701	.108	.049	1.684	.056	3,350	10,510
WH-165	1.653	1.730	.108	.049	1.712	.056	3,510	10,690
WH-168	1.687	1.768	.118	.049	1.750	.056	3,700	10,910
WH-175	1.750	1.834	.118	.049	1.813	.056	3,840	11,310
WH-181	1.813	1.894	.118	.049	1.875	.056	3,970	11,720
WH-185	1.850	1.937	.118	.049	1.917	.056	4,450	11,960

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.



Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WH-187	1.875	1.960	.118	.049	1.942	.056	4,510	12,120
WH-193	1.938	2.025	.118	.049	2.005	.056	4,660	12,530
WH-200	2.000	2.091	.128	.049	2.071	.056	4,950	12,930
WH-204	2.047	2.138	.128	.049	2.118	.056	5,060	13,240
WH-206	2.062	2.154	.128	.049	2.132	.056	5,100	13,330
WH-212	2.125	2.217	.128	.049	2.195	.056	5,260	13,740
WH-216	2.165	2.260	.138	.049	2.239	.056	5,660	14,000
WH-218	2.188	2.284	.138	.049	2.262	.056	5,720	14,150
WH-225	2.250	2.347	.138	.049	2.324	.056	5,890	14,550
WH-231	2.312	2.413	.138	.049	2.390	.056	6,370	14,950
WH-237	2.375	2.476	.138	.049	2.453	.056	6,550	15,360
WH-243	2.437	2.543	.148	.049	2.519	.056	7,060	15,760
WH-244	2.440	2.546	.148	.049	2.522	.056	7,070	15,780
WH-250	2.500	2.606	.148	.049	2.582	.056	7,250	16,160
WH-253	2.531	2.641	.148	.049	2.617	.056	7,690	16,360
WH-256	2.562	2.673	.148	.049	2.648	.056	7,790	16,560
WH-262	2.625	2.736	.148	.049	2.711	.056	7,980	16,970
WH-267	2.677	2.789	.158	.049	2.767	.056	8,520	17,310
WH-268	2.688	2.803	.158	.049	2.778	.056	8,550	17,380
WH-275	2.750	2.865	.158	.049	2.841	.056	8,750	17,780
WH-281	2.813	2.929	.158	.049	2.903	.056	8,950	18,190
WH-283	2.834	2.954	.168	.049	2.928	.056	9,520	18,320
WH-287	2.875	2.995	.168	.049	2.969	.056	9,550	18,590
WH-293	2.937	3.058	.168	.049	3.031	.056	9,760	18,990
WH-295	2.952	3.073	.168	.049	3.046	.056	9,810	19,090
WH-300	3.000	3.122	.168	.061	3.096	.068	10,180	24,150
WH-306	3.062	3.186	.168	.061	3.158	.068	10,390	24,650
WH-312	3.125	3.251	.178	.061	3.223	.068	10,600	25,150
WH-314	3.149	3.276	.178	.061	3.247	.068	10,680	25,350
WH-318	3.187	3.311	.178	.061	3.283	.068	10,810	25,650
WH-325	3.250	3.379	.178	.061	3.350	.068	11,490	26,160
WH-331	3.312	3.446	.188	.061	3.416	.068	12,170	26,660
WH-334	3.346	3.479	.188	.061	3.450	.068	12,300	26,930
WH-337	3.375	3.509	.188	.061	3.479	.068	12,410	27,170
WH-343	3.437	3.574	.188	.061	3.543	.068	12,880	27,660
WH-350	3.500	3.636	.188	.061	3.606	.068	13,110	28,170
WH-354	3.543	3.684	.198	.061	3.653	.068	13,770	28,520
WH-356	3.562	3.703	.198	.061	3.672	.068	13,850	28,670
WH-362	3.625	3.769	.198	.061	3.737	.068	14,350	29,180
WH-368	3.687	3.832	.198	.061	3.799	.068	14,600	29,680
WH-374	3.740	3.885	.198	.061	3.852	.068	14,800	30,100
WH-375	3.750	3.894	.198	.061	3.862	.068	14,840	30,180
WH-381	3.812	3.963	.208	.061	3.930	.068	15,900	30,680
WH-387	3.875	4.025	.208	.061	3.993	.068	16,160	31,190
WH-393	3.938	4.089	.208	.061	4.056	.068	16,420	31,700
WH-400	4.000	4.157	.218	.061	4.124	.068	17,530	32,200
WH-406	4.063	4.222	.218	.061	4.187	.068	17,810	32,700
WH-412	4.125	4.284	.218	.061	4.249	.068	18,080	33,200
WH-418	4.188	4.347	.218	.061	4.311	.068	18,350	33,710
WH-425	4.250	4.416	.228	.061	4.380	.068	19,530	34,210
WH-431	4.312	4.479	.228	.061	4.442	.068	19,810	34,710
WH-433	4.330	4.497	.228	.061	4.460	.068	19,900	34,850
WH-437	4.375	4.543	.228	.061	4.505	.068	20,100	35,210
WH-443	4.437	4.611	.238	.061	4.573	.068	21,330	35,710
WH-450	4.500	4.674	.238	.061	4.636	.068	21,630	36,220
WH-452	4.527	4.701	.238	.061	4.663	.068	21,760	36,440
WH-456	4.562	4.737	.238	.061	4.698	.068	21,930	36,720
WH-462	4.625	4.803	.250	.072	4.765	.079	22,890	43,940
WH-468	4.687	4.867	.250	.072	4.827	.079	23,190	44,530
WH-472	4.724	4.903	.250	.072	4.864	.079	23,370	44,880
WH-475	4.750	4.930	.250	.072	4.890	.079	23,500	45,130
WH-481	4.812	4.993	.250	.072	4.952	.079	23,810	45,720

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

# WH Series - Medium Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY

Stock Items available in carbon steel and 302 and 316 stainless steel.

Product Dimensions All dimensions in inches unless otherwise specified.

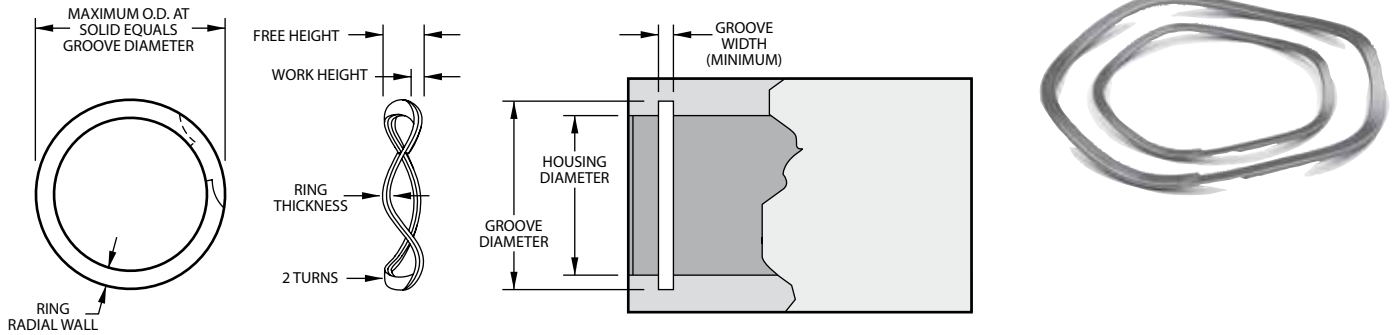
Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WH-487	4.875	5.055	.250	.072	5.015	.079	24,120	46,310
WH-492	4.921	5.102	.250	.072	5.061	.079	24,350	46,750
WH-493	4.937	5.122	.250	.072	5.081	.079	25,130	46,900
WH-500	5.000	5.185	.250	.072	5.144	.079	25,450	47,500
WH-511	5.118	5.304	.250	.072	5.262	.079	26,050	48,620
WH-512	5.125	5.311	.250	.072	5.269	.079	26,100	48,690
WH-525	5.250	5.436	.250	.072	5.393	.079	26,720	49,880
WH-537	5.375	5.566	.250	.072	5.522	.079	28,120	51,060
WH-550	5.500	5.693	.250	.072	5.647	.079	28,770	52,250
WH-551	5.511	5.703	.250	.072	5.658	.079	28,830	52,360
WH-562	5.625	5.818	.250	.072	5.772	.079	29,400	53,440
WH-570	5.708	5.909	.250	.072	5.861	.079	31,070	54,230
WH-575	5.750	5.950	.250	.072	5.903	.079	31,300	54,630
WH-587	5.875	6.077	.250	.072	6.028	.079	31,980	55,810
WH-590	5.905	6.106	.250	.072	6.058	.079	32,140	56,100
WH-600	6.000	6.202	.250	.072	6.153	.079	32,660	57,000
WH-612	6.125	6.349	.312	.086	6.297	.094	37,200	69,500
WH-625	6.250	6.474	.312	.086	6.422	.094	37,990	70,920
WH-629	6.299	6.524	.312	.086	6.471	.094	38,290	71,480
WH-637	6.375	6.601	.312	.086	6.547	.094	38,750	72,340
WH-650	6.500	6.726	.312	.086	6.672	.094	39,510	73,760
WH-662	6.625	6.863	.312	.086	6.807	.094	42,620	75,180
WH-669	6.692	6.931	.312	.086	6.874	.094	43,050	75,940
WH-675	6.750	6.987	.312	.086	6.932	.094	43,420	76,600
WH-687	6.875	7.114	.312	.086	7.057	.094	44,220	78,010
WH-700	7.000	7.239	.312	.086	7.182	.094	45,030	79,430
WH-708	7.086	7.337	.312	.086	7.278	.094	48,080	80,410
WH-712	7.125	7.376	.312	.086	7.317	.094	48,350	80,850
WH-725	7.250	7.501	.312	.086	7.442	.094	49,200	82,270
WH-737	7.375	7.628	.312	.086	7.567	.094	50,050	83,690
WH-748	7.480	7.734	.312	.086	7.672	.094	50,760	84,880
WH-750	7.500	7.754	.312	.086	7.692	.094	50,890	85,110
WH-762	7.625	7.890	.312	.086	7.827	.094	54,440	86,520
WH-775	7.750	8.014	.312	.086	7.952	.094	55,330	87,940
WH-787	7.875	8.131	.312	.086	8.077	.094	63,360	89,360
WH-800	8.000	8.266	.312	.086	8.202	.094	57,110	90,780
WH-825	8.250	8.528	.375	.086	8.462	.094	61,820	93,620
WH-826	8.267	8.546	.375	.086	8.479	.094	61,940	93,810
WH-846	8.464	8.744	.375	.086	8.676	.094	63,420	96,050
WH-850	8.500	8.780	.375	.086	8.712	.094	63,690	96,450
WH-875	8.750	9.041	.375	.086	8.972	.094	68,650	99,290
WH-885	8.858	9.151	.375	.086	9.080	.094	69,500	100,520
WH-900	9.000	9.293	.375	.086	9.222	.094	70,620	102,130
WH-905	9.055	9.359	.375	.086	9.287	.094	74,250	102,750
WH-925	9.250	9.555	.375	.086	9.482	.094	75,850	104,960
WH-944	9.448	9.755	.375	.086	9.680	.094	77,470	107,210
WH-950	9.500	9.806	.375	.086	9.732	.094	77,900	107,800
WH-975	9.750	10.068	.375	.086	9.992	.094	83,390	110,640
WH-1000	10.000	10.320	.375	.086	10.242	.094	85,530	113,470
WH-1025	10.250	10.582	.375	.086	10.502	.094	91,290	116,310
WH-1050	10.500	10.834	.375	.086	10.752	.094	93,520	119,150
WH-1075	10.750	11.095	.375	.086	11.012	.094	99,540	121,990
WH-1100	11.000	11.347	.375	.086	11.262	.094	101,860	124,820

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.

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Simplify your design process by downloading CAD models of standard retaining rings and wave springs at [www.smalley.com/cad-models](http://www.smalley.com/cad-models).

Stock Items available in carbon steel and 17-7 PH stainless steel.

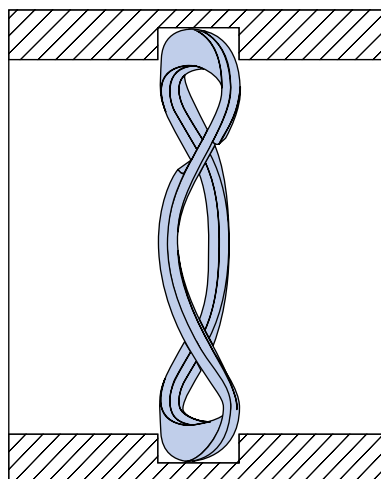


**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,2</sup>	Housing Diameter	Load (lb) @ Work Height	Max. Free Height	Number of Waves	Ring			Groove	
					Thickness	Radial Wall	Crimp	Diameter	Width Min.
WHW-75	.750	25 @ .080	.114	3	.035	.065	N	.796	.119
WHW-87	.875	30 @ .085	.110	3	.042	.085	N	.931	.115
WHW-100	1.000	34 @ .085	.120	3	.042	.085	N	1.066	.125
WHW-112	1.125	38 @ .100	.125	3	.050	.128	N	1.197	.130
WHW-125	1.250	40 @ .100	.135	3	.050	.128	N	1.330	.140
WHW-137	1.375	45 @ .100	.125	4	.050	.128	N	1.461	.130
WHW-150	1.500	50 @ .100	.135	4	.050	.128	N	1.594	.140
WHW-162	1.625	55 @ .110	.135	4	.062	.158	N	1.725	.140
WHW-175	1.750	60 @ .110	.140	4	.062	.158	N	1.858	.145
WHW-187	1.875	63 @ .110	.141	4	.062	.158	N	1.989	.146
WHW-200	2.000	65 @ .110	.150	4	.062	.158	N	2.122	.155
WHW-212	2.125	70 @ .130	.170	4	.078	.188	N	2.251	.175
WHW-225	2.250	75 @ .130	.175	4	.078	.188	N	2.382	.180
WHW-237	2.375	80 @ .130	.180	4	.078	.188	N	2.517	.185
WHW-250	2.500	84 @ .130	.183	4	.078	.188	N	2.648	.188
WHW-262	2.625	88 @ .170	.220	4	.093	.225	N	2.781	.225
WHW-275	2.750	94 @ .170	.229	4	.093	.225	N	2.914	.234
WHW-287	2.875	97 @ .170	.225	4	.093	.225	N	3.051	.230
WHW-300	3.000	100 @ .170	.230	4	.093	.225	N	3.182	.235
WHW-312	3.125	103 @ .185	.250	4	.111	.281	Y	3.315	.255
WHW-325	3.250	106 @ .185	.250	4	.111	.281	Y	3.446	.255
WHW-350	3.500	115 @ .185	.245	4	.111	.281	Y	3.710	.250
WHW-362	3.625	117 @ .185	.250	4	.111	.281	Y	3.841	.250
WHW-375	3.750	121 @ .185	.255	4	.111	.312	Y	3.974	.260
WHW-387	3.875	126 @ .185	.260	4	.111	.312	Y	4.107	.265
WHW-400	4.000	130 @ .185	.255	4	.111	.312	Y	4.240	.260
WHW-412	4.125	134 @ .185	.258	4	.111	.312	Y	4.365	.263
WHW-425	4.250	140 @ .185	.264	4	.111	.312	Y	4.490	.269
WHW-450	4.500	150 @ .185	.250	5	.111	.312	Y	4.740	.255
WHW-475	4.750	160 @ .185	.252	5	.111	.312	Y	4.995	.257
WHW-500	5.000	170 @ .185	.247	5	.111	.312	Y	5.260	.252

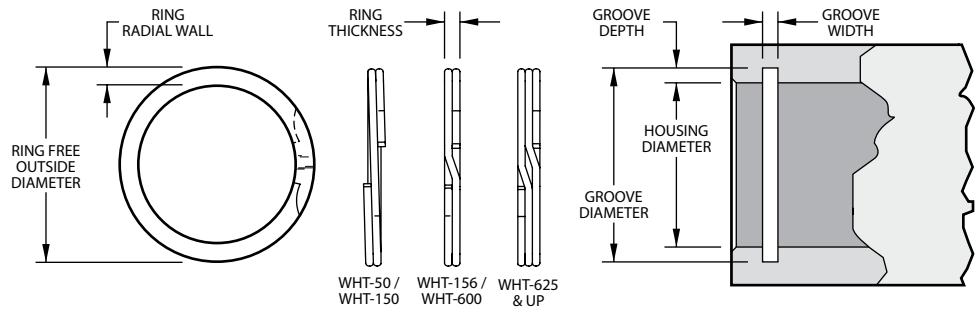
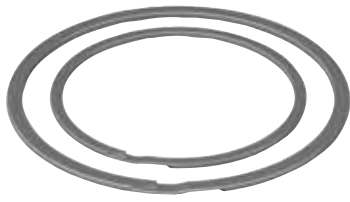
<sup>1</sup> Add suffix "-S17" for stainless steel.

<sup>2</sup> See pages 132-133 for How to Order.



# WHT Series - Medium Heavy Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WHT-50	.500	.529	.045	.035	.524 ±.002	.039	420	2,530
WHT-51	.512	.541	.045	.035	.536 ±.002	.039	430	2,590
WHT-56	.562	.597	.045	.035	.592 ±.002	.039	600	2,840
WHT-62	.625	.665	.045	.035	.659 ±.002	.039	750	3,160
WHT-68	.688	.730	.055	.035	.724 ±.003	.039	880	3,480
WHT-75	.750	.796	.055	.035	.790 ±.003	.039	1,060	3,790
WHT-77	.777	.825	.065	.042	.819 ±.003	.046	1,150	4,720
WHT-81	.812	.864	.065	.042	.857 ±.003	.046	1,320	4,930
WHT-86	.866	.919	.065	.042	.912 ±.003	.046	1,410	5,260
WHT-87	.875	.929	.065	.042	.922 ±.003	.046	1,480	5,310
WHT-90	.901	.957	.065	.042	.950 ±.003	.046	1,590	5,470
WHT-93	.938	.997	.075	.042	.989 ±.003	.046	1,720	5,690
WHT-100	1.000	1.063	.075	.042	1.055 ±.003	.046	1,980	6,070
WHT-102	1.023	1.087	.075	.042	1.079 ±.003	.046	2,030	6,210
WHT-106	1.062	1.129	.078	.050	1.120 ±.004	.056	2,180	7,010
WHT-112	1.125	1.195	.078	.050	1.185 ±.004	.056	2,390	7,420
WHT-118	1.188	1.260	.088	.050	1.250 ±.004	.056	2,600	7,840
WHT-125	1.250	1.330	.093	.050	1.320 ±.004	.056	3,090	8,250
WHT-131	1.312	1.395	.093	.050	1.385 ±.004	.056	3,430	8,660
WHT-137	1.375	1.461	.098	.050	1.450 ±.004	.056	3,690	9,070
WHT-143	1.438	1.526	.103	.050	1.515 ±.004	.056	3,960	9,490
WHT-145	1.456	1.546	.108	.050	1.535 ±.004	.056	4,120	9,610
WHT-150	1.500	1.591	.108	.050	1.580 ±.004	.056	4,240	9,900
WHT-156	1.562	1.659	.113	.062	1.647 ±.005	.068	4,750	12,780
WHT-162	1.625	1.727	.113	.062	1.715 ±.005	.068	5,170	13,290
WHT-165	1.653	1.757	.118	.062	1.745 ±.005	.068	5,380	13,520
WHT-168	1.688	1.793	.118	.062	1.780 ±.005	.068	5,490	13,810
WHT-175	1.750	1.858	.118	.062	1.845 ±.005	.068	5,940	14,320
WHT-181	1.812	1.923	.123	.062	1.910 ±.005	.068	6,280	14,820
WHT-185	1.850	1.963	.123	.062	1.949 ±.005	.068	6,540	15,130
WHT-187	1.875	1.989	.128	.062	1.975 ±.005	.068	6,630	15,340
WHT-193	1.938	2.054	.128	.062	2.040 ±.005	.068	6,990	15,850
WHT-200	2.000	2.125	.138	.062	2.110 ±.005	.068	7,780	16,360
WHT-206	2.062	2.190	.141	.078	2.175 ±.006	.086	8,310	21,220
WHT-212	2.125	2.255	.141	.078	2.240 ±.006	.086	8,710	21,870
WHT-218	2.188	2.321	.141	.078	2.305 ±.006	.086	9,130	22,520
WHT-225	2.250	2.386	.141	.078	2.370 ±.006	.086	9,540	23,160
WHT-231	2.312	2.457	.188	.078	2.440 ±.006	.086	10,460	23,800
WHT-237	2.375	2.522	.188	.078	2.505 ±.006	.086	10,910	24,440
WHT-244	2.440	2.588	.188	.078	2.570 ±.006	.086	11,210	25,110
WHT-250	2.500	2.653	.188	.078	2.635 ±.006	.086	12,020	25,730
WHT-253	2.531	2.687	.188	.078	2.668 ±.006	.086	12,350	26,050
WHT-256	2.562	2.720	.188	.093	2.700 ±.006	.103	12,500	29,940
WHT-262	2.625	2.785	.188	.093	2.765 ±.006	.103	12,990	30,680

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WHT-268	2.688	2.855	.188	.093	2.834	.103	13,870	31,410
WHT-275	2.750	2.921	.188	.093	2.900	.103	14,580	32,140
WHT-281	2.813	2.987	.188	.093	2.965	.103	15,110	32,880
WHT-283	2.834	3.009	.188	.093	2.987	.103	15,430	33,120
WHT-287	2.875	3.053	.188	.093	3.030	.103	15,850	33,600
WHT-300	3.000	3.188	.188	.093	3.165	.103	17,600	35,060
WHT-306	3.062	3.253	.250	.111	3.230	.120	18,180	42,710
WHT-312	3.125	3.318	.250	.111	3.295	.120	18,780	43,590
WHT-315	3.156	3.354	.250	.111	3.328	.120	19,190	44,040
WHT-325	3.250	3.450	.250	.111	3.426	.120	20,220	45,330
WHT-334	3.346	3.550	.250	.111	3.525	.120	21,290	46,670
WHT-346	3.464	3.675	.250	.111	3.650	.120	22,770	48,320
WHT-350	3.500	3.716	.250	.111	3.690	.120	23,500	48,820
WHT-354	3.543	3.761	.250	.111	3.735	.120	24,040	49,420
WHT-356	3.562	3.783	.250	.111	3.756	.120	24,420	49,690
WHT-362	3.625	3.849	.250	.111	3.822	.120	25,370	50,560
WHT-375	3.750	3.982	.250	.111	3.955	.120	27,300	52,310
WHT-387	3.875	4.115	.250	.111	4.087	.120	29,030	54,050
WHT-393	3.938	4.178	.250	.111	4.150	.120	29,510	54,930
WHT-400	4.000	4.248	.250	.111	4.220	.120	31,100	55,800
WHT-412	4.125	4.373	.312	.111	4.345	.120	32,070	57,540
WHT-425	4.250	4.500	.312	.111	4.470	.120	33,050	59,280
WHT-433	4.330	4.586	.312	.111	4.556	.120	34,590	60,400
WHT-450	4.500	4.768	.312	.111	4.735	.120	37,530	62,770
WHT-462	4.625	4.897	.312	.111	4.865	.120	39,230	64,510
WHT-475	4.750	5.028	.312	.111	4.995	.120	41,300	66,260
WHT-500	5.000	5.295	.312	.111	5.260	.120	45,950	69,740
WHT-525	5.250	5.559	.375	.127	5.520	.139	50,100	83,790
WHT-537	5.375	5.685	.375	.127	5.645	.139	51,290	85,780
WHT-550	5.500	5.810	.375	.127	5.770	.139	52,480	87,780
WHT-575	5.750	6.062	.375	.127	6.020	.139	54,870	91,770
WHT-600	6.000	6.314	.375	.127	6.270	.139	57,260	95,760

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

### Rings listed below are three-turn construction.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WHT-625	6.250	6.576	.312	.165	6.530	.174	61,850	129,590
WHT-650	6.500	6.837	.312	.165	6.790	.174	66,620	134,780
WHT-662	6.625	6.973	.312	.165	6.925	.174	70,240	137,370
WHT-675	6.750	7.104	.312	.165	7.055	.174	73,000	139,960
WHT-700	7.000	7.366	.312	.165	7.315	.174	78,180	145,140
WHT-725	7.250	7.628	.375	.189	7.575	.209	83,530	172,190
WHT-750	7.500	7.895	.375	.189	7.840	.209	90,120	178,130
WHT-775	7.750	8.156	.375	.189	8.100	.209	95,870	184,070
WHT-800	8.000	8.418	.375	.189	8.360	.209	101,790	190,000
WHT-825	8.250	8.680	.375	.189	8.620	.209	107,880	195,940
WHT-850	8.500	8.942	.375	.189	8.880	.209	114,160	201,880
WHT-875	8.750	9.209	.375	.189	9.145	.209	122,460	207,820
WHT-900	9.000	9.471	.375	.189	9.405	.209	129,140	213,750
WHT-925	9.250	9.736	.375	.189	9.669	.209	137,310	219,690
WHT-950	9.500	9.999	.375	.189	9.930	.209	144,380	225,630
WHT-975	9.750	10.260	.375	.189	10.189	.209	151,620	231,570
WHT-1000	10.000	10.552	.375	.189	10.450	.209	159,040	237,500
WHT-1050	10.500	11.072	.375	.189	10.970	.209	174,420	249,380

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

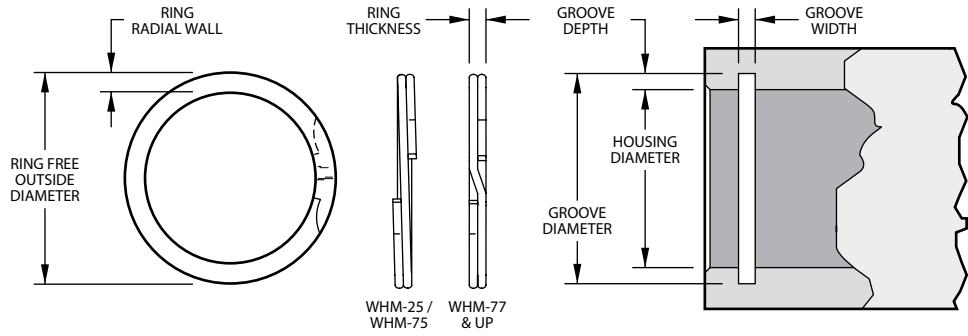
<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.



# WHM Series - Heavy Duty Series

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



AS3215, AS4299  
MIL-DTL-27426/4

**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WHM-25 <sup>5,6</sup>	.250	.270	.020	.015	.268	.020	159	561
WHM-31 <sup>5,6</sup>	.312	.333	.025	.015	.330	.020	198	700
WHM-37 <sup>5,6</sup>	.375	.400	.030	.025	.397	.029	292	1,442
WHM-43 <sup>5</sup>	.437	.464	.035	.025	.461	.029	371	1,680
WHM-50	.500	.538	.045	.035	.530	.039	530	2,530
WHM-51	.512	.550	.045	.035	.542	.039	540	2,590
WHM-56	.562	.605	.055	.035	.596	.039	680	2,840
WHM-62	.625	.675	.055	.035	.665	.039	880	3,160
WHM-68	.688	.743	.065	.035	.732	.039	1,070	3,480
WHM-75	.750	.807	.065	.035	.796	.039	1,220	3,790
WHM-77	.777	.836	.075	.042	.825	.046	1,320	4,720
WHM-81	.812	.873	.075	.042	.862	.046	1,440	4,930
WHM-86	.866	.931	.075	.042	.920	.046	1,650	5,260
WHM-87	.875	.943	.085	.042	.931	.046	1,730	5,310
WHM-90	.901	.972	.085	.042	.959	.046	1,850	5,470
WHM-93	.938	1.013	.085	.042	1.000	.046	2,060	5,690
WHM-100	1.000	1.080	.085	.042	1.066	.046	2,330	6,070
WHM-102	1.023	1.105	.085	.042	1.091	.046	2,460	6,210
WHM-106	1.062	1.138	.103	.050	1.130	.056	2,550	7,010
WHM-112	1.125	1.205	.103	.050	1.197	.056	2,860	7,420
WHM-118	1.188	1.271	.103	.050	1.262	.056	3,110	7,840
WHM-125	1.250	1.339	.103	.050	1.330	.056	3,530	8,250
WHM-131	1.312	1.406	.118	.050	1.396	.056	3,900	8,660
WHM-137	1.375	1.471	.118	.050	1.461	.056	4,180	9,070
WHM-143	1.439	1.539	.118	.050	1.528	.056	4,580	9,490
WHM-145	1.456	1.559	.118	.050	1.548	.056	4,730	9,610
WHM-150	1.500	1.605	.118	.050	1.594	.056	4,980	9,900
WHM-156	1.562	1.675	.128	.062	1.658	.068	5,300	12,780
WHM-162	1.625	1.742	.128	.062	1.725	.068	5,740	13,290
WHM-165	1.653	1.772	.128	.062	1.755	.068	5,960	13,520
WHM-168	1.688	1.810	.128	.062	1.792	.068	6,210	13,810
WHM-175	1.750	1.876	.128	.062	1.858	.068	6,680	14,320
WHM-181	1.812	1.940	.128	.062	1.922	.068	7,050	14,820
WHM-185	1.850	1.981	.158	.062	1.962	.068	7,320	15,130
WHM-187	1.875	2.008	.158	.062	1.989	.068	7,560	15,340
WHM-193	1.938	2.075	.158	.062	2.056	.068	8,080	15,850
WHM-200	2.000	2.142	.158	.062	2.122	.068	8,620	16,360
WHM-206	2.062	2.201	.168	.078	2.186	.086	9,040	21,220
WHM-212	2.125	2.267	.168	.078	2.251	.086	9,460	21,870
WHM-218	2.188	2.334	.168	.078	2.318	.086	10,050	22,520
WHM-225	2.250	2.399	.168	.078	2.382	.086	10,500	23,160
WHM-231	2.312	2.467	.200	.078	2.450	.086	11,280	23,800
WHM-237	2.375	2.535	.200	.078	2.517	.086	11,920	24,440
WHM-244	2.440	2.602	.200	.078	2.584	.086	12,420	25,110
WHM-250	2.500	2.667	.200	.078	2.648	.086	13,080	25,730
WHM-253	2.531	2.700	.200	.078	2.681	.086	13,420	26,050
WHM-256	2.562	2.733	.225	.093	2.714	.103	13,760	29,940
WHM-262	2.625	2.801	.225	.093	2.781	.103	14,470	30,680
WHM-268	2.688	2.868	.225	.093	2.848	.103	15,200	31,410
WHM-275	2.750	2.934	.225	.093	2.914	.103	15,940	32,140
WHM-281	2.813	3.001	.225	.093	2.980	.103	16,700	32,880

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.  
<sup>5</sup> No removal notch.  
<sup>6</sup> Square edge wire.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WHM-283	2.834	3.027	.225	.093	3.006	.103	17,230	33,120
WHM-287	2.875	3.072	.225	.093	3.051	.103	17,880	33,600
WHM-300	3.000	3.204	.225	.093	3.182	.103	18,300	35,060
WHM-306	3.062	3.271	.281	.111	3.248	.120	20,130	42,710
WHM-312	3.125	3.338	.281	.111	3.315	.120	20,990	43,590
WHM-315	3.157	3.371	.281	.111	3.348	.120	21,420	44,040
WHM-325	3.250	3.470	.281	.111	3.446	.120	22,510	45,330
WHM-334	3.346	3.571	.281	.111	3.546	.120	23,650	46,670
WHM-347	3.464	3.701	.281	.111	3.675	.120	25,710	48,320
WHM-350	3.500	3.736	.281	.111	3.710	.120	25,980	48,820
WHM-354	3.543	3.781	.281	.111	3.755	.120	26,550	49,420
WHM-356	3.562	3.802	.281	.111	3.776	.120	26,940	49,690
WHM-362	3.625	3.868	.281	.111	3.841	.120	27,670	50,560
WHM-375	3.750	4.002	.312	.111	3.974	.120	29,690	52,310
WHM-387	3.875	4.136	.312	.111	4.107	.120	31,770	54,050
WHM-393	3.938	4.203	.312	.111	4.174	.120	32,850	54,930
WHM-400	4.000	4.270	.312	.111	4.240	.120	33,930	55,800
WHM-412	4.125	4.369	.312	.111	4.339	.120	34,990	57,540
WHM-425	4.250	4.501	.312	.111	4.470	.120	36,050	59,280
WHM-433	4.330	4.588	.312	.111	4.556	.120	36,730	60,400
WHM-450	4.500	4.768	.312	.111	4.735	.120	38,170	62,770
WHM-462	4.625	4.899	.312	.111	4.865	.120	39,230	64,510
WHM-475	4.750	5.030	.312	.111	4.995	.120	41,300	66,260
WHM-500	5.000	5.297	.312	.111	5.260	.120	45,950	69,740
WHM-525	5.250	5.559	.350	.127	5.520	.139	50,100	83,790
WHM-537	5.375	5.690	.350	.127	5.650	.139	51,290	85,780
WHM-550	5.500	5.810	.350	.127	5.770	.139	52,480	87,780
WHM-575	5.750	6.062	.350	.127	6.020	.139	54,870	91,770
WHM-600	6.000	6.314	.350	.127	6.270	.139	57,260	95,760
WHM-625	6.250	6.576	.380	.156	6.530	.174	61,850	122,520
WHM-650	6.500	6.838	.380	.156	6.790	.174	66,620	127,420
WHM-662	6.625	6.974	.380	.156	6.925	.174	70,240	129,870
WHM-675	6.750	7.105	.380	.156	7.055	.174	73,000	132,320
WHM-700	7.000	7.366	.380	.156	7.315	.174	78,180	137,230
WHM-725	7.250	7.628	.418	.187	7.575	.209	83,530	170,370
WHM-750	7.500	7.895	.418	.187	7.840	.209	90,120	176,240
WHM-775	7.750	8.157	.418	.187	8.100	.209	95,870	182,120
WHM-800	8.000	8.419	.418	.187	8.360	.209	101,790	187,990
WHM-825	8.250	8.680	.437	.187	8.620	.209	107,880	193,870
WHM-850	8.500	8.942	.437	.187	8.880	.209	114,160	199,740
WHM-875	8.750	9.209	.437	.187	9.145	.209	122,460	205,620
WHM-900	9.000	9.471	.437	.187	9.405	.209	129,140	211,490
WHM-925	9.250	9.737	.437	.187	9.669	.209	137,310	217,370
WHM-950	9.500	10.000	.500	.187	9.930	.209	144,380	223,240
WHM-975	9.750	10.260	.500	.187	10.189	.209	150,620	229,120
WHM-1000	10.000	10.523	.500	.187	10.450	.209	159,040	234,990
WHM-1025	10.250	10.786	.500	.187	10.711	.209	167,370	240,870
WHM-1050	10.500	11.047	.500	.187	10.970	.209	174,420	246,740
WHM-1075	10.750	11.313	.500	.187	11.234	.209	183,890	252,620
WHM-1100	11.000	11.575	.500	.187	11.495	.209	192,830	258,490
WHM-1125	11.250	11.838	.500	.187	11.756	.209	201,190	264,370
WHM-1150	11.500	12.102	.562	.187	12.018	.209	210,540	270,240
WHM-1175	11.750	12.365	.562	.187	12.279	.209	220,100	276,120
WHM-1200	12.000	12.628	.562	.187	12.540	.209	229,020	281,990
WHM-1225	12.250	12.891	.562	.187	12.801	.209	238,990	287,860
WHM-1250	12.500	13.154	.562	.187	13.063	.209	249,170	293,740
WHM-1275	12.750	13.417	.562	.187	13.324	.209	258,660	299,610
WHM-1300	13.000	13.680	.662	.187	13.585	.209	269,240	305,490
WHM-1325	13.250	13.943	.662	.187	13.846	.209	279,100	311,360
WHM-1350	13.500	14.207	.662	.187	14.108	.209	290,100	317,240
WHM-1375	13.750	14.470	.662	.187	14.369	.209	301,300	323,110
WHM-1400	14.000	14.732	.662	.187	14.630	.209	311,730	328,990
WHM-1425	14.250	14.995	.662	.187	14.891	.209	323,340	334,860
WHM-1450	14.500	15.259	.750	.187	15.153	.209	335,160	340,740
WHM-1475	14.750	15.522	.750	.187	15.414	.209	346,150	346,610
WHM-1500	15.000	15.785	.750	.187	15.675	.209	358,380	352,490

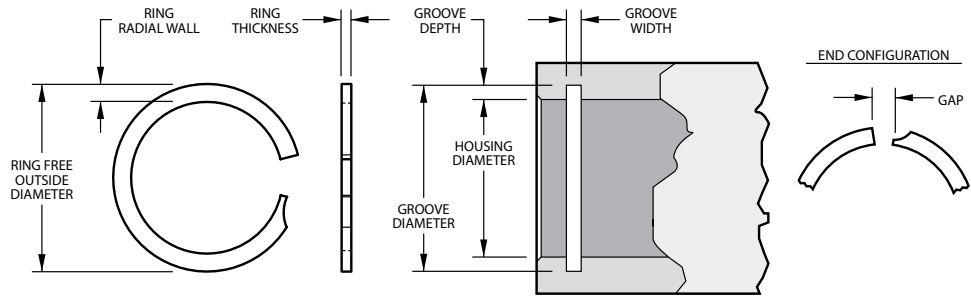
<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

# FHE Series - Constant Section Rings



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1, 4, 5</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
FHE-0050	.500	.529	.055	.037	.524	.043	424	2,325
FHE-0056	.562	.591	.055	.037	.586	.043	477	2,613
FHE-0062	.625	.665	.065	.037	.657	.043	707	2,906
FHE-0068	.687	.726	.065	.037	.719	.043	777	3,194
FHE-0075	.750	.797	.075	.037	.790	.043	1,060	3,487
FHE-0081	.812	.860	.075	.037	.852	.043	1,148	3,775
FHE-0087	.875	.924	.075	.037	.915	.043	1,237	4,068
FHE-0093	.937	1.000	.085	.045	.985	.051	1,590	5,334
FHE-0100	1.000	1.058	.085	.045	1.048	.051	1,696	5,693
FHE-0106	1.062	1.121	.094	.045	1.110	.051	1,802	6,045
FHE-0112	1.125	1.192	.094	.045	1.181	.051	2,227	6,404
FHE-0118	1.187	1.252	.094	.045	1.243	.051	2,349	6,757
FHE-0125	1.250	1.336	.094	.045	1.316	.051	2,916	7,116
FHE-0131	1.312	1.391	.094	.045	1.378	.051	3,060	7,469
FHE-0137	1.375	1.470	.128	.057	1.453	.063	3,791	9,307
FHE-0143	1.437	1.529	.128	.057	1.515	.063	3,961	9,727
FHE-0150	1.500	1.592	.128	.057	1.578	.063	4,135	10,153
FHE-0156	1.562	1.687	.158	.067	1.666	.073	5,741	12,400
FHE-0162	1.625	1.746	.158	.067	1.729	.073	5,973	12,901
FHE-0168	1.687	1.808	.158	.067	1.791	.073	6,201	13,393
FHE-0175	1.750	1.885	.158	.067	1.862	.073	6,927	13,893
FHE-0181	1.812	1.942	.158	.067	1.924	.073	7,173	14,385
FHE-0187	1.875	2.007	.158	.067	1.987	.073	7,422	14,885
FHE-0193	1.937	2.074	.200	.076	2.055	.085	8,078	16,649
FHE-0200	2.000	2.143	.200	.076	2.118	.085	8,341	17,191
FHE-0206	2.062	2.200	.200	.076	2.180	.085	8,599	17,724
FHE-0212	2.125	2.264	.200	.076	2.243	.085	8,862	18,265
FHE-0218	2.187	2.327	.200	.076	2.305	.085	9,121	18,798
FHE-0225	2.250	2.389	.200	.076	2.368	.085	9,384	19,340
FHE-0231	2.312	2.453	.200	.076	2.430	.085	9,642	19,873
FHE-0237	2.375	2.517	.200	.076	2.493	.085	9,905	20,414
FHE-0243	2.437	2.582	.200	.076	2.555	.085	10,163	20,947
FHE-0250	2.500	2.643	.200	.076	2.618	.085	10,426	21,488
FHE-0256	2.562	2.705	.200	.095	2.680	.104	10,685	26,225
FHE-0262	2.625	2.777	.200	.095	2.743	.104	10,947	26,870
FHE-0268	2.687	2.828	.200	.095	2.805	.104	11,206	27,504
FHE-0275	2.750	2.899	.200	.095	2.868	.104	11,469	28,149
FHE-0281	2.812	2.958	.200	.095	2.930	.104	11,727	28,784
FHE-0287	2.875	3.022	.200	.095	2.993	.104	11,990	29,429
FHE-0293	2.937	3.084	.200	.095	3.055	.104	12,249	30,063
FHE-0300	3.000	3.145	.200	.095	3.118	.104	12,511	30,708
FHE-0306	3.062	3.218	.200	.095	3.184	.104	13,203	31,343
FHE-0312	3.125	3.294	.237	.095	3.263	.104	15,242	31,988
FHE-0318	3.187	3.357	.237	.095	3.325	.104	15,544	32,622
FHE-0325	3.250	3.420	.237	.095	3.388	.104	15,851	33,267

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.

Smalley Part Number <sup>1, 4, 5</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
FHE-0331	3.312	3.483	.248	.115	3.450	.124	16,154	38,952
FHE-0337	3.375	3.547	.248	.115	3.513	.124	16,461	39,693
FHE-0343	3.437	3.609	.248	.115	3.575	.124	16,763	40,422
FHE-0350	3.500	3.673	.248	.115	3.638	.124	17,071	41,163
FHE-0356	3.562	3.728	.248	.115	3.700	.124	17,373	41,892
FHE-0362	3.625	3.799	.248	.115	3.763	.124	17,680	42,633
FHE-0368	3.687	3.862	.248	.115	3.825	.124	17,983	43,362
FHE-0375	3.750	3.922	.248	.115	3.888	.124	18,290	44,103
FHE-0381	3.812	3.988	.248	.115	3.950	.124	18,592	44,832
FHE-0387	3.875	4.044	.248	.115	4.013	.124	18,900	45,573
FHE-0393	3.937	4.114	.248	.115	4.075	.124	19,202	46,302
FHE-0400	4.000	4.223	.265	.153	4.158	.163	22,337	60,283
FHE-0412	4.125	4.329	.265	.153	4.283	.163	23,035	62,166
FHE-0425	4.250	4.452	.265	.153	4.408	.163	23,733	64,050
FHE-0437	4.375	4.576	.265	.153	4.533	.163	24,431	65,934
FHE-0450	4.500	4.703	.265	.153	4.658	.163	25,129	67,818
FHE-0462	4.625	4.829	.265	.153	4.783	.163	25,827	69,702
FHE-0475	4.750	4.945	.265	.153	4.908	.163	26,525	71,585
FHE-0487	4.875	5.082	.265	.153	5.033	.163	27,223	73,469
FHE-0500	5.000	5.207	.265	.153	5.158	.163	27,921	75,353
FHE-0525	5.250	5.460	.265	.153	5.408	.163	29,317	79,121
FHE-0550	5.500	5.719	.265	.153	5.658	.163	30,713	82,888
FHE-0575	5.750	5.965	.265	.153	5.908	.163	32,109	86,656
FHE-0600	6.000	6.256	.316	.153	6.196	.163	41,563	90,424
FHE-0625	6.250	6.508	.316	.153	6.446	.163	43,295	94,191
FHE-0650	6.500	6.760	.316	.153	6.696	.163	45,027	97,959
FHE-0675	6.750	7.013	.316	.153	6.946	.163	46,759	101,727
FHE-0700	7.000	7.266	.316	.153	7.196	.163	48,490	105,494
FHE-0725	7.250	7.541	.316	.153	7.446	.163	50,222	109,262
FHE-0750	7.500	7.762	.316	.153	7.696	.163	51,954	113,030
FHE-0775	7.750	8.023	.316	.153	7.946	.163	53,686	116,797
FHE-0800	8.000	8.276	.316	.153	8.196	.163	55,418	120,565
FHE-0825	8.250	8.580	.373	.192	8.486	.203	68,813	147,399
FHE-0850	8.500	8.821	.373	.192	8.736	.203	70,898	151,866
FHE-0875	8.750	9.073	.373	.192	8.986	.203	72,983	156,332
FHE-0900	9.000	9.326	.373	.192	9.236	.203	75,068	160,799
FHE-0925	9.250	9.580	.373	.192	9.486	.203	77,154	165,265
FHE-0950	9.500	9.831	.373	.192	9.736	.203	79,239	169,732
FHE-0975	9.750	10.083	.373	.192	9.986	.203	81,324	174,199
FHE-1000	10.000	10.414	.435	.192	10.314	.203	110,977	178,665
FHE-1025	10.250	10.660	.435	.192	10.564	.203	113,751	183,132
FHE-1050	10.500	10.919	.435	.192	10.814	.203	116,526	187,599
FHE-1075	10.750	11.171	.435	.192	11.064	.203	119,300	192,065
FHE-1100	11.000	11.440	.435	.192	11.314	.203	122,074	196,532

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.

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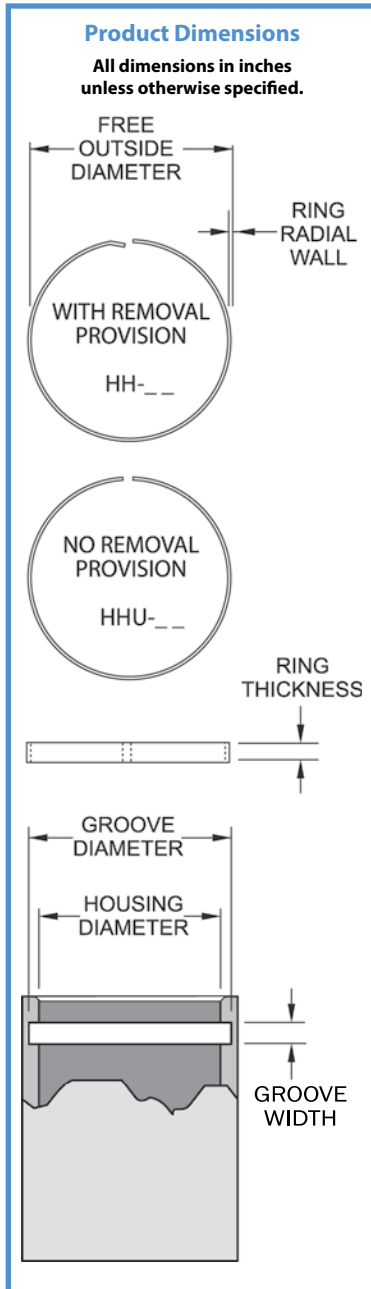
Simplify your design process by downloading CAD models of standard retaining rings and wave springs at [www.smalley.com/cad-models](http://www.smalley.com/cad-models).

# HH/HHU Series - Hoopster® Rings



**Stock Items** available in carbon steel and 302 stainless steel.

Internal Hoopster Retaining Rings are difficult to remove from the groove without a removal provision. We offer either a bent end for removal or no removal provision as shown to the left.



Smalley Part Number <sup>1,2,4,6</sup>	Housing Diameter	Ring			Groove		Groove Yield (lb) <sup>3</sup>
		Outside Diameter	Radial Wall	Thickness	Diameter <sup>5</sup>	Width	
HH-37	.375	.400	.017	.045	.392	.050	225
HH-43	.437	.463	.017	.045	.454	.050	263
HH-46	.469	.495	.017	.045	.486	.050	282
HH-50	.500	.531	.021	.065	.521	.070	371
HH-53	.531	.563	.021	.065	.552	.070	394
HH-56	.562	.594	.021	.065	.583	.070	417
HH-59	.594	.627	.021	.065	.615	.070	441
HH-62	.625	.659	.021	.065	.646	.070	464
HH-65	.656	.690	.021	.065	.677	.070	487
HH-68	.688	.723	.021	.065	.709	.070	511
HH-71	.718	.756	.024	.088	.742	.093	609
HH-75	.750	.789	.024	.088	.774	.093	636
HH-78	.781	.821	.024	.088	.805	.093	662
HH-81	.812	.852	.024	.088	.836	.093	689
HH-84	.843	.884	.024	.088	.867	.093	715
HH-87	.875	.917	.024	.088	.899	.093	742
HH-90	.906	.948	.024	.088	.930	.093	768
HH-93	.938	.981	.024	.088	.962	.093	796
HH-96	.968	1.011	.024	.088	.992	.093	821
HH-100	1.000	1.044	.024	.088	1.024	.093	848
HH-103	1.031	1.082	.030	.118	1.061	.123	1,093
HH-106	1.062	1.113	.030	.118	1.092	.123	1,126
HH-109	1.093	1.145	.030	.118	1.123	.123	1,159
HH-112	1.125	1.178	.030	.118	1.155	.123	1,193
HH-115	1.156	1.209	.030	.118	1.186	.123	1,226
HH-118	1.188	1.242	.030	.118	1.218	.123	1,260
HH-121	1.218	1.272	.030	.118	1.248	.123	1,291
HH-125	1.250	1.305	.030	.118	1.280	.123	1,325
HH-128	1.281	1.337	.030	.118	1.311	.123	1,358
HH-131	1.312	1.372	.034	.150	1.346	.155	1,577
HH-134	1.343	1.404	.034	.150	1.377	.155	1,614
HH-137	1.375	1.437	.034	.150	1.409	.155	1,652
HH-140	1.406	1.468	.034	.150	1.440	.155	1,690
HH-143	1.437	1.500	.034	.150	1.471	.155	1,727
HH-146	1.468	1.531	.034	.150	1.502	.155	1,765
HH-150	1.500	1.564	.034	.150	1.534	.155	1,802
HH-156	1.562	1.627	.034	.150	1.596	.155	1,877
HH-162	1.625	1.692	.034	.150	1.659	.155	1,953
HH-168	1.688	1.755	.034	.150	1.721	.155	2,028
HH-175	1.750	1.823	.038	.187	1.788	.193	2,350
HH-181	1.812	1.887	.038	.187	1.851	.193	2,434
HH-187	1.875	1.951	.038	.187	1.913	.193	2,518
HH-193	1.938	2.015	.038	.187	1.976	.193	2,603
HH-200	2.000	2.078	.038	.187	2.038	.193	2,686
HH-206	2.062	2.141	.038	.187	2.100	.193	2,769
HH-212	2.125	2.206	.038	.187	2.163	.193	2,854
HH-218	2.188	2.270	.038	.187	2.226	.193	2,939
HH-225	2.250	2.333	.038	.187	2.288	.193	3,022
HH-231	2.312	2.396	.038	.187	2.350	.193	3,105
HH-237	2.375	2.461	.038	.187	2.413	.193	3,190
HH-243	2.437	2.531	.045	.225	2.482	.232	3,876
HH-250	2.500	2.595	.045	.225	2.545	.232	3,976
HH-256	2.562	2.658	.045	.225	2.607	.232	4,075
HH-262	2.625	2.723	.045	.225	2.670	.232	4,175
HH-268	2.688	2.787	.045	.225	2.733	.232	4,275
HH-275	2.750	2.850	.045	.225	2.795	.232	4,374
HH-281	2.812	2.914	.045	.225	2.858	.232	4,472
HH-287	2.875	2.978	.045	.225	2.920	.232	4,572
HH-293	2.938	3.041	.045	.225	2.982	.232	4,673
HH-300	3.000	3.105	.045	.225	3.045	.232	4,771

<sup>1</sup> Use "HH" prefix for removal provision end. Use "HHU" prefix for no removal provision.

<sup>2</sup> Add suffix "-S02" for 302 stainless steel.

<sup>3</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Sharp corners on the groove required, see page 127 for more information.

<sup>6</sup> Square edge wire.

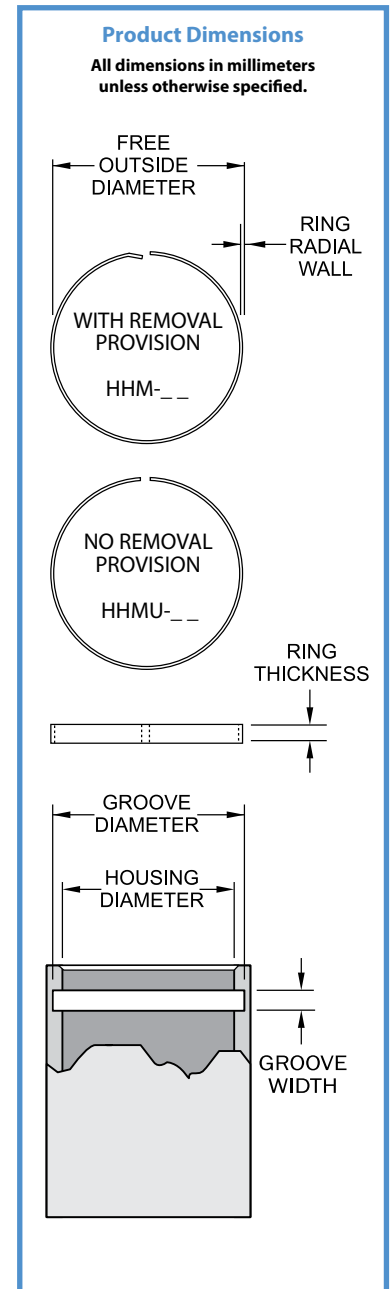


Internal Hoopster Retaining Rings are difficult to remove from the groove without a removal provision.  
We offer either a bent end for removal or no removal provision as shown to the left.



**Stock Items** available in carbon steel and 302 stainless steel.

Smalley Part Number <sup>1, 2, 4, 6</sup>	Housing Diameter	Ring			Groove		Groove Yield (N) <sup>2</sup>
		Outside Diameter	Radial Wall	Thickness	Diameter <sup>5</sup>	Width	
HHM-10	10	10.63	.43	1.14	10.43	1.27	1,052
HHM-11	11	11.65	.43	1.14	11.43	1.27	1,157
HHM-12	12	12.67	.43	1.14	12.43	1.27	1,263
HHM-13	13	13.79	.53	1.65	13.53	1.78	1,690
HHM-14	14	14.81	.53	1.65	14.53	1.78	1,820
HHM-15	15	15.83	.53	1.65	15.53	1.78	1,950
HHM-16	16	16.85	.53	1.65	16.53	1.78	2,080
HHM-17	17	17.87	.53	1.65	17.53	1.78	2,210
HHM-18	18	18.97	.61	2.24	18.61	2.36	2,674
HHM-19	19	19.99	.61	2.24	19.61	2.36	2,822
HHM-20	20	21.01	.61	2.24	20.61	2.36	2,971
HHM-21	21	22.03	.61	2.24	21.61	2.36	3,119
HHM-22	22	23.05	.61	2.24	22.61	2.36	3,268
HHM-23	23	24.07	.61	2.24	23.61	2.36	3,417
HHM-24	24	25.09	.61	2.24	24.61	2.36	3,565
HHM-25	25	26.11	.61	2.24	25.61	2.36	3,714
HHM-26	26	27.28	.76	3.00	26.76	3.12	4,828
HHM-27	27	28.30	.76	3.00	27.76	3.12	5,013
HHM-28	28	29.32	.76	3.00	28.76	3.12	5,199
HHM-29	29	30.34	.76	3.00	29.76	3.12	5,385
HHM-30	30	31.36	.76	3.00	30.76	3.12	5,570
HHM-31	31	32.38	.76	3.00	31.76	3.12	5,756
HHM-32	32	33.40	.76	3.00	32.76	3.12	5,942
HHM-33	33	34.52	.86	3.81	33.86	3.94	6,945
HHM-34	34	35.54	.86	3.81	34.86	3.94	7,155
HHM-35	35	36.56	.86	3.81	35.86	3.94	7,365
HHM-36	36	37.58	.86	3.81	36.86	3.94	7,576
HHM-37	37	38.60	.86	3.81	37.86	3.94	7,786
HHM-38	38	39.62	.86	3.81	38.86	3.94	7,997
HHM-40	40	41.66	.86	3.81	40.86	3.94	8,418
HHM-41	41	42.68	.86	3.81	41.86	3.94	8,628
HHM-42	42	43.70	.86	3.81	42.86	3.94	8,838
HHM-45	45	46.87	.97	4.75	45.97	4.88	10,584
HHM-47	47	48.91	.97	4.75	47.97	4.88	11,054
HHM-48	48	49.93	.97	4.75	48.97	4.88	11,289
HHM-50	50	51.97	.97	4.75	50.97	4.88	11,760
HHM-51	51	52.99	.97	4.75	51.97	4.88	11,995
HHM-52	52	54.01	.97	4.75	52.97	4.88	12,230
HHM-55	55	57.07	.97	4.75	55.97	4.90	12,936
HHM-56	56	58.09	.97	4.75	56.97	4.90	13,171
HHM-57	57	59.11	.97	4.75	57.97	4.90	13,406
HHM-58	58	60.13	.97	4.75	58.97	4.90	13,641
HHM-60	60	62.17	.97	4.75	60.97	4.90	14,112
HHM-62	62	64.38	1.14	5.72	63.14	5.87	17,268
HHM-63	63	65.40	1.14	5.72	64.14	5.87	17,547
HHM-64	64	66.42	1.14	5.72	65.14	5.87	17,826
HHM-65	65	67.44	1.14	5.72	66.14	5.87	18,104
HHM-67	67	69.48	1.14	5.72	68.14	5.87	18,661
HHM-68	68	70.50	1.14	5.72	69.14	5.87	18,940
HHM-70	70	72.54	1.14	5.72	71.14	5.87	19,497
HHM-72	72	74.58	1.14	5.72	73.14	5.87	20,054
HHM-75	75	77.64	1.14	5.72	76.14	5.87	20,889
HHM-76	76	78.66	1.14	5.72	77.14	5.87	21,168



<sup>1</sup> Use "HHM" prefix for removal provision end. Use "HHMU" prefix for no removal provision.

<sup>2</sup> Add suffix "-S02" for 302 stainless steel.

<sup>3</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2

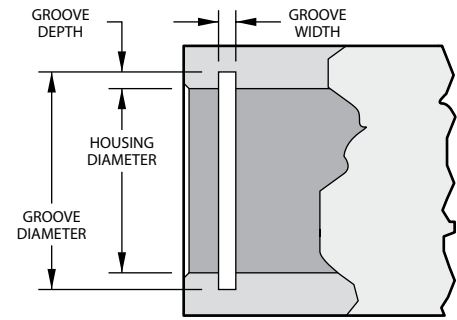
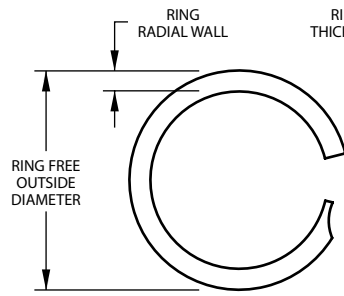
<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Sharp corners on the groove required, see page 127 for more information.

<sup>6</sup> Square edge wire.

# VHM Series - Metric Light Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



**Product Dimensions** All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
VHM-6 <sup>5,6</sup>	6.00	6.35	.51	.30	6.30	.38	439	1,988
VHM-7 <sup>5,6</sup>	7.00	7.38	.51	.30	7.32	.38	546	2,320
VHM-8 <sup>5,6</sup>	8.00	8.44	.64	.38	8.36	.46	702	3,183
VHM-9 <sup>5,6</sup>	9.00	9.54	.76	.38	9.46	.46	1,003	3,580
VHM-10 <sup>5,6</sup>	10.00	10.58	.76	.38	10.50	.46	1,238	3,978
VHM-11 <sup>5,6</sup>	11.00	11.68	.89	.38	11.60	.46	1,634	4,388
VHM-12 <sup>6</sup>	12.00	12.74	.89	.38	12.66	.46	1,930	4,774
VHM-13	13.00	13.80	1.14	.46	13.72	.56	2,281	6,261
VHM-14	14.00	14.80	1.14	.46	14.72	.56	2,456	6,742
VHM-15	15.00	15.80	1.14	.46	15.72	.56	2,632	7,224
VHM-16	16.00	16.80	1.14	.46	16.72	.56	2,807	7,705
VHM-17	17.00	17.82	1.14	.46	17.72	.56	2,983	8,187
VHM-18	18.00	18.82	1.14	.46	18.72	.56	3,158	8,669
VHM-19	19.00	19.86	1.14	.46	19.76	.56	3,519	9,150
VHM-20	20.00	21.26	1.65	.53	21.06	.66	5,166	11,097
VHM-21	21.00	22.27	1.65	.53	22.06	.66	5,424	11,652
VHM-22	22.00	23.28	1.65	.53	23.06	.66	5,683	12,207
VHM-24	24.00	25.29	1.65	.53	25.06	.66	6,199	13,317
VHM-25	25.00	26.30	1.65	.53	26.06	.66	6,458	13,872
VHM-26	26.00	27.31	1.65	.53	27.06	.66	6,716	14,427
VHM-28	28.00	29.40	2.24	.64	29.12	.79	7,642	16,303
VHM-29	29.00	30.41	2.24	.64	30.12	.79	7,915	16,885
VHM-30	30.00	31.42	2.24	.64	31.12	.79	8,188	17,467
VHM-31	31.00	32.43	2.24	.64	32.12	.79	8,461	18,049
VHM-32	32.00	33.44	2.24	.64	33.12	.79	8,734	18,632
VHM-34	34.00	35.45	2.24	.64	35.12	.79	9,279	19,796
VHM-35	35.00	36.47	2.24	.64	36.12	.79	9,552	20,378
VHM-36	36.00	37.48	2.24	.64	37.12	.79	9,825	20,960
VHM-37	37.00	38.49	2.24	.64	38.12	.79	10,098	21,543
VHM-38	38.00	39.50	2.24	.64	39.12	.79	10,371	22,125
VHM-40	40.00	41.94	3.00	.79	41.48	.99	14,426	28,748
VHM-42	42.00	43.96	3.00	.79	43.48	.99	15,147	30,185
VHM-45	45.00	46.99	3.00	.79	46.48	.99	16,229	32,341
VHM-47	47.00	49.00	3.00	.79	48.48	.99	16,950	33,779
VHM-48	48.00	50.01	3.00	.79	49.48	.99	17,311	34,497
VHM-50	50.00	52.04	3.00	.79	51.48	.99	18,032	35,935
VHM-52	52.00	54.55	4.01	.79	53.94	.99	24,583	37,372
VHM-55	55.00	57.57	4.01	.79	56.94	.99	26,001	39,528
VHM-56	56.00	58.58	4.01	.79	57.94	.99	26,473	40,247
VHM-58	58.00	60.60	4.01	.79	59.94	.99	27,419	41,684
VHM-60	60.00	62.64	4.01	.79	61.94	.99	28,364	43,122
VHM-62	62.00	64.67	4.01	.79	63.94	.99	29,310	44,559
VHM-63	63.00	65.69	4.01	.79	64.94	.99	29,783	45,278
VHM-65	65.00	67.70	4.01	.79	66.94	.99	30,728	46,715
VHM-68	68.00	70.72	4.01	.79	69.94	.99	32,146	48,871
VHM-70	70.00	72.74	4.01	.79	71.94	.99	33,092	50,309
VHM-72	72.00	74.77	4.01	.79	73.94	.99	34,037	51,746
VHM-75	75.00	77.80	4.01	.79	76.94	.99	35,456	53,902

<sup>1</sup> Add suffix "-S02" for 302 stainless steel. Add suffix "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> No removal notch.

<sup>6</sup> Square edge wire.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
VHM-78	78.00	81.20	4.78	.99	80.34	1.12	44,477	70,250
VHM-80	80.00	83.23	4.78	.99	82.34	1.12	45,617	72,052
VHM-82	82.00	85.25	4.78	.99	84.34	1.12	46,757	73,853
VHM-85	85.00	88.29	4.78	.99	87.34	1.12	48,468	76,555
VHM-88	88.00	91.32	4.78	.99	90.34	1.12	50,179	79,257
VHM-90	90.00	93.36	4.78	.99	92.34	1.12	51,319	81,058
VHM-92	92.00	95.37	4.78	.99	94.34	1.12	52,460	82,859
VHM-95	95.00	98.39	4.78	.99	97.34	1.12	54,170	85,561
VHM-98	98.00	101.41	4.78	.99	100.34	1.12	55,881	88,263
VHM-100	100.00	103.43	4.78	.99	102.34	1.12	57,021	90,064
VHM-102	102.00	105.44	4.78	.99	104.34	1.12	58,162	91,866
VHM-105	105.00	108.92	5.72	1.17	107.80	1.32	71,642	106,440
VHM-110	110.00	113.98	5.72	1.17	112.80	1.32	75,054	111,508
VHM-112	112.00	116.01	5.72	1.17	114.80	1.32	76,418	113,536
VHM-115	115.00	119.12	5.72	1.17	117.88	1.32	80,707	116,577
VHM-120	120.00	124.30	5.72	1.17	123.00	1.32	87,725	121,645
VHM-125	125.00	129.47	5.72	1.17	128.12	1.32	95,036	126,714
VHM-130	130.00	134.66	5.72	1.17	133.26	1.32	103,272	131,783
VHM-135	135.00	139.83	5.72	1.55	138.38	1.70	111,192	181,299
VHM-140	140.00	145.00	5.72	1.55	143.50	1.70	119,404	188,013
VHM-145	145.00	150.17	5.72	1.55	148.62	1.70	127,974	194,907
VHM-150	150.00	155.30	6.73	1.55	153.76	1.70	137,436	201,443
VHM-155	155.00	160.46	6.73	1.55	158.88	1.70	146,361	208,158
VHM-160	160.00	165.64	6.73	1.55	164.00	1.70	155,956	214,872
VHM-165	165.00	170.82	6.73	1.55	169.13	1.70	165,855	221,587
VHM-170	170.00	175.99	6.73	1.55	174.25	1.70	176,059	228,302
VHM-175	175.00	181.17	6.73	1.55	179.38	1.70	186,568	235,017
VHM-180	180.00	186.35	6.73	1.55	184.50	1.70	197,381	241,731
VHM-185	185.00	191.52	6.73	1.55	189.63	1.70	208,499	248,446
VHM-190	190.00	196.70	6.73	1.55	194.75	1.70	219,922	255,161
VHM-195	195.00	201.87	7.62	1.55	199.88	1.70	231,649	261,876
VHM-200	200.00	207.05	7.62	1.55	205.00	1.70	243,681	268,590
VHM-210	210.00	217.40	7.62	1.55	215.25	1.70	268,658	282,020
VHM-220	220.00	227.76	8.76	1.93	225.50	2.08	294,854	367,882
VHM-230	230.00	238.11	8.76	1.93	235.75	2.08	322,268	384,604
VHM-240	240.00	248.46	8.76	1.93	246.00	2.08	350,900	401,326
VHM-250	250.00	258.81	8.76	1.93	256.25	2.08	380,751	418,048
VHM-260	260.00	269.17	9.65	1.93	266.50	2.08	411,821	434,770
VHM-270	270.00	279.52	9.65	1.93	276.75	2.08	444,108	451,492
VHM-280	280.00	289.87	9.65	1.93	287.00	2.08	477,614	468,214
VHM-290	290.00	300.22	9.65	1.93	297.25	2.08	512,339	484,936
VHM-300	300.00	310.58	9.65	1.93	307.50	2.08	548,282	501,658

<sup>1</sup> Add suffix "-S02" for 302 stainless steel. Add suffix "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

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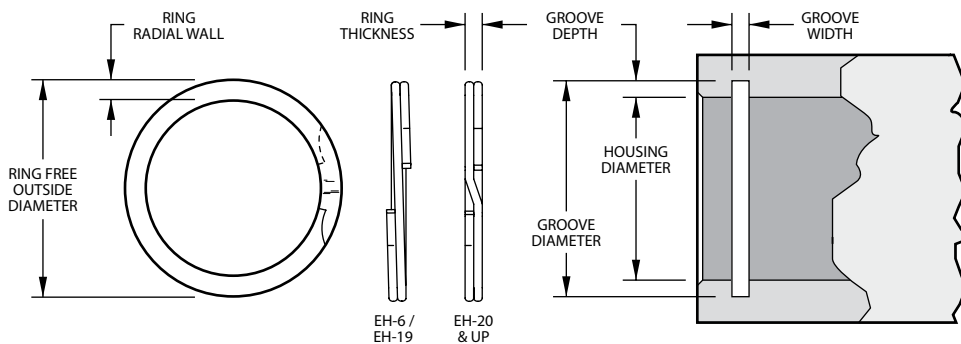
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# EH Series - Metric Aerospace Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



MA 4017<sup>5</sup>



Product Dimensions All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
EH-6 <sup>6,7</sup>	6.00	6.35	.33 - .53	.38	6.30	.51	440	1,880
EH-7 <sup>6,7</sup>	7.00	7.37	.33 - .53	.38	7.32	.51	550	2,190
EH-8 <sup>6,7</sup>	8.00	8.51	.51 - .71	.38	8.43	.51	840	2,500
EH-9 <sup>6,7</sup>	9.00	9.60	.64 - .84	.64	9.50	.74	1,100	4,740
EH-10 <sup>6,7</sup>	10.00	10.62	.64 - .84	.64	10.52	.74	1,270	5,270
EH-11 <sup>7</sup>	11.00	11.79	.76 - .96	.64	11.71	.74	1,900	5,790
EH-12	12.00	12.89	1.02 - 1.22	.60	12.70	.70	2,050	7,950
EH-13	13.00	13.95	1.02 - 1.22	.89	13.75	1.00	2,410	12,110
EH-14	14.00	15.07	1.27 - 1.47	.89	14.85	1.00	2,930	13,040
EH-15	15.00	16.14	1.27 - 1.47	.89	15.90	1.00	3,290	13,970
EH-16	16.00	17.15	1.27 - 1.47	.89	16.95	1.00	3,740	14,900
EH-17	17.00	18.32	1.52 - 1.73	.89	18.05	1.00	4,390	15,830
EH-18	18.00	19.39	1.52 - 1.73	.89	19.10	1.00	4,820	16,760
EH-19	19.00	20.48	1.52 - 1.73	.89	20.17	1.00	5,460	17,690
EH-20	20.00	21.51	1.78 - 1.98	.89	21.22	1.00	5,940	18,620
EH-21	21.00	22.56	1.78 - 1.98	.89	22.27	1.00	6,550	19,550
EH-22	22.00	23.65	1.78 - 1.98	1.07	23.37	1.20	7,390	24,630
EH-23	23.00	24.69	2.03 - 2.24	1.07	24.42	1.20	7,950	25,750
EH-24	24.00	25.73	2.03 - 2.24	1.07	25.47	1.20	8,650	26,870
EH-25	25.00	27.03	2.03 - 2.24	1.07	26.67	1.20	10,230	27,990
EH-26	26.00	28.07	2.03 - 2.24	1.07	27.77	1.20	11,270	29,110
EH-27	27.00	29.11	2.49 - 2.69	1.27	28.87	1.40	12,360	31,170
EH-28	28.00	30.10	2.49 - 2.69	1.27	29.87	1.40	12,820	32,330
EH-29	29.00	31.21	2.49 - 2.69	1.27	30.95	1.40	13,840	33,480
EH-30	30.00	32.28	2.49 - 2.69	1.27	32.00	1.40	14,610	34,640
EH-31	31.00	33.32	2.49 - 2.69	1.27	33.05	1.40	15,550	35,790
EH-32	32.00	34.23	2.49 - 2.69	1.27	34.00	1.40	15,880	36,950
EH-34	34.00	36.46	2.87 - 3.07	1.27	36.20	1.40	18,210	39,260
EH-35	35.00	37.55	2.87 - 3.07	1.27	37.30	1.40	19,600	40,410
EH-36	36.00	38.68	2.87 - 3.07	1.27	38.40	1.40	21,040	41,560
EH-37	37.00	39.60	2.87 - 3.07	1.27	39.40	1.40	21,620	42,720
EH-38	38.00	40.77	2.87 - 3.07	1.27	40.50	1.40	23,130	43,870
EH-40	40.00	42.91	3.12 - 3.33	1.57	42.50	1.75	24,350	57,090
EH-42	42.00	45.01	3.12 - 3.33	1.57	44.60	1.75	26,590	59,950
EH-45	45.00	48.13	3.12 - 3.33	1.57	47.70	1.75	29,590	64,230
EH-46	46.00	49.28	3.12 - 3.33	1.57	48.80	1.75	31,370	65,660
EH-47	47.00	50.32	3.89 - 4.09	1.57	49.90	1.75	33,190	67,080
EH-48	48.00	51.46	3.89 - 4.09	1.57	51.00	1.75	35,070	68,510
EH-50	50.00	53.66	3.89 - 4.09	1.57	53.20	1.75	38,960	71,370
EH-52	52.00	54.30	3.12 - 3.33	1.25	53.79	1.42	22,790	59,090
EH-53	53.00	55.32	3.12 - 3.33	1.25	54.79	1.42	23,230	60,230
EH-55	55.00	57.38	3.38 - 3.58	1.25	56.85	1.42	24,910	62,500
EH-56	56.00	58.40	3.38 - 3.58	1.25	57.85	1.42	25,360	63,640
EH-58	58.00	60.43	3.38 - 3.58	1.25	59.85	1.42	26,270	65,910
EH-59	59.00	61.54	3.38 - 3.58	1.25	60.93	1.42	27,870	67,050
EH-60	60.00	62.57	3.38 - 3.58	1.25	61.99	1.42	29,220	68,180

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Contact Smalley for details/information on how to order parts to be in compliance with this specification.

<sup>6</sup> No removal notch.

<sup>7</sup> Square edge wire

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
EH-61	61.00	63.65	3.63 - 3.84	1.25	63.09	1.42	31,190	69,320
EH-62	62.00	64.70	3.63 - 3.84	1.25	64.09	1.42	31,700	70,460
EH-63	63.00	65.70	3.63 - 3.84	1.25	65.09	1.42	32,220	71,590
EH-64	64.00	66.77	3.63 - 3.84	1.25	66.19	1.42	34,290	72,730
EH-65	65.00	67.82	3.63 - 3.84	1.25	67.19	1.42	34,820	73,870
EH-66	66.00	68.80	3.63 - 3.84	1.25	68.19	1.42	35,360	75,000
EH-67	67.00	69.90	3.63 - 3.84	1.25	69.25	1.42	36,870	76,140
EH-68	68.00	70.94	3.89 - 4.09	1.25	70.29	1.42	38,090	77,270
EH-69	69.00	71.94	3.89 - 4.09	1.25	71.29	1.42	38,650	78,410
EH-70	70.00	72.94	3.89 - 4.09	1.25	72.29	1.42	39,210	79,550
EH-71	71.00	73.99	3.89 - 4.09	1.25	73.29	1.42	39,770	80,680
EH-72	72.00	75.04	4.11 - 4.39	1.25	74.39	1.42	40,910	81,510
EH-75	75.00	78.07	4.11 - 4.39	1.25	77.39	1.42	43,830	85,230
EH-78	78.00	81.21	4.11 - 4.39	1.55	80.45	1.73	46,730	109,910
EH-80	80.00	83.22	4.37 - 4.62	1.55	82.49	1.73	48,700	112,730
EH-82	82.00	85.28	4.37 - 4.62	1.55	84.55	1.73	51,120	115,550
EH-85	85.00	88.38	4.62 - 4.88	1.55	87.65	1.73	55,060	119,780
EH-88	88.00	91.45	4.62 - 4.88	1.55	90.69	1.73	57,860	124,000
EH-90	90.00	93.58	4.88 - 5.13	1.55	92.79	1.73	61,370	126,820
EH-92	92.00	95.66	4.88 - 5.13	1.55	94.85	1.73	64,070	129,640
EH-95	95.00	98.69	4.88 - 5.13	1.55	97.85	1.73	66,160	133,870
EH-98	98.00	101.83	5.13 - 5.38	1.55	100.99	1.73	71,590	138,090
EH-100	100.00	103.83	5.13 - 5.38	1.55	102.99	1.73	73,050	140,910
EH-102	102.00	106.00	5.38 - 5.64	1.55	105.15	1.73	78,490	143,730
EH-105	105.00	109.00	5.38 - 5.64	1.55	108.15	1.73	80,800	147,960
EH-108	108.00	112.22	5.64 - 5.89	1.55	111.31	1.73	87,310	152,190
EH-110	110.00	114.25	5.64 - 5.89	1.55	113.31	1.73	62,140	155,000
EH-112	112.00	116.44	5.89 - 6.15	1.55	115.45	1.73	94,370	157,820
EH-115	115.00	119.44	5.89 - 6.15	1.55	118.45	1.73	96,890	162,050
EH-120	120.00	124.54	6.20 - 6.45	1.83	123.55	2.00	104,030	199,640
EH-125	125.00	129.59	6.20 - 6.45	1.83	128.55	2.00	108,360	207,960
EH-130	130.00	134.71	6.20 - 6.45	1.83	133.65	2.00	115,860	216,280
EH-135	135.00	139.74	6.20 - 6.45	1.83	138.62	2.00	119,000	224,600
EH-140	140.00	144.87	6.20 - 6.45	1.83	143.72	2.00	126,820	232,920
EH-145	145.00	150.04	6.20 - 6.45	1.83	148.82	2.00	134,880	241,230
EH-150	150.00	155.07	6.20 - 6.45	1.83	153.82	2.00	139,530	249,550
EH-155	155.00	160.72	7.72 - 8.03	2.18	159.40	2.40	166,080	307,190
EH-160	160.00	165.74	7.72 - 8.03	2.18	164.40	2.40	171,433	317,100
EH-165	165.00	170.77	7.72 - 8.03	2.18	169.40	2.40	176,790	327,010
EH-170	170.00	176.05	7.72 - 8.03	2.18	174.60	2.40	190,430	336,920
EH-175	175.00	181.05	7.72 - 8.03	2.18	179.60	2.40	196,030	346,830
EH-180	180.00	186.38	7.72 - 8.03	2.18	184.88	2.40	213,900	356,740
EH-185	185.00	191.10	7.72 - 8.03	2.18	189.88	2.40	219,840	366,650
EH-190	190.00	196.45	7.72 - 8.03	2.18	194.88	2.40	225,790	376,560
EH-195	195.00	201.74	7.72 - 8.03	2.18	200.14	2.40	244,070	386,460
EH-200	200.00	206.76	7.72 - 8.03	2.18	205.14	2.40	250,330	396,370
EH-210	210.00	217.10	9.32 - 9.63	2.18	215.40	2.40	276,140	416,490
EH-220	220.00	227.40	9.32 - 9.63	2.18	225.64	2.40	257,150	436,010
EH-230	230.00	237.73	9.32 - 9.63	2.18	235.90	2.40	330,450	455,830
EH-240	240.00	247.80	9.32 - 9.63	2.18	245.90	2.40	344,810	475,650
EH-250	250.00	258.10	9.32 - 9.63	2.18	256.16	2.40	375,010	495,470
EH-260	260.00	268.43	9.32 - 9.63	2.18	266.40	2.40	405,210	515,290
EH-270	270.00	278.50	9.32 - 9.63	2.18	276.40	2.40	420,790	535,100
EH-280	280.00	288.82	9.32 - 9.63	2.18	286.66	2.40	454,100	554,920

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

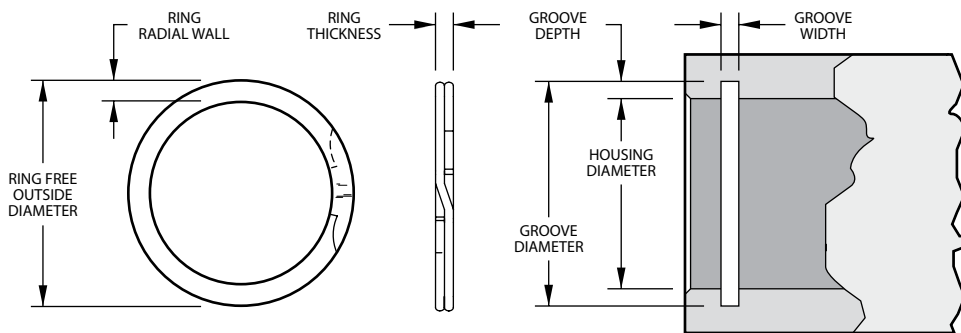
<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Contact Smalley for details/information on how to order parts to be in compliance with this specification.



# DNH Series - DIN Metric Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



Groove Compatible with DIN 472

Product Dimensions All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
DNH-13	13.00	13.72	1.40	.99	13.60	1.10	1,901	13,474
DNH-14	14.00	14.75	1.40	.99	14.60	1.10	2,047	14,510
DNH-15	15.00	15.85	1.40	.99	15.70	1.10	2,559	15,547
DNH-16	16.00	16.97	1.65	.99	16.80	1.10	3,119	16,583
DNH-17	17.00	17.98	1.65	.99	17.80	1.10	3,314	17,620
DNH-18	18.00	19.18	1.91	.99	19.00	1.10	4,386	18,656
DNH-19	19.00	20.19	1.91	.99	20.00	1.10	4,630	19,693
DNH-20	20.00	21.21	1.91	.99	21.00	1.10	4,874	20,729
DNH-21	21.00	22.23	1.91	.99	22.00	1.10	5,117	21,766
DNH-22	22.00	23.23	1.91	.99	23.00	1.10	5,361	22,802
DNH-23	23.00	24.33	2.18	1.14	24.10	1.30	6,165	23,853
DNH-24	24.00	25.45	2.18	1.14	25.20	1.30	7,018	24,891
DNH-25	25.00	26.45	2.18	1.14	26.20	1.30	7,310	25,928
DNH-26	26.00	27.48	2.18	1.14	27.20	1.30	7,603	26,965
DNH-27	27.00	28.68	2.41	1.14	28.40	1.30	9,211	28,002
DNH-28	28.00	29.69	2.41	1.14	29.40	1.30	9,552	29,039
DNH-29	29.00	30.71	2.41	1.14	30.40	1.30	9,893	30,076
DNH-30	30.00	31.71	2.41	1.14	31.40	1.30	10,235	31,113
DNH-31	31.00	33.02	2.41	1.14	32.70	1.30	12,842	32,150
DNH-32	32.00	34.04	2.41	1.14	33.70	1.30	13,256	33,187
DNH-33	33.00	35.05	2.41	1.14	34.70	1.30	13,670	34,224
DNH-34	34.00	36.07	3.25	1.44	35.70	1.60	14,085	44,541
DNH-35	35.00	37.38	3.25	1.44	37.00	1.60	17,058	45,851
DNH-36	36.00	38.39	3.25	1.44	38.00	1.60	17,545	47,161
DNH-37	37.00	39.40	3.25	1.44	39.00	1.60	18,032	48,471
DNH-38	38.00	40.41	3.25	1.44	40.00	1.60	18,520	49,781
DNH-40	40.00	42.93	4.01	1.69	42.50	1.85	24,368	61,498
DNH-41	41.00	43.94	4.01	1.69	43.50	1.85	24,977	63,036
DNH-42	42.00	44.96	4.01	1.69	44.50	1.85	25,586	64,573
DNH-45	45.00	47.98	4.01	1.69	47.50	1.85	27,414	69,186
DNH-47	47.00	49.99	4.01	1.69	49.50	1.85	28,633	72,261
DNH-48	48.00	51.00	4.01	1.69	50.50	1.85	29,242	73,798
DNH-50	50.00	53.54	5.08	1.93	53.00	2.15	36,552	87,790
DNH-51	51.00	54.54	5.08	1.93	54.00	2.15	37,283	89,546
DNH-52	52.00	55.55	5.08	1.93	55.00	2.15	38,014	91,302
DNH-55	55.00	58.57	5.08	1.93	58.00	2.15	40,207	96,569
DNH-56	56.00	59.59	5.08	1.93	59.00	2.15	40,938	98,325
DNH-57	57.00	60.60	5.08	1.93	60.00	2.15	41,669	100,081
DNH-58	58.00	61.62	5.08	1.93	61.00	2.15	42,400	101,836
DNH-60	60.00	63.63	5.08	1.93	63.00	2.15	43,863	105,348
DNH-62	62.00	65.66	5.08	1.93	65.00	2.15	45,325	108,860
DNH-63	63.00	66.67	5.08	1.93	66.00	2.15	46,056	110,615
DNH-64	64.00	67.67	5.08	1.93	67.00	2.15	46,787	112,371

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
DNH-65	65.00	68.67	5.08	2.41	68.00	2.65	47,518	135,725
DNH-67	67.00	70.67	5.08	2.41	70.00	2.65	48,980	139,901
DNH-68	68.00	71.67	5.08	2.41	71.00	2.65	49,711	141,989
DNH-70	70.00	73.67	5.08	2.41	73.00	2.65	51,173	146,165
DNH-72	72.00	75.67	5.08	2.41	75.00	2.65	52,635	150,341
DNH-75	75.00	78.68	5.08	2.41	78.00	2.65	54,828	156,605
DNH-76	76.00	79.68	5.08	2.41	79.00	2.65	55,559	158,694
DNH-78	78.00	81.69	5.08	2.41	81.00	2.65	57,021	162,870
DNH-80	80.00	84.19	6.05	2.41	83.50	2.65	68,231	167,046
DNH-82	82.00	86.20	6.05	2.41	85.50	2.65	69,936	171,222
DNH-85	85.00	89.20	6.05	2.91	88.50	3.15	72,495	214,309
DNH-88	88.00	92.21	6.05	2.91	91.50	3.15	75,054	221,873
DNH-90	90.00	94.21	6.05	2.91	93.50	3.15	76,759	226,915
DNH-92	92.00	96.22	6.05	2.91	95.50	3.15	78,465	231,958
DNH-95	95.00	99.24	6.05	2.91	98.50	3.15	81,024	239,522
DNH-98	98.00	102.26	6.05	2.91	101.50	3.15	83,583	247,086
DNH-100	100.00	104.29	6.05	2.91	103.50	3.15	85,288	252,128
DNH-102	102.00	106.79	6.73	3.89	106.00	4.15	99,422	343,778
DNH-105	105.00	109.79	6.73	3.89	109.00	4.15	102,346	353,889
DNH-108	108.00	112.80	6.73	3.89	112.00	4.15	105,270	364,000
DNH-110	110.00	114.83	6.73	3.89	114.00	4.15	107,220	370,741
DNH-112	112.00	116.84	6.73	3.89	116.00	4.15	109,169	377,482
DNH-115	115.00	119.86	6.73	3.89	119.00	4.15	112,093	387,593
DNH-120	120.00	124.92	6.73	3.89	124.00	4.15	116,967	404,445
DNH-125	125.00	129.97	6.73	3.89	129.00	4.15	121,840	421,297
DNH-127	127.00	131.97	6.73	3.89	131.00	4.15	123,790	428,038
DNH-130	130.00	135.00	6.73	3.89	134.00	4.15	126,714	438,149
DNH-135	135.00	140.03	6.73	3.89	139.00	4.15	131,588	455,001
DNH-140	140.00	145.11	6.73	3.89	144.00	4.15	136,461	471,852
DNH-145	145.00	150.11	6.73	3.89	149.00	4.15	141,335	488,704
DNH-150	150.00	156.13	7.92	3.89	155.00	4.15	182,761	505,556
DNH-155	155.00	161.19	7.92	3.89	160.00	4.15	188,853	522,408
DNH-160	160.00	166.22	7.92	3.89	165.00	4.15	194,945	539,260
DNH-165	165.00	171.27	7.92	3.89	170.00	4.15	201,037	556,112
DNH-170	170.00	176.33	7.92	3.89	175.00	4.15	207,129	572,964
DNH-175	175.00	181.36	7.92	3.89	180.00	4.15	213,221	589,815
DNH-180	180.00	186.39	7.92	3.89	185.00	4.15	219,313	606,667
DNH-185	185.00	191.44	7.92	3.89	190.00	4.15	225,405	623,519
DNH-190	190.00	196.47	7.92	3.89	195.00	4.15	231,497	640,371
DNH-195	195.00	201.52	7.92	3.89	200.00	4.15	237,589	657,223
DNH-200	200.00	206.58	7.92	3.89	205.00	4.15	243,681	674,075
DNH-210	210.00	217.58	9.53	4.86	216.00	5.15	307,038	884,268
DNH-220	220.00	227.66	9.53	4.86	226.00	5.15	321,659	926,376
DNH-230	230.00	237.72	9.53	4.86	236.00	5.15	336,280	968,484
DNH-240	240.00	247.80	9.53	4.86	246.00	5.15	350,900	1,010,592
DNH-250	250.00	257.89	9.53	4.86	256.00	5.15	365,521	1,052,700
DNH-260	260.00	269.93	11.18	4.86	268.00	5.15	506,856	1,094,808
DNH-270	270.00	280.01	11.18	4.86	278.00	5.15	526,351	1,136,916
DNH-280	280.00	290.09	11.18	4.86	288.00	5.15	545,845	1,179,024
DNH-290	290.00	300.15	11.18	4.86	298.00	5.15	565,340	1,221,132
DNH-300	300.00	310.24	11.18	4.86	308.00	5.15	584,834	1,263,241
DNH-310	310.00	322.25	12.70	5.87	320.00	6.20	755,411	1,576,625
DNH-320	320.00	332.33	12.70	5.87	330.00	6.20	779,779	1,627,484
DNH-330	330.00	342.42	12.70	5.87	340.00	6.20	804,147	1,678,342
DNH-340	340.00	352.50	12.70	5.87	350.00	6.20	828,515	1,729,201
DNH-350	350.00	362.56	12.70	5.87	360.00	6.20	852,883	1,780,060
DNH-360	360.00	372.64	12.70	5.87	370.00	6.20	877,251	1,830,919
DNH-370	370.00	382.73	12.70	5.87	380.00	6.20	901,619	1,881,778
DNH-380	380.00	392.79	12.70	5.87	390.00	6.20	925,987	1,932,637
DNH-390	390.00	402.84	12.70	5.87	400.00	6.20	950,355	1,983,496
DNH-400	400.00	412.93	12.70	5.87	410.00	6.20	974,723	2,034,354

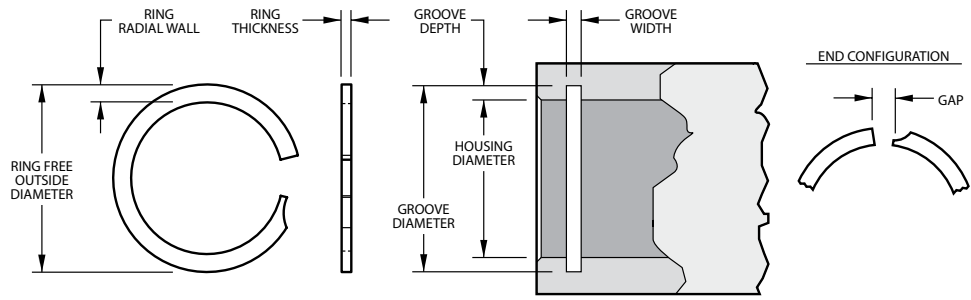
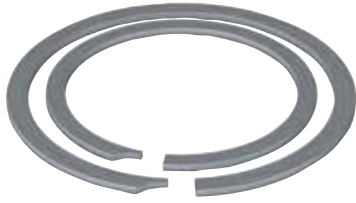
<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

# FH Series - Metric Constant Section Rings



Groove Compatible with DIN 472

Product Dimensions All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4,5</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
FH-013	13.00	13.73	1.40	.94	13.60	1.10	1,931	10,591
FH-014	14.00	14.74	1.40	.94	14.60	1.10	2,077	11,396
FH-015	15.00	15.85	1.40	.94	15.70	1.10	2,602	12,224
FH-016	16.00	16.90	1.65	.94	16.80	1.10	3,172	13,029
FH-017	17.00	17.97	1.65	.94	17.80	1.10	3,367	13,838
FH-018	18.00	19.18	1.90	.94	19.00	1.10	4,457	14,666
FH-019	19.00	20.25	1.90	.94	20.00	1.10	4,702	15,471
FH-020	20.00	21.20	1.90	.94	21.00	1.10	4,951	16,276
FH-021	21.00	22.21	1.90	.94	22.00	1.10	5,200	17,103
FH-022	22.00	23.22	1.90	.94	23.00	1.10	5,445	17,913
FH-023	23.00	24.23	1.90	.94	24.00	1.10	5,698	18,736
FH-024	24.00	25.40	2.15	1.15	25.20	1.30	6,539	23,927
FH-025	25.00	26.45	2.15	1.15	26.20	1.30	6,806	24,914
FH-026	26.00	27.46	2.15	1.15	27.20	1.30	7,082	25,929
FH-027	27.00	28.47	2.38	1.15	28.20	1.30	7,353	26,916
FH-028	28.00	29.68	2.38	1.15	29.40	1.30	9,702	27,904
FH-029	29.00	30.69	2.38	1.15	30.40	1.30	10,053	28,918
FH-030	30.00	31.79	2.38	1.15	31.40	1.30	10,395	29,905
FH-031	31.00	33.01	2.38	1.15	32.70	1.30	12,660	30,893
FH-032	32.00	33.93	2.38	1.15	33.70	1.30	13,073	31,907
FH-033	33.00	35.03	2.38	1.15	34.70	1.30	13,478	32,895
FH-034	34.00	36.04	3.25	1.44	35.70	1.60	13,892	40,319
FH-035	35.00	37.35	3.25	1.44	37.00	1.60	16,899	41,493
FH-036	36.00	38.36	3.25	1.44	38.00	1.60	17,375	42,663
FH-037	37.00	39.37	3.25	1.44	39.00	1.60	17,869	43,868
FH-038	38.00	40.44	3.25	1.44	40.00	1.60	18,344	45,043
FH-040	40.00	42.86	4.01	1.69	42.50	1.85	24,265	55,621
FH-041	41.00	43.91	4.01	1.69	43.50	1.85	24,866	56,995
FH-042	42.00	44.92	4.01	1.69	44.50	1.85	25,484	58,410
FH-045	45.00	47.88	4.01	1.69	47.50	1.85	27,303	62,578
FH-047	47.00	49.97	4.01	1.69	49.50	1.85	28,504	65,331
FH-048	48.00	50.98	4.01	1.69	50.50	1.85	29,118	66,741
FH-050	50.00	53.50	5.08	1.93	53.00	2.15	36,529	75,282
FH-051	51.00	54.43	5.08	1.93	54.00	2.15	37,249	76,776
FH-052	52.00	55.52	5.08	1.93	55.00	2.15	37,974	78,266
FH-055	55.00	58.55	5.08	1.93	58.00	2.15	40,163	82,777
FH-056	56.00	59.56	5.08	1.93	59.00	2.15	40,906	84,307
FH-057	57.00	60.68	5.08	1.93	60.00	2.15	41,631	85,797
FH-058	58.00	61.58	5.08	1.93	61.00	2.15	42,352	87,287
FH-060	60.00	63.60	5.08	1.93	63.00	2.15	43,819	90,308
FH-062	62.00	65.58	5.08	1.93	65.00	2.15	45,283	93,328
FH-063	63.00	66.63	5.08	1.93	66.00	2.15	46,008	94,823
FH-064	64.00	67.64	5.08	2.41	67.00	2.65	46,751	114,742

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.

Smalley Part Number <sup>1,4,5</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
FH-065	65.00	68.70	5.08	2.41	68.00	2.65	47,471	116,517
FH-067	67.00	70.54	5.08	2.41	70.00	2.65	48,939	120,115
FH-068	68.00	71.84	5.08	2.41	71.00	2.65	49,660	121,890
FH-070	70.00	73.64	5.08	2.41	73.00	2.65	51,128	125,489
FH-072	72.00	75.72	5.08	2.41	75.00	2.65	52,591	129,083
FH-075	75.00	78.75	5.08	2.41	78.00	2.65	54,780	134,456
FH-076	76.00	79.88	5.08	2.41	79.00	2.65	55,505	136,231
FH-078	78.00	81.73	5.08	2.41	81.00	2.65	56,968	139,830
FH-080	80.00	84.30	6.02	2.41	83.50	2.65	68,342	143,428
FH-082	82.00	86.32	6.02	2.41	85.50	2.65	70,033	146,978
FH-085	85.00	89.35	6.30	2.91	88.50	3.15	72,595	175,046
FH-088	88.00	92.38	6.30	2.91	91.50	3.15	75,175	181,269
FH-090	90.00	94.70	6.30	2.91	93.50	3.15	76,865	185,353
FH-092	92.00	96.50	6.30	2.91	95.50	3.15	78,582	189,485
FH-095	95.00	99.62	6.30	2.91	98.50	3.15	81,140	195,659
FH-098	98.00	102.71	6.30	2.91	101.50	3.15	83,702	201,829
FH-100	100.00	104.50	6.30	2.91	103.50	3.15	85,415	205,962
FH-102	102.00	107.27	6.73	3.89	106.00	4.15	87,127	269,224
FH-105	105.00	109.96	6.73	3.89	109.00	4.15	102,687	277,133
FH-108	108.00	113.09	6.73	3.89	112.00	4.15	105,619	285,042
FH-110	110.00	115.10	6.73	3.89	114.00	4.15	107,580	290,340
FH-112	112.00	117.12	6.73	3.89	116.00	4.15	109,520	295,567
FH-115	115.00	120.15	6.73	3.89	119.00	4.15	112,473	303,547
FH-120	120.00	125.60	6.73	3.89	124.00	4.15	117,344	316,687
FH-125	125.00	130.25	6.73	3.89	129.00	4.15	122,237	329,893
FH-127	127.00	132.27	6.73	3.89	131.00	4.15	124,199	335,187
FH-130	130.00	135.30	6.73	3.89	134.00	4.15	127,130	343,096
FH-135	135.00	140.35	6.73	3.89	139.00	4.15	132,023	356,303
FH-140	140.00	145.26	6.73	3.89	144.00	4.15	136,916	369,509
FH-145	145.00	150.45	6.73	3.89	149.00	4.15	141,809	382,716
FH-150	150.00	156.50	8.03	3.89	155.00	4.15	181,986	395,923
FH-155	155.00	161.55	8.03	3.89	160.00	4.15	188,026	409,063
FH-160	160.00	166.60	8.03	3.89	165.00	4.15	194,094	422,270
FH-165	165.00	171.70	8.03	3.89	170.00	4.15	200,166	435,476
FH-170	170.00	176.70	8.03	3.89	175.00	4.15	206,237	448,683
FH-175	175.00	181.75	8.03	3.89	180.00	4.15	212,305	461,890
FH-180	180.00	186.80	8.03	3.89	185.00	4.15	218,377	475,097
FH-185	185.00	191.85	8.03	3.89	190.00	4.15	224,417	488,232
FH-190	190.00	197.15	8.03	3.89	195.00	4.15	230,489	501,439
FH-195	195.00	201.95	8.03	3.89	200.00	4.15	236,556	514,646
FH-200	200.00	207.00	8.03	3.89	205.00	4.15	242,628	527,853
FH-210	210.00	217.93	9.48	4.87	216.00	5.15	306,763	657,096
FH-220	220.00	228.20	9.48	4.87	226.00	5.15	321,344	688,327
FH-230	230.00	238.30	9.48	4.87	236.00	5.15	335,961	719,638
FH-240	240.00	248.40	9.48	4.87	246.00	5.15	350,578	750,953
FH-250	250.00	258.50	9.48	4.87	256.00	5.15	365,199	782,264
FH-260	260.00	270.77	11.05	4.87	268.00	5.15	505,300	813,500
FH-270	270.00	280.70	11.05	4.87	278.00	5.15	524,748	844,811
FH-280	280.00	290.57	11.05	4.87	288.00	5.15	544,200	876,126
FH-290	290.00	300.90	11.05	4.87	298.00	5.15	563,599	907,357
FH-300	300.00	311.00	11.05	4.87	308.00	5.15	583,051	938,673

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.

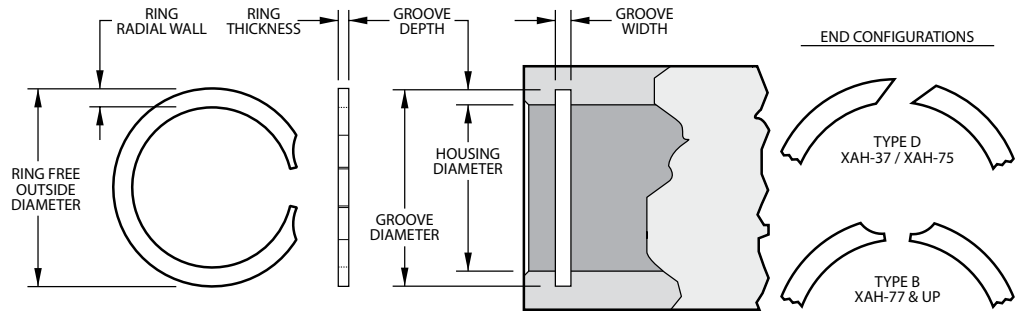
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# XAH Series - Contact Section Rings

Stock Items available in carbon steel and 302 stainless steel.



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
XAH-37	.375	.400	.035	.025	.395	.028	265	1,174
XAH-43	.438	.467	.035	.025	.462	.028	372	1,371
XAH-50	.500	.530	.040	.035	.524	.039	424	2,073
XAH-51	.512	.542	.040	.035	.536	.039	434	2,123
XAH-56	.562	.600	.048	.035	.590	.039	556	2,331
XAH-62	.625	.670	.048	.035	.657	.039	707	2,592
XAH-68	.688	.733	.048	.035	.720	.039	778	2,853
XAH-75	.750	.799	.048	.035	.786	.039	954	3,110
XAH-77	.777	.827	.062	.042	.813	.046	989	3,906
XAH-81	.812	.867	.062	.042	.852	.046	1,148	4,082
XAH-87	.875	.934	.062	.042	.919	.046	1,361	4,398
XAH-90	.901	.961	.078	.042	.945	.046	1,401	4,529
XAH-93	.938	1.003	.078	.042	.986	.046	1,591	4,715
XAH-100	1.000	1.070	.078	.042	1.052	.046	1,696	5,027
XAH-102	1.023	1.094	.093	.042	1.075	.046	1,880	5,142
XAH-106	1.062	1.134	.093	.050	1.114	.056	1,952	6,272
XAH-112	1.125	1.202	.093	.050	1.181	.056	2,227	6,644
XAH-118	1.188	1.270	.093	.050	1.248	.056	2,519	7,017
XAH-125	1.250	1.337	.109	.050	1.314	.056	2,827	7,383
XAH-131	1.312	1.404	.109	.050	1.380	.056	3,153	7,749
XAH-137	1.375	1.472	.109	.050	1.447	.056	3,499	8,121
XAH-143	1.438	1.535	.125	.050	1.510	.056	3,659	8,493
XAH-145	1.456	1.557	.125	.050	1.532	.056	3,911	8,599
XAH-150	1.500	1.607	.125	.050	1.576	.056	4,029	8,859
XAH-156	1.562	1.668	.125	.062	1.642	.068	4,416	11,002
XAH-162	1.625	1.736	.141	.062	1.709	.068	4,824	11,446
XAH-165	1.653	1.765	.141	.062	1.737	.068	4,907	11,643
XAH-168	1.688	1.804	.156	.062	1.776	.068	5,250	11,889
XAH-175	1.750	1.870	.156	.062	1.842	.068	5,690	12,326
XAH-181	1.812	1.933	.156	.062	1.904	.068	5,892	12,763
XAH-185	1.850	1.975	.156	.062	1.946	.068	6,277	13,030
XAH-187	1.875	2.000	.156	.062	1.971	.068	6,362	13,206
XAH-193	1.938	2.068	.156	.062	2.038	.068	6,849	13,650
XAH-196	1.968	2.098	.156	.062	2.068	.068	6,955	13,862
XAH-200	2.000	2.131	.156	.062	2.100	.068	7,069	14,087
XAH-206	2.062	2.197	.156	.078	2.166	.086	7,579	17,491
XAH-212	2.125	2.260	.156	.078	2.229	.086	7,811	18,025
XAH-218	2.188	2.331	.171	.078	2.296	.086	8,352	18,559
XAH-225	2.250	2.393	.171	.078	2.358	.086	8,588	19,085
XAH-231	2.312	2.459	.171	.078	2.424	.086	9,152	19,611
XAH-237	2.375	2.523	.171	.078	2.487	.086	9,401	20,145
XAH-244	2.440	2.592	.187	.078	2.556	.086	10,003	20,697
XAH-250	2.500	2.653	.187	.078	2.616	.086	10,249	21,206
XAH-253	2.531	2.688	.187	.078	2.651	.086	10,734	21,469
XAH-256	2.562	2.726	.187	.093	2.686	.103	11,228	26,078
XAH-262	2.625	2.790	.187	.093	2.750	.103	11,504	26,719
XAH-268	2.688	2.856	.187	.093	2.816	.103	11,780	27,361
XAH-271	2.717	2.882	.187	.093	2.842	.103	12,291	27,656

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

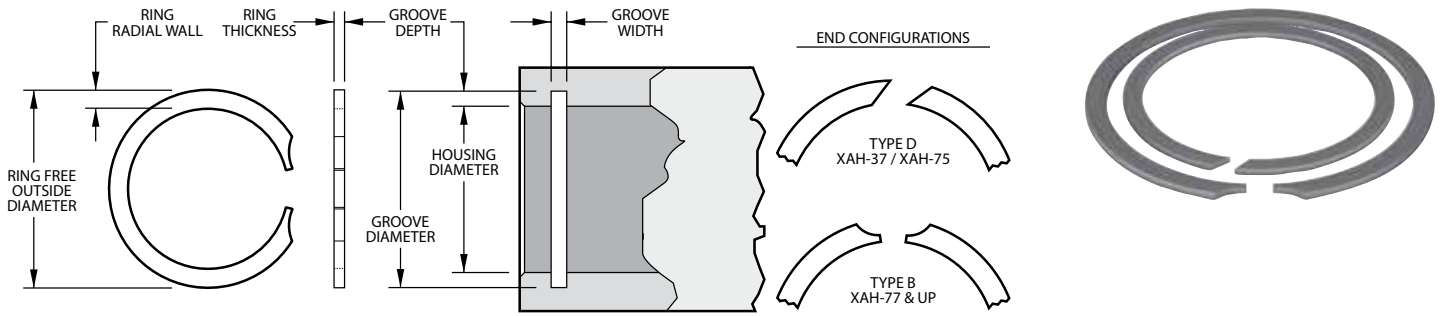
<sup>2</sup> Based on a groove material strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.



Stock Items available in carbon steel and 302 stainless steel.



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
XAH-275	2.750	2.918	.187	.093	2.878	.103	12,441	27,992
XAH-281	2.813	2.985	.187	.093	2.945	.103	13,123	28,633
XAH-283	2.834	3.006	.187	.093	2.966	.103	13,221	28,847
XAH-287	2.875	3.056	.187	.093	3.011	.103	13,819	29,264
XAH-300	3.000	3.181	.187	.093	3.136	.103	14,420	30,536
XAH-306	3.062	3.247	.218	.109	3.202	.120	15,151	35,009
XAH-312	3.125	3.311	.218	.109	3.265	.120	15,463	35,729
XAH-315	3.156	3.342	.218	.109	3.296	.120	15,616	36,084
XAH-325	3.250	3.442	.218	.109	3.394	.120	16,540	37,158
XAH-334	3.346	3.539	.218	.109	3.490	.120	17,029	38,256
XAH-346	3.469	3.663	.218	.109	3.613	.120	17,655	39,662
XAH-350	3.500	3.700	.250	.109	3.648	.120	18,308	40,017
XAH-354	3.543	3.745	.250	.109	3.691	.120	18,533	40,508
XAH-356	3.562	3.766	.250	.109	3.710	.120	18,632	40,725
XAH-362	3.625	3.831	.250	.109	3.773	.120	18,961	41,446
XAH-375	3.750	3.962	.250	.109	3.902	.120	20,145	42,875
XAH-387	3.875	4.089	.250	.109	4.027	.120	20,817	44,304
XAH-393	3.938	4.156	.250	.109	4.094	.120	21,712	45,024
XAH-400	4.000	4.221	.250	.109	4.156	.120	22,054	45,733
XAH-412	4.125	4.355	.250	.109	4.285	.120	23,326	47,162
XAH-425	4.250	4.485	.250	.109	4.410	.120	24,033	48,592
XAH-433	4.330	4.565	.250	.109	4.490	.120	24,486	49,506
XAH-443	4.436	4.670	.250	.109	4.596	.120	25,085	50,718
XAH-450	4.500	4.744	.250	.109	4.664	.120	26,083	51,450
XAH-462	4.625	4.875	.250	.109	4.795	.120	27,788	52,879
XAH-475	4.750	5.011	.281	.109	4.926	.120	29,547	54,308
XAH-500	5.000	5.265	.281	.109	5.180	.120	31,809	57,167
XAH-525	5.250	5.530	.312	.125	5.435	.139	34,141	65,732
XAH-537	5.375	5.660	.312	.125	5.565	.139	36,094	67,297
XAH-550	5.500	5.796	.312	.125	5.696	.139	38,100	68,862
XAH-575	5.750	6.050	.312	.125	5.950	.139	40,644	71,992
XAH-600	6.000	6.309	.312	.125	6.204	.139	43,260	75,122
XAH-625	6.250	6.568	.343	.156	6.458	.174	45,946	94,130
XAH-650	6.500	6.832	.343	.156	6.712	.174	48,703	97,895
XAH-662	6.625	6.975	.343	.156	6.845	.174	51,512	99,778
XAH-675	6.750	7.100	.343	.156	6.970	.174	52,484	101,660
XAH-700	7.000	7.350	.343	.156	7.220	.174	54,428	105,426
XAH-725	7.250	7.630	.375	.187	7.500	.209	64,059	123,654
XAH-750	7.500	7.890	.375	.187	7.750	.209	66,268	127,918
XAH-800	8.000	8.400	.375	.187	8.250	.209	70,686	136,446
XAH-825	8.250	8.665	.437	.187	8.540	.209	84,558	141,478
XAH-850	8.500	8.915	.437	.187	8.790	.209	87,120	145,766
XAH-875	8.750	9.205	.500	.187	9.080	.209	102,053	150,053
XAH-900	9.000	9.455	.500	.187	9.330	.209	104,968	154,340
XAH-905	9.055	9.509	.500	.187	9.384	.209	105,610	155,283
XAH-950	9.500	9.955	.500	.187	9.830	.209	110,800	162,915
XAH-984	9.840	10.295	.500	.187	10.170	.209	114,766	168,745
XAH-1000	10.000	10.455	.500	.187	10.330	.209	116,632	171,489

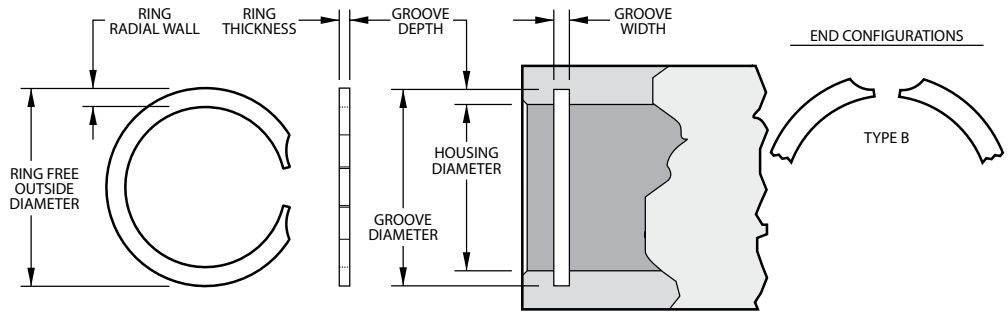
<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

# XDH Series - Constant Section Rings



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Housing Diameter	Ring			Groove		Thrust Capacity	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
XDH-112	1.125	1.196	.093	.042	1.181	.046	2,227	5,655
XDH-125	1.250	1.330	.093	.042	1.310	.046	2,651	6,283
XDH-137	1.375	1.460	.093	.042	1.435	.046	2,916	6,912
XDH-150	1.500	1.600	.125	.042	1.580	.046	4,241	7,540
XDH-162	1.625	1.725	.125	.042	1.705	.046	4,595	8,168
XDH-175	1.750	1.855	.125	.042	1.830	.046	4,948	8,796
XDH-187	1.875	1.990	.156	.042	1.965	.046	5,964	9,425
XDH-200	2.000	2.115	.156	.042	2.090	.046	6,362	10,053
XDH-206	2.062	2.177	.156	.042	2.152	.046	6,559	10,365
XDH-218	2.187	2.302	.156	.042	2.277	.046	6,957	10,993
XDH-231	2.312	2.432	.156	.042	2.402	.046	7,354	11,621
XDH-243	2.437	2.557	.156	.042	2.527	.046	7,752	12,250
XDH-256	2.562	2.682	.156	.042	2.652	.046	8,149	12,878
XDH-300	3.000	3.154	.187	.062	3.124	.068	13,148	21,130
XDH-325	3.250	3.404	.187	.062	3.374	.068	14,243	22,891
XDH-350	3.500	3.654	.187	.062	3.624	.068	15,339	24,652
XDH-375	3.750	3.904	.187	.062	3.874	.068	16,434	26,413
XDH-400	4.000	4.155	.187	.062	4.125	.068	17,671	28,174
XDH-425	4.250	4.429	.218	.078	4.394	.086	21,630	36,050
XDH-450	4.500	4.679	.218	.078	4.644	.086	22,902	38,170
XDH-475	4.750	4.929	.218	.078	4.894	.086	24,175	40,291
XDH-500	5.000	5.184	.218	.078	5.144	.086	25,447	42,412
XDH-525	5.250	5.434	.218	.078	5.394	.086	26,719	44,532
XDH-575	5.750	5.934	.218	.078	5.894	.086	29,264	48,773
XDH-600	6.000	6.220	.250	.093	6.160	.103	33,929	61,073
XDH-650	6.500	6.730	.250	.093	6.660	.103	36,757	66,162
XDH-700	7.000	7.240	.250	.093	7.160	.103	39,584	71,251
XDH-725	7.250	7.500	.250	.093	7.410	.103	40,998	73,796
XDH-750	7.500	7.760	.250	.093	7.660	.103	42,412	76,341
XDH-800	8.000	8.285	.250	.093	8.160	.103	45,239	81,430

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

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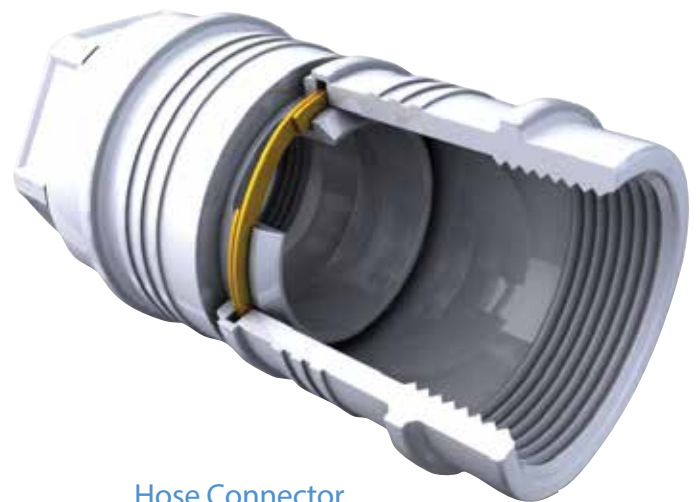
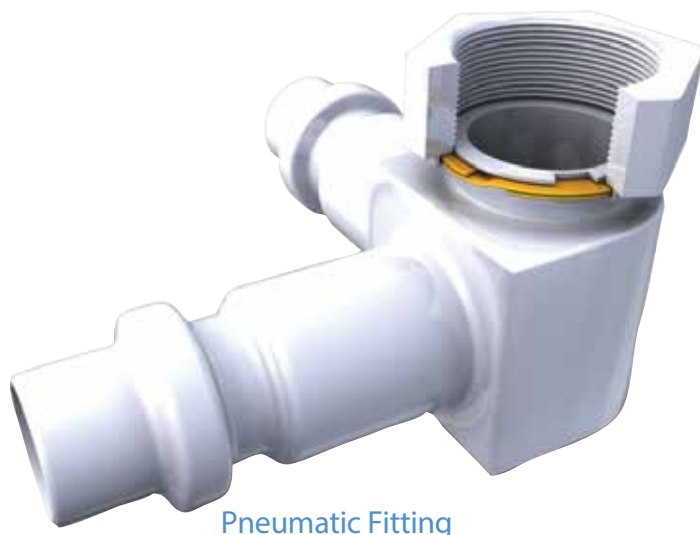
Simplify your design process by downloading CAD models of standard retaining rings and wave springs at [www.smalley.com/cad-models](http://www.smalley.com/cad-models).

## ID/OD Retaining Ring Lock

Spirolox Retaining Rings can operate in an internal and an external groove simultaneously. Spiral type retaining rings have many benefits for the ID/OD Lock, these benefits include concealed fastening, no required assembly tooling and a 360° rotational capacity. With a Spirolox Retaining Ring, the application is tamper-proof and aesthetically pleasing. In this featured application, the retaining ring is initially installed in the housing groove. When the mating component in the assembly is added, the retaining ring compresses into the groove. The groove is deep enough for the rings radial wall to fit into as the component slides into position. Finally, when the grooves meet, the retaining ring snaps into the shaft groove (groove depth equals 1/2 the retaining rings radial wall) while still in the housing groove.

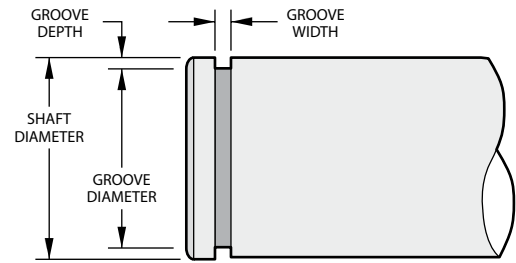
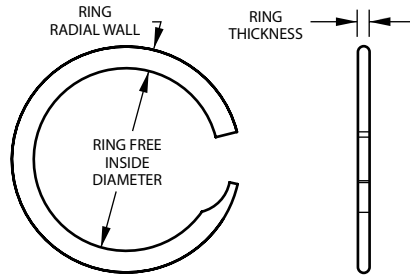
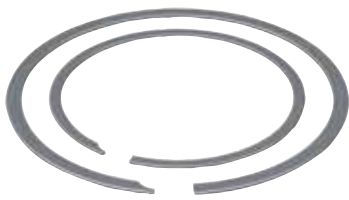


In the pneumatic fitting and hose connector applications depicted below, a 2-Turn retaining ring without removal notches or an offset, creates an ID/OD lock, permitting the 360° rotation of the nut.



# VS Series - Light Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
VS-25 <sup>5,6</sup>	.250	.236	.020	.012	.238	.015	106	481
VS-31 <sup>5,6</sup>	.312	.294	.025	.015	.297	.018	165	750
VS-37 <sup>5,6</sup>	.375	.348	.025	.015	.351	.018	318	901
VS-43 <sup>6</sup>	.437	.410	.035	.015	.413	.018	371	1,050
VS-50	.500	.467	.045	.018	.472	.022	500	1,300
VS-56	.562	.529	.045	.018	.534	.022	560	1,460
VS-62	.625	.591	.045	.018	.597	.022	620	1,630
VS-68	.687	.652	.045	.018	.659	.022	680	1,790
VS-75	.750	.715	.045	.018	.722	.022	740	1,950
VS-81	.812	.762	.065	.021	.770	.026	1,210	2,460
VS-87	.875	.825	.065	.021	.833	.026	1,300	2,660
VS-93	.937	.886	.065	.021	.895	.026	1,390	2,840
VS-100	1.000	.949	.065	.021	.958	.026	1,480	3,040
VS-106	1.062	1.008	.088	.025	1.018	.031	1,650	3,500
VS-112	1.125	1.071	.088	.025	1.081	.031	1,750	3,710
VS-118	1.187	1.132	.088	.025	1.143	.031	1,850	3,920
VS-125	1.250	1.194	.088	.025	1.206	.031	1,940	4,120
VS-131	1.312	1.255	.088	.025	1.268	.031	2,040	4,330
VS-137	1.375	1.318	.088	.025	1.331	.031	2,140	4,540
VS-143	1.437	1.379	.088	.025	1.393	.031	2,240	4,740
VS-150	1.500	1.442	.088	.025	1.456	.031	2,330	4,950
VS-156	1.562	1.488	.118	.031	1.505	.039	3,200	6,390
VS-162	1.625	1.550	.118	.031	1.568	.039	3,330	6,650
VS-168	1.687	1.612	.118	.031	1.630	.039	3,460	6,900
VS-175	1.750	1.674	.118	.031	1.693	.039	3,590	7,160
VS-181	1.812	1.736	.118	.031	1.755	.039	3,710	7,410
VS-187	1.875	1.798	.118	.031	1.818	.039	3,840	7,670
VS-193	1.937	1.859	.118	.031	1.880	.039	3,970	7,920
VS-200	2.000	1.922	.118	.031	1.943	.039	4,100	8,180
VS-206	2.062	1.963	.158	.031	1.986	.039	5,540	8,430
VS-212	2.125	2.026	.158	.031	2.049	.039	5,710	8,690
VS-218	2.187	2.087	.158	.031	2.111	.039	5,870	8,950
VS-225	2.250	2.149	.158	.031	2.174	.039	6,040	9,200
VS-231	2.312	2.211	.158	.031	2.236	.039	6,210	9,460
VS-237	2.375	2.273	.158	.031	2.299	.039	6,380	9,720
VS-243	2.437	2.335	.158	.031	2.361	.039	6,550	9,970
VS-250	2.500	2.397	.158	.031	2.424	.039	6,720	10,230
VS-256	2.562	2.458	.158	.031	2.486	.039	6,880	10,480
VS-262	2.625	2.521	.158	.031	2.549	.039	7,050	10,740
VS-268	2.687	2.582	.158	.031	2.611	.039	7,220	10,990
VS-275	2.750	2.644	.158	.031	2.674	.039	7,390	11,250
VS-281	2.812	2.706	.158	.031	2.736	.039	7,550	11,500
VS-287	2.875	2.768	.158	.031	2.799	.039	7,720	11,760
VS-293	2.937	2.830	.158	.031	2.861	.039	7,890	12,010
VS-300	3.000	2.892	.158	.031	2.924	.039	8,060	12,270

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.  
<sup>5</sup> No removal notch.  
<sup>6</sup> Square edge wire.

Stock Items available in carbon steel and 302 and 316 stainless steel.

Product Dimensions All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
VS-306	3.062	2.938	.188	.039	2.970	.044	9,960	15,760
VS-312	3.125	3.001	.188	.039	3.033	.044	10,160	16,080
VS-318	3.187	3.062	.188	.039	3.095	.044	10,360	16,400
VS-325	3.250	3.125	.188	.039	3.158	.044	10,570	16,720
VS-331	3.312	3.186	.188	.039	3.220	.044	10,770	17,040
VS-337	3.375	3.248	.188	.039	3.283	.044	10,970	17,370
VS-343	3.437	3.310	.188	.039	3.345	.044	11,180	17,690
VS-350	3.500	3.372	.188	.039	3.408	.044	11,380	18,010
VS-356	3.562	3.433	.188	.039	3.470	.044	11,580	18,330
VS-362	3.625	3.496	.188	.039	3.533	.044	11,790	18,650
VS-368	3.687	3.557	.188	.039	3.595	.044	11,990	18,970
VS-375	3.750	3.620	.188	.039	3.658	.044	12,190	19,300
VS-381	3.812	3.681	.188	.039	3.720	.044	12,400	19,620
VS-387	3.875	3.743	.188	.039	3.783	.044	12,600	19,940
VS-393	3.937	3.805	.188	.039	3.845	.044	12,800	20,260
VS-400	4.000	3.867	.188	.039	3.908	.044	13,010	20,580
VS-412	4.125	3.973	.225	.046	4.015	.052	16,040	23,850
VS-425	4.250	4.097	.225	.046	4.140	.052	16,520	24,570
VS-437	4.375	4.221	.225	.046	4.265	.052	17,010	25,290
VS-450	4.500	4.345	.225	.046	4.390	.052	17,500	26,010
VS-462	4.625	4.468	.225	.046	4.515	.052	17,980	26,740
VS-475	4.750	4.592	.225	.046	4.640	.052	18,470	27,460
VS-487	4.875	4.715	.225	.046	4.765	.052	18,950	28,180
VS-500	5.000	4.839	.225	.046	4.890	.052	19,440	28,900
VS-525	5.250	5.067	.225	.061	5.119	.067	24,490	40,240
VS-550	5.500	5.309	.225	.061	5.363	.067	26,830	42,160
VS-575	5.750	5.550	.225	.061	5.606	.067	29,260	44,080
VS-600	6.000	5.792	.225	.061	5.850	.067	31,810	45,990
VS-625	6.250	6.033	.265	.061	6.094	.067	34,460	47,910
VS-650	6.500	6.275	.265	.061	6.338	.067	37,220	49,830
VS-675	6.750	6.515	.265	.061	6.581	.067	40,560	51,740
VS-700	7.000	6.757	.265	.061	6.825	.067	43,540	53,660
VS-725	7.250	6.998	.300	.061	7.069	.067	46,640	55,580
VS-750	7.500	7.240	.300	.061	7.313	.067	49,830	57,490
VS-775	7.750	7.480	.300	.061	7.556	.067	53,140	59,410
VS-800	8.000	7.722	.300	.061	7.800	.067	56,550	61,320
VS-825	8.250	7.964	.345	.076	8.044	.082	60,070	78,790
VS-850	8.500	8.205	.345	.076	8.288	.082	63,690	81,180
VS-875	8.750	8.446	.345	.076	8.531	.082	68,040	83,570
VS-900	9.000	8.687	.345	.076	8.775	.082	71,890	85,950
VS-925	9.250	8.929	.345	.076	9.019	.082	75,850	88,340
VS-950	9.500	9.170	.345	.076	9.263	.082	79,910	90,730
VS-975	9.750	9.411	.345	.076	9.506	.082	84,080	93,120
VS-1000	10.000	9.653	.345	.076	9.750	.082	88,360	95,500

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

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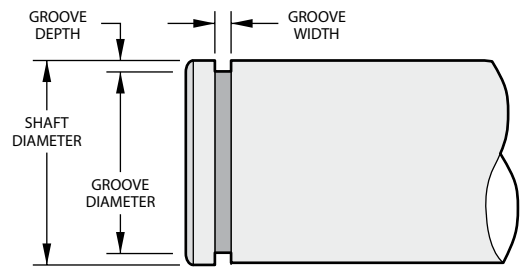
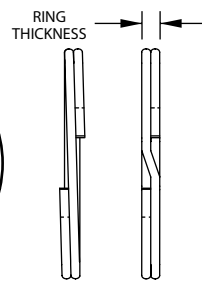
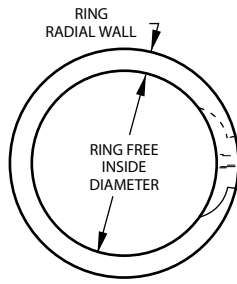
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# WS Series - Medium Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



AS3218, AS4299  
MIL-DTL-27426/1

WS-50 / WS-150  
WS-156 & UP

**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WS-50	.500	.467	.045	.025	.474	.030	460	2,000
WS-53	.531	.498	.045	.025	.505	.030	490	2,130
WS-55	.551	.518	.045	.025	.525	.030	510	2,210
WS-56	.562	.529	.045	.025	.536	.030	520	2,250
WS-59	.594	.561	.045	.025	.569	.030	550	2,380
WS-62	.625	.585	.055	.025	.594	.030	710	2,500
WS-65	.656	.617	.055	.025	.625	.030	740	2,630
WS-66	.669	.629	.055	.025	.638	.030	760	2,680
WS-68	.687	.647	.055	.025	.656	.030	780	2,750
WS-71	.718	.679	.055	.025	.687	.030	810	2,880
WS-75	.750	.710	.065	.031	.719	.036	850	3,360
WS-78	.781	.741	.065	.031	.750	.036	880	3,500
WS-81	.812	.771	.065	.031	.781	.036	920	3,640
WS-84	.843	.803	.065	.031	.812	.036	950	3,780
WS-87	.875	.828	.065	.031	.838	.036	1,180	3,920
WS-90	.906	.860	.065	.031	.869	.036	1,220	4,060
WS-93	.937	.889	.065	.031	.900	.036	1,260	4,200
WS-96	.968	.916	.075	.037	.925	.042	1,440	5,180
WS-98	.984	.930	.075	.037	.941	.042	1,460	5,260
WS-100	1.000	.946	.075	.037	.957	.042	1,480	5,350
WS-102	1.023	.968	.075	.037	.980	.042	1,520	5,470
WS-103	1.031	.978	.075	.037	.988	.042	1,530	5,510
WS-106	1.062	1.007	.075	.037	1.020	.042	1,580	5,680
WS-109	1.093	1.040	.075	.037	1.051	.042	1,620	5,840
WS-112	1.125	1.070	.075	.037	1.083	.042	1,670	6,020
WS-115	1.156	1.102	.075	.037	1.114	.042	1,720	6,180
WS-118	1.188	1.127	.085	.043	1.140	.048	2,020	7,380
WS-121	1.218	1.159	.085	.043	1.170	.048	2,070	7,570
WS-125	1.250	1.188	.085	.043	1.202	.048	2,120	7,770
WS-128	1.281	1.221	.085	.043	1.233	.048	2,170	7,960
WS-131	1.312	1.251	.095	.043	1.264	.048	2,230	8,150
WS-134	1.343	1.282	.095	.043	1.295	.048	2,280	8,350
WS-137	1.375	1.308	.095	.043	1.323	.048	2,530	8,540
WS-140	1.406	1.340	.095	.043	1.354	.048	2,580	8,740
WS-143	1.437	1.370	.095	.043	1.385	.048	2,640	8,930
WS-146	1.468	1.402	.095	.043	1.416	.048	2,700	9,120
WS-150	1.500	1.433	.095	.043	1.448	.048	2,760	9,320
WS-156	1.562	1.490	.108	.049	1.507	.056	3,090	10,100
WS-157	1.575	1.503	.108	.049	1.520	.056	3,120	10,190
WS-162	1.625	1.549	.108	.049	1.566	.056	3,450	10,510
WS-168	1.687	1.610	.118	.049	1.628	.056	3,580	10,910
WS-175	1.750	1.673	.118	.049	1.691	.056	3,710	11,310
WS-177	1.771	1.690	.118	.049	1.708	.056	4,010	11,450
WS-181	1.813	1.730	.118	.049	1.749	.056	4,100	11,720

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.

Stock Items available in carbon steel and 302 and 316 stainless steel.

Product Dimensions All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WS-187	1.875	1.789	.128	.049	1.808	.056	4,510	12,120
WS-193	1.938	1.844	.128	.049	1.861	.056	4,660	12,530
WS-196	1.969	1.882	.128	.049	1.902	.056	4,730	12,730
WS-200	2.000	1.909	.128	.049	1.929	.056	4,950	12,930
WS-206	2.062	1.971	.128	.049	1.992	.056	5,100	13,330
WS-212	2.125	2.029	.128	.049	2.051	.056	5,560	13,740
WS-215	2.156	2.060	.138	.049	2.082	.056	5,640	13,940
WS-216	2.165	2.070	.138	.049	2.091	.056	5,660	14,000
WS-218	2.188	2.092	.138	.049	2.113	.056	5,720	14,150
WS-225	2.250	2.153	.138	.049	2.176	.056	5,890	14,550
WS-231	2.312	2.211	.138	.049	2.234	.056	6,370	14,950
WS-236	2.362	2.261	.138	.049	2.284	.056	6,510	15,270
WS-237	2.375	2.273	.138	.049	2.297	.056	6,550	15,360
WS-243	2.437	2.331	.148	.049	2.355	.056	7,060	15,760
WS-250	2.500	2.394	.148	.049	2.418	.056	7,250	16,160
WS-255	2.559	2.449	.148	.049	2.473	.056	7,780	16,550
WS-256	2.562	2.452	.148	.049	2.476	.056	7,790	16,560
WS-262	2.625	2.514	.148	.049	2.539	.056	7,980	16,970
WS-268	2.688	2.572	.158	.049	2.597	.056	8,550	17,380
WS-275	2.750	2.635	.158	.049	2.660	.056	8,750	17,780
WS-281	2.813	2.696	.168	.049	2.722	.056	8,950	18,190
WS-287	2.875	2.755	.168	.049	2.781	.056	9,550	18,590
WS-293	2.937	2.817	.168	.049	2.843	.056	9,760	18,990
WS-295	2.952	2.831	.168	.049	2.858	.056	9,810	19,090
WS-300	3.000	2.877	.168	.061	2.904	.068	10,180	24,150
WS-306	3.062	2.938	.168	.061	2.966	.068	10,390	24,650
WS-312	3.125	3.000	.178	.061	3.027	.068	10,820	25,150
WS-314	3.149	3.023	.178	.061	3.051	.068	10,910	25,350
WS-318	3.187	3.061	.178	.061	3.089	.068	11,040	25,650
WS-325	3.250	3.121	.178	.061	3.150	.068	11,490	26,160
WS-331	3.312	3.180	.188	.061	3.208	.068	12,170	26,660
WS-334	3.343	3.210	.188	.061	3.239	.068	12,290	26,910
WS-337	3.375	3.242	.188	.061	3.271	.068	12,410	27,170
WS-343	3.437	3.301	.188	.061	3.331	.068	12,880	27,660
WS-350	3.500	3.363	.188	.061	3.394	.068	13,110	28,170
WS-354	3.543	3.402	.198	.061	3.433	.068	13,770	28,520
WS-356	3.562	3.422	.198	.061	3.452	.068	13,850	28,670
WS-362	3.625	3.483	.198	.061	3.515	.068	14,090	29,180
WS-368	3.687	3.543	.198	.061	3.575	.068	14,600	29,680
WS-374	3.740	3.597	.198	.061	3.628	.068	14,800	30,100
WS-375	3.750	3.606	.198	.061	3.638	.068	14,840	30,180
WS-381	3.812	3.668	.198	.061	3.700	.068	15,090	30,680
WS-387	3.875	3.724	.208	.061	3.757	.068	16,160	31,190
WS-393	3.938	3.784	.208	.061	3.820	.068	16,420	31,700
WS-400	4.000	3.842	.218	.061	3.876	.068	17,530	32,200
WS-406	4.063	3.906	.218	.061	3.939	.068	17,810	32,700
WS-412	4.125	3.967	.218	.061	4.000	.068	18,080	33,200
WS-413	4.134	3.975	.218	.061	4.010	.068	18,120	33,270
WS-418	4.188	4.030	.218	.061	4.058	.068	19,240	33,710
WS-425	4.250	4.084	.228	.061	4.120	.068	19,530	34,210
WS-431	4.312	4.147	.228	.061	4.182	.068	19,810	34,710
WS-433	4.331	4.164	.228	.061	4.200	.068	19,900	34,860
WS-437	4.375	4.208	.228	.061	4.245	.068	20,100	35,210
WS-443	4.437	4.271	.228	.061	4.307	.068	20,390	35,710
WS-450	4.500	4.326	.238	.061	4.364	.068	21,630	36,220
WS-456	4.562	4.384	.250	.072	4.422	.079	22,570	43,340
WS-462	4.625	4.447	.250	.072	4.485	.079	22,890	43,940
WS-468	4.687	4.508	.250	.072	4.547	.079	23,190	44,530
WS-472	4.724	4.546	.250	.072	4.584	.079	23,370	44,880
WS-475	4.750	4.571	.250	.072	4.610	.079	23,500	45,130
WS-481	4.812	4.633	.250	.072	4.672	.079	23,810	45,720
WS-487	4.875	4.695	.250	.072	4.735	.079	24,120	46,310

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

# WS Series - Medium Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY

Stock Items available in carbon steel and 302 and 316 stainless steel.

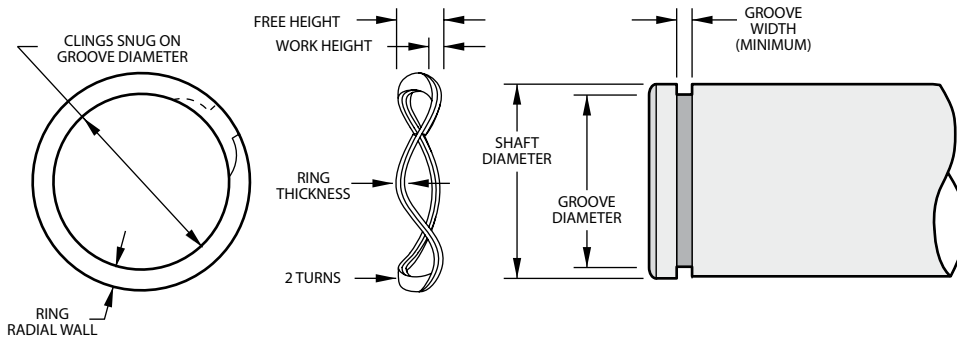
Product Dimensions All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WS-493	4.937	4.757	.250	.072	4.797	.079	24,430	46,900
WS-500	5.000	4.820	.250	.072	4.856	.079	25,450	47,500
WS-511	5.118	4.934	.250	.072	4.974	.079	26,050	48,620
WS-512	5.125	4.939	.250	.072	4.981	.079	26,080	48,690
WS-525	5.250	5.064	.250	.072	5.107	.079	26,720	49,880
WS-537	5.375	5.187	.250	.072	5.228	.079	28,120	51,060
WS-550	5.500	5.308	.250	.072	5.353	.079	28,770	52,250
WS-551	5.511	5.320	.250	.072	5.364	.079	28,830	52,360
WS-562	5.625	5.433	.250	.072	5.478	.079	29,420	53,440
WS-575	5.750	5.550	.250	.072	5.597	.079	31,300	54,630
WS-587	5.875	5.674	.250	.072	5.722	.079	31,980	55,810
WS-590	5.905	5.705	.250	.072	5.752	.079	32,140	56,100
WS-600	6.000	5.798	.250	.072	5.847	.079	32,660	57,000
WS-612	6.125	5.903	.312	.086	5.953	.094	37,230	69,500
WS-625	6.250	6.026	.312	.086	6.078	.094	37,990	70,920
WS-629	6.299	6.076	.312	.086	6.127	.094	38,290	71,480
WS-637	6.375	6.152	.312	.086	6.203	.094	38,750	72,340
WS-650	6.500	6.274	.312	.086	6.328	.094	39,510	73,760
WS-662	6.625	6.390	.312	.086	6.443	.094	42,620	75,180
WS-675	6.750	6.513	.312	.086	6.568	.094	43,420	76,600
WS-687	6.875	6.638	.312	.086	6.693	.094	44,220	78,010
WS-700	7.000	6.761	.312	.086	6.818	.094	45,030	79,430
WS-712	7.125	6.877	.312	.086	6.933	.094	48,350	80,850
WS-725	7.250	6.999	.312	.086	7.058	.094	49,200	82,270
WS-737	7.375	7.125	.312	.086	7.183	.094	50,050	83,690
WS-750	7.500	7.250	.312	.086	7.308	.094	50,890	85,110
WS-762	7.625	7.363	.312	.086	7.423	.094	54,440	86,520
WS-775	7.750	7.486	.312	.086	7.548	.094	55,330	87,940
WS-787	7.875	7.611	.312	.086	7.673	.094	56,220	89,360
WS-800	8.000	7.734	.312	.086	7.798	.094	57,110	90,780
WS-825	8.250	7.972	.375	.086	8.038	.094	61,820	93,620
WS-850	8.500	8.220	.375	.086	8.288	.094	63,690	96,450
WS-875	8.750	8.459	.375	.086	8.528	.094	68,650	99,290
WS-900	9.000	8.707	.375	.086	8.778	.094	70,620	102,130
WS-925	9.250	8.945	.375	.086	9.018	.094	75,850	104,960
WS-950	9.500	9.194	.375	.086	9.268	.094	77,900	107,800
WS-975	9.750	9.432	.375	.086	9.508	.094	83,390	110,640
WS-1000	10.000	9.680	.375	.086	9.758	.094	85,530	113,470
WS-1025	10.250	9.918	.375	.086	9.998	.094	91,290	116,310
WS-1050	10.500	10.166	.375	.086	10.248	.094	93,520	119,150
WS-1075	10.750	10.405	.375	.086	10.488	.094	99,540	121,990
WS-1100	11.000	10.653	.375	.086	10.738	.094	101,860	124,820

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.

## Get CAD downloads

Simplify your design process by downloading CAD models of standard retaining rings and wave springs at [www.smalley.com/cad-models](http://www.smalley.com/cad-models).

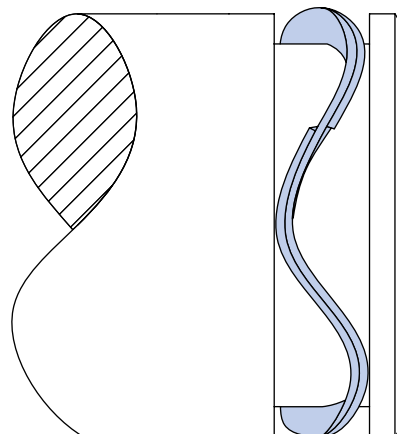


**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,2</sup>	Shaft Diameter	Load (lb) @ Work Height	Max. Free Height	Number of Waves	Ring		Crimp	Groove	
					Thickness	Radial Wall		Diameter	Width Min.
WSW-75	.750	25 @ .085	.115	3	.042	.065	N	.704	.120
WSW-87	.875	30 @ .085	.131	3	.042	.075	N	.821	.136
WSW-100	1.000	34 @ .085	.129	3	.042	.085	N	.940	.134
WSW-112	1.125	38 @ .100	.137	3	.050	.128	N	1.059	.142
WSW-125	1.250	40 @ .100	.145	3	.050	.128	N	1.176	.150
WSW-137	1.375	45 @ .100	.130	4	.050	.128	N	1.291	.135
WSW-150	1.500	50 @ .100	.126	4	.050	.128	N	1.406	.131
WSW-162	1.625	55 @ .110	.138	4	.062	.158	N	1.529	.143
WSW-175	1.750	60 @ .110	.137	4	.062	.158	N	1.650	.142
WSW-187	1.875	63 @ .110	.140	4	.062	.158	N	1.769	.145
WSW-200	2.000	65 @ .110	.145	4	.062	.158	N	1.886	.150
WSW-212	2.125	70 @ .130	.170	4	.078	.188	N	2.003	.175
WSW-225	2.250	75 @ .130	.175	4	.078	.188	N	2.120	.180
WSW-237	2.375	80 @ .130	.175	4	.078	.188	N	2.239	.180
WSW-250	2.500	84 @ .130	.171	4	.078	.188	N	2.360	.176
WSW-262	2.625	88 @ .130	.181	4	.078	.188	N	2.481	.190
WSW-275	2.750	94 @ .170	.217	4	.093	.225	Y	2.602	.222
WSW-287	2.875	97 @ .170	.217	4	.093	.225	Y	2.721	.222
WSW-300	3.000	100 @ .170	.225	4	.093	.225	Y	2.838	.230
WSW-312	3.125	103 @ .170	.230	4	.093	.225	Y	2.957	.235
WSW-325	3.250	106 @ .170	.225	4	.093	.225	Y	3.076	.230
WSW-350	3.500	115 @ .185	.245	4	.111	.281	Y	3.316	.250
WSW-362	3.625	117 @ .185	.250	4	.111	.281	Y	3.435	.255
WSW-375	3.750	121 @ .185	.258	4	.111	.281	Y	3.552	.263
WSW-387	3.875	126 @ .185	.255	4	.111	.281	Y	3.673	.260
WSW-400	4.000	130 @ .185	.268	4	.111	.281	Y	3.792	.273
WSW-412	4.125	134 @ .185	.263	4	.111	.281	Y	3.919	.268
WSW-425	4.250	140 @ .185	.248	5	.111	.281	Y	4.065	.253
WSW-450	4.500	150 @ .185	.256	5	.111	.281	Y	4.310	.261
WSW-475	4.750	160 @ .185	.253	5	.111	.281	Y	4.550	.258
WSW-500	5.000	170 @ .185	.259	5	.111	.281	Y	4.790	.264

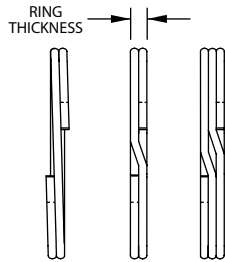
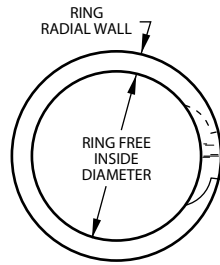
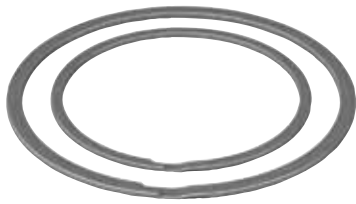
<sup>1</sup> Add suffix "-S17" for stainless steel.

<sup>2</sup> See pages 132-133 for How to Order.

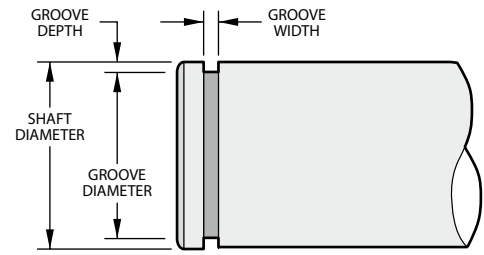


# WST Series - Medium Heavy Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



WST-46 / WS-150    WST-156 / WST-600    WST-625 & UP



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WST-46	.469	.436	.045	.025	.443	.029	430	1,800
WST-50	.500	.469	.045	.035	.474	.039	460	2,530
WST-55	.551	.518	.045	.035	.524	.039	550	2,790
WST-56	.562	.529	.045	.035	.535	.039	560	2,840
WST-59	.594	.559	.045	.035	.565	.039	630	3,000
WST-62	.625	.590	.055	.035	.596	.039	660	3,160
WST-66	.669	.630	.055	.035	.638	.039	760	3,380
WST-68	.688	.648	.065	.042	.655	.046	830	4,180
WST-75	.750	.708	.065	.042	.715	.046	950	4,550
WST-78	.781	.738	.065	.042	.745	.046	990	4,740
WST-81	.812	.768	.065	.042	.776	.046	1,030	4,930
WST-87	.875	.827	.075	.042	.835	.046	1,240	5,310
WST-93	.938	.886	.075	.042	.894	.046	1,460	5,690
WST-98	.984	.934	.075	.042	.940	.046	1,530	5,970
WST-100	1.000	.947	.075	.042	.955	.046	1,630	6,070
WST-102	1.023	.969	.075	.042	.977	.046	1,660	6,210
WST-106	1.062	1.005	.088	.050	1.015	.056	1,800	7,010
WST-112	1.125	1.064	.088	.050	1.075	.056	1,990	7,420
WST-118	1.188	1.126	.088	.050	1.135	.056	2,270	7,370
WST-125	1.250	1.184	.093	.050	1.195	.056	2,470	8,250
WST-131	1.312	1.240	.098	.050	1.250	.056	2,880	8,660
WST-137	1.375	1.298	.103	.050	1.310	.056	3,210	9,070
WST-143	1.438	1.359	.103	.050	1.370	.056	3,460	9,490
WST-150	1.500	1.419	.103	.050	1.430	.056	3,710	9,900
WST-156	1.562	1.476	.113	.062	1.490	.068	3,980	12,780
WST-162	1.625	1.537	.118	.062	1.550	.068	4,370	13,290
WST-168	1.687	1.598	.118	.062	1.610	.068	4,650	13,800
WST-175	1.750	1.657	.118	.062	1.670	.068	4,950	14,320
WST-177	1.771	1.676	.123	.062	1.689	.068	5,130	14,490
WST-181	1.812	1.714	.123	.062	1.730	.068	5,250	14,820
WST-187	1.875	1.774	.123	.062	1.790	.068	5,700	15,340
WST-196	1.969	1.864	.123	.062	1.879	.068	6,260	16,110
WST-200	2.000	1.894	.128	.062	1.910	.068	6,360	16,360
WST-206	2.062	1.955	.141	.078	1.970	.086	6,710	21,220
WST-212	2.125	2.012	.141	.078	2.027	.086	7,360	21,870
WST-215	2.156	2.041	.141	.078	2.057	.086	7,620	22,190
WST-225	2.250	2.129	.141	.078	2.145	.086	8,430	23,160
WST-231	2.312	2.188	.141	.078	2.205	.086	8,830	23,800
WST-237	2.375	2.248	.141	.078	2.265	.086	9,230	24,440
WST-243	2.437	2.307	.141	.078	2.325	.086	9,650	25,080
WST-250	2.500	2.366	.188	.078	2.385	.086	10,250	25,730
WST-255	2.559	2.424	.188	.078	2.443	.086	10,490	26,340
WST-262	2.625	2.485	.188	.078	2.505	.086	11,130	27,020
WST-268	2.687	2.545	.188	.078	2.565	.086	11,590	27,660

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WST-275	2.750	2.604	.188	.093	2.625	.103	12,250	32,140
WST-287	2.875	2.722	.188	.093	2.742	.103	13,620	33,600
WST-293	2.937	2.780	.188	.093	2.801	.103	14,120	34,320
WST-300	3.000	2.838	.188	.093	2.860	.103	14,840	35,060
WST-306	3.062	2.897	.188	.093	2.920	.103	15,370	35,790
WST-312	3.125	2.957	.188	.093	2.980	.103	16,130	36,520
WST-315	3.156	2.986	.188	.093	3.010	.103	16,290	36,880
WST-325	3.250	3.075	.188	.093	3.100	.103	17,230	37,980
WST-334	3.344	3.164	.188	.093	3.190	.103	18,200	39,080
WST-343	3.437	3.254	.188	.093	3.280	.103	19,190	40,170
WST-350	3.500	3.315	.250	.111	3.340	.120	19,790	48,820
WST-354	3.543	3.356	.250	.111	3.381	.120	20,290	49,420
WST-362	3.625	3.433	.250	.111	3.458	.120	21,520	50,560
WST-368	3.687	3.490	.250	.111	3.517	.120	22,150	51,430
WST-375	3.750	3.550	.250	.111	3.577	.120	23,060	52,310
WST-387	3.875	3.670	.250	.111	3.696	.120	24,650	54,050
WST-393	3.938	3.730	.250	.111	3.756	.120	25,330	54,930
WST-400	4.000	3.787	.250	.111	3.815	.120	26,300	55,800
WST-425	4.250	4.032	.250	.111	4.065	.120	27,940	59,280
WST-437	4.375	4.162	.250	.111	4.190	.120	28,760	61,030
WST-450	4.500	4.280	.250	.111	4.310	.120	30,220	62,770
WST-475	4.750	4.515	.250	.111	4.550	.120	33,580	66,260
WST-500	5.000	4.755	.250	.111	4.790	.120	37,110	69,740
WST-525	5.250	4.995	.375	.127	5.030	.139	40,820	83,790
WST-550	5.500	5.229	.375	.127	5.265	.139	45,880	87,780
WST-575	5.750	5.466	.375	.127	5.505	.139	49,990	91,770
WST-600	6.000	5.705	.375	.127	5.745	.139	54,290	95,760

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

**Rings listed below are three-turn construction.**

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WST-625	6.250	5.942	.312	.165	5.985	.174	58,760	129,590
WST-650	6.500	6.182	.312	.165	6.225	.174	63,410	134,780
WST-675	6.750	6.420	.312	.165	6.465	.174	68,230	139,960
WST-700	7.000	6.658	.312	.165	6.705	.174	73,230	145,140
WST-725	7.250	6.894	.312	.165	6.942	.174	78,290	172,190
WST-750	7.500	7.130	.375	.189	7.180	.209	84,820	178,130
WST-775	7.750	7.368	.375	.189	7.420	.209	90,390	184,070
WST-800	8.000	7.607	.375	.189	7.660	.209	96,130	190,000
WST-825	8.250	7.845	.375	.189	7.900	.209	102,050	195,940
WST-850	8.500	8.083	.375	.189	8.140	.209	108,150	201,880
WST-875	8.750	8.321	.375	.189	8.383	.209	113,800	207,820
WST-900	9.000	8.560	.375	.189	8.620	.209	120,870	213,750
WST-925	9.250	8.798	.375	.189	8.860	.209	127,500	219,690
WST-950	9.500	9.036	.375	.189	9.100	.209	134,300	225,630
WST-975	9.750	9.273	.375	.189	9.338	.209	141,970	231,570
WST-1000	10.000	9.508	.375	.189	9.575	.209	150,560	237,500

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

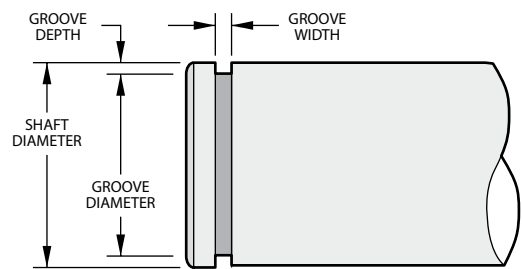
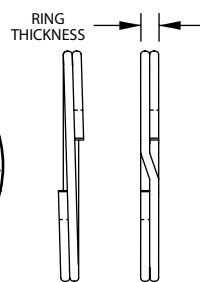
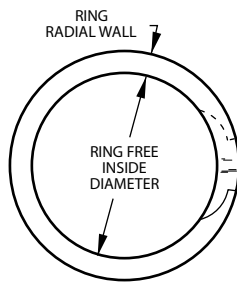
<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.



# WSM Series - Heavy Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



AS3216, AS4299  
MIL-DTL-27426/2

**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WSM-25 <sup>5,6</sup>	.250	.228	.020	.025	.230	.029	177	961
WSM-31 <sup>5,6</sup>	.312	.287	.025	.025	.290	.029	243	1,200
WSM-37 <sup>5,6</sup>	.375	.349	.030	.025	.352	.029	305	1,442
WSM-43 <sup>6</sup>	.437	.409	.035	.025	.412	.029	386	1,680
WSM-46	.469	.439	.045	.025	.443	.029	430	1,880
WSM-50	.500	.464	.050	.035	.468	.039	570	2,530
WSM-55	.551	.514	.050	.035	.519	.039	620	2,790
WSM-56	.562	.525	.050	.035	.530	.039	640	2,840
WSM-59	.594	.554	.050	.035	.559	.039	760	3,000
WSM-62	.625	.583	.055	.035	.588	.039	840	3,160
WSM-66	.669	.623	.055	.035	.629	.039	950	3,380
WSM-68	.688	.641	.065	.042	.646	.046	1,020	4,180
WSM-75	.750	.698	.065	.042	.704	.046	1,220	4,550
WSM-78	.781	.727	.065	.042	.733	.046	1,330	4,740
WSM-81	.812	.756	.065	.042	.762	.046	1,440	4,930
WSM-87	.875	.814	.075	.042	.821	.046	1,670	5,310
WSM-93	.938	.875	.075	.042	.882	.046	1,860	5,690
WSM-98	.984	.919	.085	.042	.926	.046	2,020	5,970
WSM-100	1.000	.932	.085	.042	.940	.046	2,120	6,070
WSM-102	1.023	.953	.085	.042	.961	.046	2,240	6,210
WSM-106	1.062	.986	.103	.050	.998	.056	2,400	7,010
WSM-112	1.125	1.047	.103	.050	1.059	.056	2,620	7,420
WSM-118	1.188	1.105	.103	.050	1.118	.056	2,940	7,840
WSM-125	1.250	1.163	.103	.050	1.176	.056	3,270	8,250
WSM-131	1.312	1.218	.118	.050	1.232	.056	3,710	8,660
WSM-137	1.375	1.277	.118	.050	1.291	.056	4,080	9,070
WSM-143	1.438	1.336	.118	.050	1.350	.056	4,470	9,490
WSM-150	1.500	1.385	.118	.050	1.406	.056	4,980	9,900
WSM-156	1.562	1.453	.128	.062	1.468	.068	5,190	12,780
WSM-162	1.625	1.513	.128	.062	1.529	.068	5,510	13,290
WSM-168	1.687	1.573	.128	.062	1.589	.068	5,840	13,800
WSM-175	1.750	1.633	.128	.062	1.650	.068	6,190	14,320
WSM-177	1.771	1.651	.128	.062	1.669	.068	6,380	14,490
WSM-181	1.812	1.690	.128	.062	1.708	.068	6,660	14,820
WSM-187	1.875	1.751	.158	.062	1.769	.068	7,020	15,340
WSM-196	1.969	1.838	.158	.062	1.857	.068	7,790	16,110
WSM-200	2.000	1.867	.158	.062	1.886	.068	8,060	16,360
WSM-206	2.062	1.932	.168	.078	1.946	.086	8,450	21,220
WSM-212	2.125	1.989	.168	.078	2.003	.086	9,160	21,870
WSM-215	2.156	2.018	.168	.078	2.032	.086	9,450	22,190
WSM-225	2.250	2.105	.168	.078	2.120	.086	10,340	23,160
WSM-231	2.312	2.163	.168	.078	2.178	.086	10,950	23,800
WSM-237	2.375	2.223	.200	.078	2.239	.086	11,420	24,440
WSM-243	2.437	2.283	.200	.078	2.299	.086	11,890	25,080
WSM-250	2.500	2.343	.200	.078	2.360	.086	12,370	25,730
WSM-255	2.559	2.402	.200	.078	2.419	.086	12,660	26,340
WSM-262	2.625	2.464	.200	.078	2.481	.086	13,360	27,020
WSM-268	2.687	2.523	.200	.078	2.541	.086	13,870	27,660

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.  
<sup>5</sup> No removal notch.  
<sup>6</sup> Square edge wire.

Stock Items available in carbon steel and 302 and 316 stainless steel.

Product Dimensions All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
WSM-275	2.750	2.584	.225	.093	2.602	.103	14,390	32,140
WSM-287	2.875	2.702	.225	.093	2.721	.103	15,650	33,600
WSM-293	2.937	2.760	.225	.093	2.779	.103	16,400	34,320
WSM-300	3.000	2.818	.225	.093	2.838	.103	17,180	35,060
WSM-306	3.062	2.878	.225	.093	2.898	.103	17,750	35,790
WSM-312	3.125	2.936	.225	.093	2.957	.103	18,560	36,520
WSM-315	3.156	2.965	.225	.093	2.986	.103	18,960	36,880
WSM-325	3.250	3.054	.225	.093	3.076	.103	19,990	37,980
WSM-334	3.344	3.144	.225	.093	3.166	.103	21,040	39,080
WSM-343	3.437	3.234	.225	.093	3.257	.103	21,870	40,170
WSM-350	3.500	3.293	.270	.111	3.316	.120	22,760	48,820
WSM-354	3.543	3.333	.270	.111	3.357	.120	23,290	49,420
WSM-362	3.625	3.411	.270	.111	3.435	.120	24,340	50,560
WSM-368	3.687	3.469	.270	.111	3.493	.120	25,280	51,430
WSM-375	3.750	3.527	.270	.111	3.552	.120	26,240	52,310
WSM-387	3.875	3.647	.270	.111	3.673	.120	27,670	54,050
WSM-393	3.938	3.708	.270	.111	3.734	.120	28,390	54,930
WSM-400	4.000	3.765	.270	.111	3.792	.120	29,410	55,800
WSM-425	4.250	4.037	.270	.111	4.065	.120	27,940	59,280
WSM-437	4.375	4.161	.270	.111	4.190	.120	28,760	61,030
WSM-450	4.500	4.280	.270	.111	4.310	.120	30,220	62,770
WSM-475	4.750	4.518	.270	.111	4.550	.120	36,930	66,260
WSM-500	5.000	4.756	.270	.111	4.790	.120	37,110	69,740
WSM-525	5.250	4.995	.350	.127	5.030	.139	40,820	83,790
WSM-550	5.500	5.228	.350	.127	5.265	.139	45,880	87,780
WSM-575	5.750	5.466	.350	.127	5.505	.139	49,990	91,770
WSM-600	6.000	5.705	.350	.127	5.745	.139	54,290	95,760
WSM-625	6.250	5.938	.418	.156	5.985	.174	58,760	122,520
WSM-650	6.500	6.181	.418	.156	6.225	.174	63,410	127,420
WSM-675	6.750	6.410	.418	.156	6.465	.174	68,230	132,330
WSM-700	7.000	6.648	.418	.156	6.705	.174	73,230	137,230
WSM-725	7.250	6.891	.418	.156	6.942	.174	78,920	142,130
WSM-750	7.500	7.130	.437	.187	7.180	.209	84,820	176,240
WSM-775	7.750	7.368	.437	.187	7.420	.209	90,390	182,120
WSM-800	8.000	7.606	.437	.187	7.660	.209	96,130	187,990
WSM-825	8.250	7.845	.437	.187	7.900	.209	102,050	193,870
WSM-850	8.500	8.083	.437	.187	8.140	.209	108,150	199,740
WSM-875	8.750	8.324	.437	.187	8.383	.209	113,800	205,620
WSM-900	9.000	8.560	.500	.187	8.620	.209	120,870	211,490
WSM-925	9.250	8.798	.500	.187	8.860	.209	127,500	217,370
WSM-950	9.500	9.036	.500	.187	9.100	.209	134,300	223,240
WSM-975	9.750	9.275	.500	.187	9.338	.209	141,970	229,120
WSM-1000	10.000	9.508	.500	.187	9.575	.209	150,560	234,990
WSM-1025	10.250	9.745	.500	.187	9.814	.209	157,950	240,870
WSM-1050	10.500	9.984	.500	.187	10.054	.209	165,510	246,740
WSM-1075	10.750	10.221	.500	.187	10.293	.209	174,010	252,620
WSM-1100	11.000	10.459	.500	.187	10.533	.209	181,950	258,490
WSM-1125	11.250	10.692	.500	.187	10.772	.209	190,060	264,360
WSM-1150	11.500	10.934	.562	.187	11.011	.209	199,160	270,240
WSM-1175	11.750	11.171	.562	.187	11.250	.209	207,640	276,120
WSM-1200	12.000	11.410	.562	.187	11.490	.209	216,300	281,990
WSM-1225	12.250	11.647	.562	.187	11.729	.209	226,000	287,860
WSM-1250	12.500	11.885	.562	.187	11.969	.209	235,030	293,740
WSM-1275	12.750	12.124	.562	.187	12.208	.209	244,240	299,610
WSM-1300	13.000	12.361	.662	.187	12.448	.209	253,620	305,490
WSM-1325	13.250	12.598	.662	.187	12.687	.209	264,120	311,360
WSM-1350	13.500	12.837	.662	.187	12.927	.209	273,870	317,240
WSM-1375	13.750	13.074	.662	.187	13.166	.209	283,800	323,110
WSM-1400	14.000	13.311	.662	.187	13.405	.209	294,900	328,990
WSM-1425	14.250	13.548	.662	.187	13.644	.209	305,200	334,860
WSM-1450	14.500	13.787	.750	.187	13.884	.209	315,680	340,740
WSM-1475	14.750	14.024	.750	.187	14.123	.209	327,380	346,610
WSM-1500	15.000	14.262	.750	.187	14.363	.209	338,230	352,490

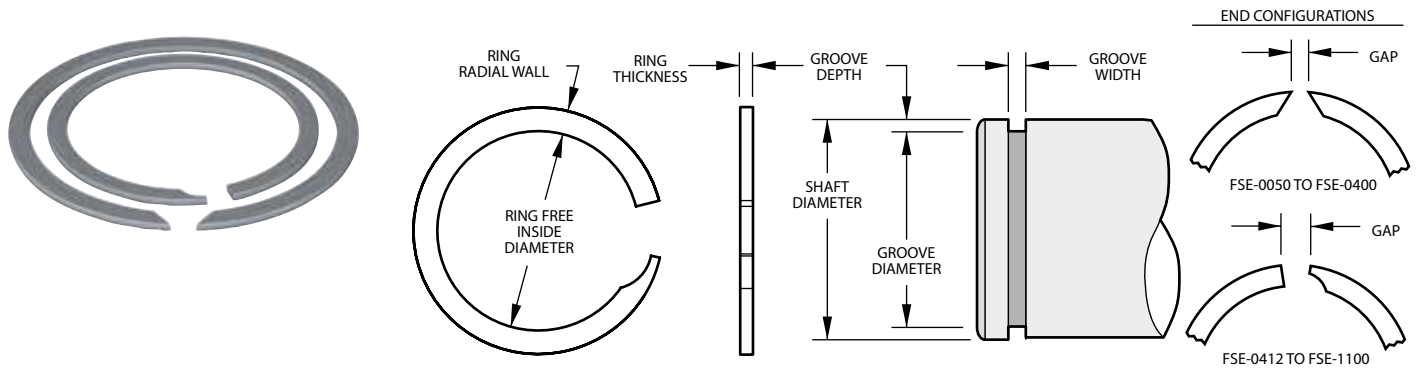
<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

# FSE Series - Constant Section Rings



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1,4,5</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
FSE-0050	.500	.471	.055	.037	.476	.043	424	2,325
FSE-0056	.562	.524	.055	.037	.532	.043	596	2,613
FSE-0062	.625	.590	.065	.037	.595	.043	663	2,906
FSE-0068	.687	.649	.065	.037	.655	.043	777	3,194
FSE-0075	.750	.701	.075	.045	.710	.051	1,060	4,241
FSE-0081	.812	.764	.075	.045	.772	.051	1,148	4,592
FSE-0087	.875	.820	.075	.045	.831	.051	1,361	4,948
FSE-0093	.937	.886	.085	.045	.893	.051	1,457	5,334
FSE-0100	1.000	.933	.085	.045	.952	.051	1,696	5,693
FSE-0106	1.062	1.004	.085	.045	1.014	.051	1,802	6,045
FSE-0112	1.125	1.069	.128	.057	1.077	.063	1,909	7,615
FSE-0118	1.187	1.116	.128	.057	1.131	.063	2,349	8,035
FSE-0125	1.250	1.176	.128	.057	1.188	.063	2,739	8,461
FSE-0131	1.312	1.223	.128	.057	1.242	.063	3,246	8,881
FSE-0137	1.375	1.282	.128	.057	1.297	.063	3,791	9,307
FSE-0143	1.437	1.344	.158	.067	1.359	.073	3,961	11,408
FSE-0150	1.500	1.402	.158	.067	1.422	.073	4,135	11,908
FSE-0156	1.562	1.457	.158	.067	1.470	.073	5,079	12,400
FSE-0162	1.625	1.517	.158	.067	1.533	.073	5,284	12,901
FSE-0168	1.687	1.578	.158	.067	1.595	.073	5,485	13,393
FSE-0175	1.750	1.640	.158	.067	1.658	.073	5,690	13,893
FSE-0181	1.812	1.697	.158	.067	1.720	.073	5,892	14,385
FSE-0187	1.875	1.767	.158	.067	1.783	.073	6,097	14,885
FSE-0193	1.937	1.800	.200	.076	1.819	.085	8,078	16,649
FSE-0200	2.000	1.862	.200	.076	1.882	.085	8,341	17,191
FSE-0206	2.062	1.924	.200	.076	1.944	.085	8,599	17,724
FSE-0212	2.125	1.987	.200	.076	2.007	.085	8,862	18,265
FSE-0218	2.187	2.048	.200	.076	2.069	.085	9,121	18,798
FSE-0225	2.250	2.110	.200	.076	2.132	.085	9,384	19,340
FSE-0231	2.312	2.171	.200	.076	2.194	.085	9,642	19,873
FSE-0237	2.375	2.226	.200	.076	2.257	.085	9,905	20,414
FSE-0243	2.437	2.296	.200	.076	2.319	.085	10,163	20,947
FSE-0250	2.500	2.357	.200	.076	2.382	.085	10,426	21,488
FSE-0256	2.562	2.415	.200	.095	2.444	.104	10,685	26,252
FSE-0262	2.625	2.486	.200	.095	2.507	.104	10,947	26,898
FSE-0268	2.687	2.537	.200	.095	2.569	.104	11,206	27,533
FSE-0275	2.750	2.607	.200	.095	2.632	.104	11,469	28,179
FSE-0281	2.812	2.665	.200	.095	2.694	.104	11,727	28,814
FSE-0287	2.875	2.727	.200	.095	2.757	.104	11,990	29,460
FSE-0293	2.937	2.789	.200	.095	2.819	.104	12,249	30,095

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.

Stock Items available in carbon steel and 302 stainless steel.

Product Dimensions All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1, 4, 5</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
FSE-0300	3.000	2.852	.200	.095	2.882	.104	12,511	30,740
FSE-0306	3.062	2.916	.200	.095	2.944	.104	12,770	31,376
FSE-0312	3.125	2.955	.237	.095	2.987	.104	15,242	32,021
FSE-0318	3.187	3.016	.237	.095	3.049	.104	15,544	32,657
FSE-0325	3.250	3.079	.237	.095	3.112	.104	15,851	33,302
FSE-0331	3.312	3.140	.248	.115	3.174	.124	16,154	39,088
FSE-0337	3.375	3.203	.248	.115	3.237	.124	16,461	39,831
FSE-0343	3.437	3.264	.248	.115	3.299	.124	16,763	40,563
FSE-0350	3.500	3.326	.248	.115	3.362	.124	17,071	41,307
FSE-0356	3.562	3.378	.248	.115	3.424	.124	17,373	42,038
FSE-0362	3.625	3.451	.248	.115	3.487	.124	17,680	42,782
FSE-0368	3.687	3.512	.248	.115	3.549	.124	17,983	43,514
FSE-0375	3.750	3.570	.248	.115	3.612	.124	18,290	44,257
FSE-0381	3.812	3.636	.248	.115	3.674	.124	18,592	44,989
FSE-0387	3.875	3.689	.248	.115	3.737	.124	18,900	45,732
FSE-0393	3.937	3.760	.248	.115	3.799	.124	19,202	46,464
FSE-0400	4.000	3.828	.248	.115	3.862	.124	19,509	47,208
FSE-0412	4.125	3.930	.265	.153	3.967	.163	23,035	62,126
FSE-0425	4.250	4.050	.265	.153	4.092	.163	23,733	64,008
FSE-0437	4.375	4.174	.265	.153	4.217	.163	24,431	65,891
FSE-0450	4.500	4.297	.265	.153	4.342	.163	25,129	67,774
FSE-0462	4.625	4.421	.265	.153	4.467	.163	25,827	69,656
FSE-0475	4.750	4.530	.265	.153	4.592	.163	26,525	71,539
FSE-0487	4.875	4.668	.265	.153	4.717	.163	27,223	73,421
FSE-0500	5.000	4.792	.265	.153	4.842	.163	27,921	75,304
FSE-0525	5.250	5.039	.265	.153	5.092	.163	29,317	79,069
FSE-0550	5.500	5.292	.265	.153	5.342	.163	30,713	82,834
FSE-0575	5.750	5.535	.265	.153	5.592	.163	32,109	86,599
FSE-0600	6.000	5.744	.316	.153	5.804	.163	41,563	90,365
FSE-0625	6.250	5.992	.316	.153	6.054	.163	43,295	94,130
FSE-0650	6.500	6.236	.316	.153	6.304	.163	45,027	97,895
FSE-0675	6.750	6.486	.316	.153	6.554	.163	46,759	101,727
FSE-0700	7.000	6.734	.316	.153	6.804	.163	48,490	105,494
FSE-0725	7.250	6.993	.316	.153	7.054	.163	50,222	109,262
FSE-0750	7.500	7.219	.316	.153	7.304	.163	51,954	113,030
FSE-0775	7.750	7.477	.316	.153	7.554	.163	53,686	116,797
FSE-0800	8.000	7.683	.435	.192	7.764	.203	66,727	142,932
FSE-0825	8.250	7.940	.435	.192	8.014	.203	68,813	147,399
FSE-0850	8.500	8.179	.435	.192	8.264	.203	70,898	151,866
FSE-0875	8.750	8.427	.435	.192	8.514	.203	72,983	156,332
FSE-0900	9.000	8.673	.435	.192	8.764	.203	75,068	160,799
FSE-0925	9.250	8.922	.435	.192	9.014	.203	77,154	165,265
FSE-0950	9.500	9.130	.435	.192	9.240	.203	87,297	169,732
FSE-0975	9.750	9.393	.435	.192	9.490	.203	89,594	174,199
FSE-1000	10.000	9.586	.500	.192	9.686	.203	110,977	178,665
FSE-1025	10.250	9.826	.500	.192	9.936	.203	113,751	183,132
FSE-1050	10.500	10.081	.500	.192	10.186	.203	116,526	187,599
FSE-1075	10.750	10.329	.500	.192	10.436	.203	119,300	192,065
FSE-1100	11.000	10.584	.500	.192	10.686	.203	122,074	196,532

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.

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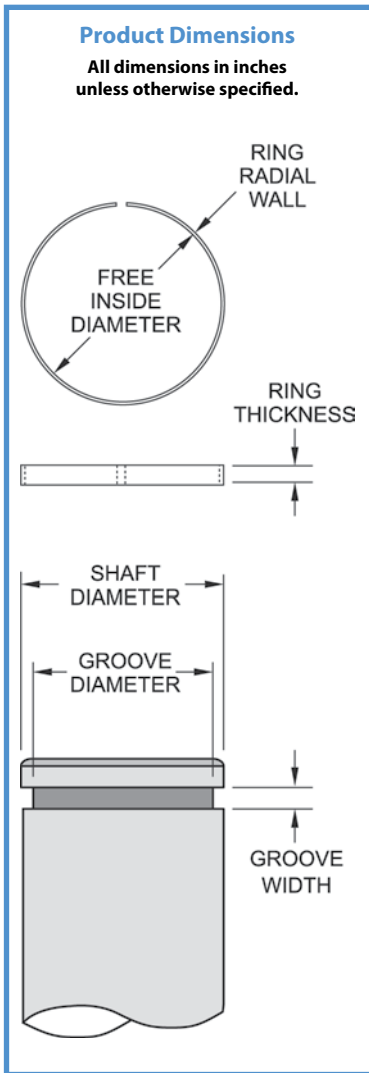
Or use form on page 131 of this catalog. Requests typically processed within 24 hours.

# HS Series - Hoopster® Rings



Stock Items available in carbon steel and 302 stainless steel.

Smalley Part Number <sup>1,3,5</sup>	Shaft Diameter	Ring			Groove		Groove Yield (lb) <sup>2</sup>
		Inside Diameter	Radial Wall	Thickness	Diameter <sup>4</sup>	Width	
HS-37	.375	.351	.017	.045	.358	.050	225
HS-43	.437	.411	.017	.045	.420	.050	263
HS-46	.469	.443	.017	.045	.452	.050	282
HS-50	.500	.469	.021	.065	.479	.070	371
HS-53	.531	.499	.021	.065	.510	.070	394
HS-56	.562	.530	.021	.065	.541	.070	417
HS-59	.594	.561	.021	.065	.573	.070	441
HS-62	.625	.592	.021	.065	.604	.070	464
HS-65	.656	.622	.021	.065	.635	.070	487
HS-68	.688	.653	.021	.065	.667	.070	511
HS-71	.718	.680	.024	.088	.694	.093	609
HS-75	.750	.711	.024	.088	.726	.093	636
HS-78	.781	.741	.024	.088	.757	.093	662
HS-81	.812	.772	.024	.088	.788	.093	689
HS-84	.843	.802	.024	.088	.819	.093	715
HS-87	.875	.834	.024	.088	.851	.093	742
HS-90	.906	.864	.024	.088	.882	.093	768
HS-93	.938	.895	.024	.088	.914	.093	796
HS-96	.968	.925	.024	.088	.944	.093	821
HS-100	1.000	.956	.024	.088	.976	.093	848
HS-103	1.031	.980	.030	.118	1.001	.123	1,093
HS-106	1.062	1.011	.030	.118	1.032	.123	1,126
HS-109	1.093	1.041	.030	.118	1.063	.123	1,159
HS-112	1.125	1.073	.030	.118	1.095	.123	1,193
HS-115	1.156	1.103	.030	.118	1.126	.123	1,226
HS-118	1.188	1.134	.030	.118	1.158	.123	1,260
HS-121	1.218	1.164	.030	.118	1.188	.123	1,291
HS-125	1.250	1.195	.030	.118	1.220	.123	1,325
HS-128	1.281	1.225	.030	.118	1.251	.123	1,358
HS-131	1.312	1.252	.034	.150	1.278	.155	1,577
HS-134	1.343	1.282	.034	.150	1.309	.155	1,614
HS-137	1.375	1.314	.034	.150	1.341	.155	1,652
HS-140	1.406	1.344	.034	.150	1.372	.155	1,690
HS-143	1.437	1.374	.034	.150	1.403	.155	1,727
HS-146	1.468	1.405	.034	.150	1.434	.155	1,765
HS-150	1.500	1.436	.034	.150	1.466	.155	1,802
HS-156	1.562	1.497	.034	.150	1.528	.155	1,877
HS-162	1.625	1.559	.034	.150	1.591	.155	1,953
HS-168	1.688	1.619	.034	.150	1.653	.155	2,028
HS-175	1.750	1.677	.038	.187	1.712	.193	2,350
HS-181	1.812	1.739	.038	.187	1.775	.193	2,434
HS-187	1.875	1.800	.038	.187	1.837	.193	2,518
HS-193	1.938	1.861	.038	.187	1.900	.193	2,603
HS-200	2.000	1.922	.038	.187	1.962	.193	2,686
HS-206	2.062	1.983	.038	.187	2.024	.193	2,769
HS-212	2.125	2.045	.038	.187	2.087	.193	2,854
HS-218	2.188	2.106	.038	.187	2.150	.193	2,939
HS-225	2.250	2.167	.038	.187	2.212	.193	3,022
HS-231	2.312	2.228	.038	.187	2.274	.193	3,105
HS-237	2.375	2.290	.038	.187	2.337	.193	3,190
HS-243	2.437	2.343	.045	.225	2.392	.232	3,876
HS-250	2.500	2.405	.045	.225	2.455	.232	3,976
HS-256	2.562	2.466	.045	.225	2.517	.232	4,075
HS-262	2.625	2.528	.045	.225	2.580	.232	4,175
HS-268	2.688	2.589	.045	.225	2.643	.232	4,275
HS-275	2.750	2.650	.045	.225	2.705	.232	4,374
HS-281	2.812	2.712	.045	.225	2.768	.232	4,472
HS-287	2.875	2.773	.045	.225	2.830	.232	4,572
HS-293	2.938	2.833	.045	.225	2.892	.232	4,673
HS-300	3.000	2.895	.045	.225	2.955	.232	4,771



<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> See pages 132-133 for How to Order.

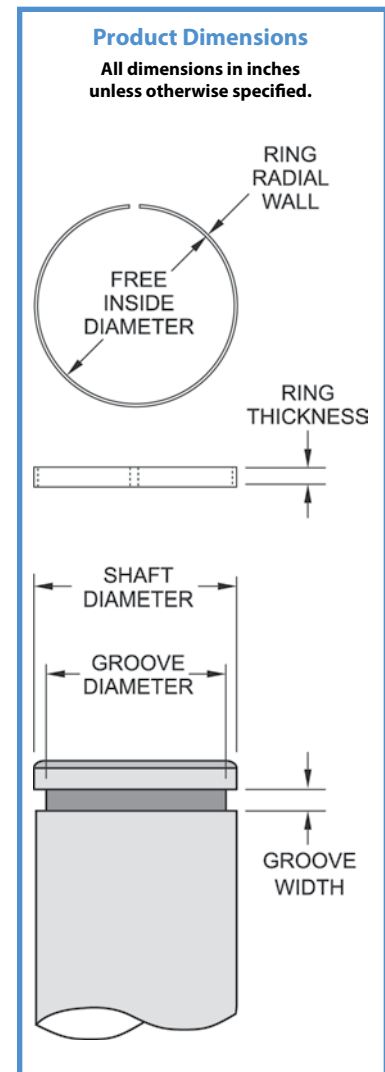
<sup>4</sup> Sharp corners on the groove required, see page 127 for more information.

<sup>5</sup> Square edge wire.



Stock Items available in carbon steel and 302 stainless steel.

Smalley Part Number <sup>1, 3, 5</sup>	Shaft Diameter	Ring			Groove		Groove Yield (N) <sup>2</sup>
		Inside Diameter	Radial Wall	Thickness	Diameter <sup>4</sup>	Width	
HSM-10	10	9.37	.43	1.14	9.57	1.27	1,051
HSM-11	11	10.35	.43	1.14	10.57	1.27	1,156
HSM-12	12	11.33	.43	1.14	11.57	1.27	1,262
HSM-13	13	12.21	.53	1.65	12.47	1.78	1,688
HSM-14	14	13.19	.53	1.65	13.47	1.78	1,818
HSM-15	15	14.17	.53	1.65	14.47	1.78	1,948
HSM-16	16	15.15	.53	1.65	15.47	1.78	2,078
HSM-17	17	16.13	.53	1.65	16.47	1.78	2,208
HSM-18	18	17.03	.61	2.24	17.39	2.36	2,672
HSM-19	19	18.01	.61	2.24	18.39	2.36	2,820
HSM-20	20	18.99	.61	2.24	19.39	2.36	2,968
HSM-21	21	19.97	.61	2.24	20.39	2.36	3,117
HSM-22	22	20.95	.61	2.24	21.39	2.36	3,265
HSM-23	23	21.93	.61	2.24	22.39	2.36	3,414
HSM-24	24	22.91	.61	2.24	23.39	2.36	3,562
HSM-25	25	23.89	.61	2.24	24.39	2.36	3,711
HSM-26	26	24.72	.76	3.00	25.24	3.12	4,824
HSM-27	27	25.70	.76	3.00	26.24	3.12	5,009
HSM-28	28	26.68	.76	3.00	27.24	3.12	5,195
HSM-29	29	27.66	.76	3.00	28.24	3.12	5,380
HSM-30	30	28.64	.76	3.00	29.24	3.12	5,566
HSM-31	31	29.62	.76	3.00	30.24	3.12	5,751
HSM-32	32	30.60	.76	3.00	31.24	3.12	5,937
HSM-33	33	31.48	.86	3.81	32.14	3.94	6,939
HSM-34	34	32.46	.86	3.81	33.14	3.94	7,149
HSM-35	35	33.44	.86	3.81	34.14	3.94	7,359
HSM-36	36	34.42	.86	3.81	35.14	3.94	7,569
HSM-37	37	35.40	.86	3.81	36.14	3.94	7,780
HSM-38	38	36.38	.86	3.81	37.14	3.94	7,990
HSM-40	40	38.34	.86	3.81	39.14	3.94	8,411
HSM-41	41	39.32	.86	3.81	40.14	3.94	8,621
HSM-42	42	40.30	.86	3.81	41.14	3.94	8,831
HSM-45	45	43.13	.97	4.75	44.03	4.88	10,575
HSM-47	47	45.09	.97	4.75	46.03	4.88	11,045
HSM-48	48	46.07	.97	4.75	47.03	4.88	11,280
HSM-50	50	48.03	.97	4.75	49.03	4.88	11,750
HSM-51	51	49.01	.97	4.75	50.03	4.88	11,985
HSM-52	52	49.99	.97	4.75	51.03	4.88	12,220
HSM-55	55	52.93	.97	4.75	54.03	4.90	12,925
HSM-56	56	53.91	.97	4.75	55.03	4.90	13,160
HSM-57	57	54.89	.97	4.75	56.03	4.90	13,395
HSM-58	58	55.87	.97	4.75	57.03	4.90	13,630
HSM-60	60	57.83	.97	4.75	59.03	4.90	14,100
HSM-62	62	59.62	1.14	5.72	60.86	5.87	17,254
HSM-63	63	60.60	1.14	5.72	61.86	5.87	17,532
HSM-64	64	61.58	1.14	5.72	62.86	5.87	17,811
HSM-65	65	62.56	1.14	5.72	63.86	5.87	18,089
HSM-67	67	64.52	1.14	5.72	65.86	5.87	18,645
HSM-68	68	65.50	1.14	5.72	66.86	5.87	18,924
HSM-70	70	67.46	1.14	5.72	68.86	5.87	19,480
HSM-72	72	69.42	1.14	5.72	70.86	5.87	20,037
HSM-75	75	72.36	1.14	5.72	73.86	5.87	20,872
HSM-76	76	73.34	1.14	5.72	74.86	5.87	21,150



<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> See pages 132-133 for How to Order.

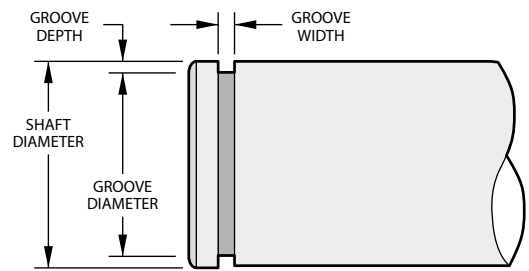
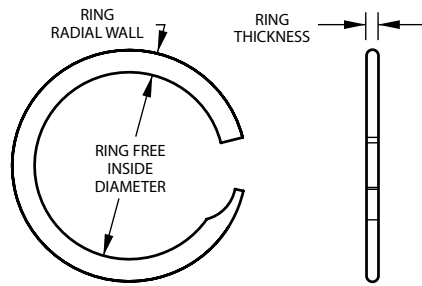
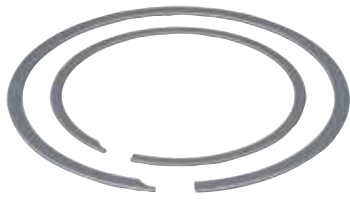
<sup>4</sup> Sharp corners on the groove required, see page 127 for more information.

<sup>5</sup> Square edge wire.



# VSM Series - Metric Light Duty Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



**Product Dimensions** All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
VSM-6 <sup>5,6</sup>	6.00	5.65	.51	.30	5.70	.38	439	1,988
VSM-7 <sup>5,6</sup>	7.00	6.58	.51	.30	6.64	.38	614	2,234
VSM-8 <sup>5,6</sup>	8.00	7.52	.64	.38	7.60	.46	780	3,183
VSM-9 <sup>5,6</sup>	9.00	8.42	.76	.38	8.50	.46	1,114	3,580
VSM-10 <sup>5,6</sup>	10.00	9.32	.89	.38	9.40	.46	1,462	3,978
VSM-11 <sup>6</sup>	11.00	10.32	.89	.38	10.40	.46	1,608	4,376
VSM-12	12.00	11.22	1.14	.46	11.34	.56	1,930	5,779
VSM-13	13.00	12.15	1.14	.46	12.28	.56	2,281	6,261
VSM-14	14.00	13.15	1.14	.46	13.28	.56	2,456	6,742
VSM-15	15.00	14.14	1.14	.46	14.28	.56	2,632	7,224
VSM-16	16.00	15.13	1.14	.46	15.28	.56	2,807	7,705
VSM-17	17.00	16.13	1.14	.46	16.28	.56	2,983	8,187
VSM-18	18.00	17.12	1.14	.46	17.28	.56	3,158	8,669
VSM-19	19.00	18.11	1.14	.46	18.28	.56	3,334	9,150
VSM-20	20.00	19.10	1.14	.46	19.28	.56	3,509	9,632
VSM-21	21.00	19.74	1.65	.53	19.94	.66	5,424	11,652
VSM-22	22.00	20.73	1.65	.53	20.94	.66	5,683	12,207
VSM-24	24.00	22.72	1.65	.53	22.94	.66	6,199	13,317
VSM-25	25.00	23.71	1.65	.53	23.94	.66	6,458	13,872
VSM-26	26.00	24.63	2.24	.64	24.88	.79	7,096	15,138
VSM-28	28.00	26.62	2.24	.64	26.88	.79	7,642	16,303
VSM-29	29.00	27.61	2.24	.64	27.88	.79	7,915	16,885
VSM-30	30.00	28.59	2.24	.64	28.88	.79	8,188	17,467
VSM-32	32.00	30.57	2.24	.64	30.88	.79	8,734	18,632
VSM-34	34.00	32.56	2.24	.64	32.88	.79	9,279	19,796
VSM-35	35.00	33.55	2.24	.64	33.88	.79	9,552	20,378
VSM-36	36.00	34.54	2.24	.64	34.88	.79	9,825	20,960
VSM-38	38.00	36.52	2.24	.64	36.88	.79	10,371	22,125
VSM-40	40.00	38.09	3.00	.79	38.52	.99	14,426	28,748
VSM-42	42.00	40.07	3.00	.79	40.52	.99	15,147	30,185
VSM-45	45.00	43.04	3.00	.79	43.52	.99	16,229	32,341
VSM-48	48.00	46.01	3.00	.79	46.52	.99	17,311	34,497
VSM-50	50.00	47.99	3.00	.79	48.52	.99	18,032	35,935
VSM-52	52.00	49.48	4.01	.79	50.06	.99	24,583	37,372
VSM-55	55.00	52.46	4.01	.79	53.06	.99	26,001	39,528
VSM-56	56.00	53.44	4.01	.79	54.06	.99	26,473	40,247
VSM-58	58.00	55.42	4.01	.79	56.06	.99	27,419	41,684
VSM-60	60.00	57.40	4.01	.79	58.06	.99	28,364	43,122
VSM-62	62.00	59.37	4.01	.79	60.06	.99	29,310	44,559
VSM-63	63.00	60.35	4.01	.79	61.06	.99	29,783	45,278
VSM-65	65.00	62.33	4.01	.79	63.06	.99	30,728	46,715
VSM-68	68.00	65.31	4.01	.79	66.06	.99	32,146	48,871
VSM-70	70.00	67.29	4.01	.79	68.06	.99	33,092	50,309
VSM-72	72.00	69.27	4.01	.79	70.06	.99	34,037	51,746
VSM-75	75.00	72.25	4.01	.79	73.06	.99	35,456	53,9027

<sup>1</sup> Add suffix "-S02" for 302 stainless steel. Add suffix "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.  
<sup>5</sup> No removal notch.  
<sup>6</sup> Square edge wire.

Stock Items available in carbon steel and 302 and 316 stainless steel.

Product Dimensions All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
VSM-78	78.00	74.85	4.78	.99	75.66	1.12	44,477	70,250
VSM-80	80.00	76.82	4.78	.99	77.66	1.12	45,617	72,052
VSM-82	82.00	78.79	4.78	.99	79.66	1.12	46,757	73,853
VSM-85	85.00	81.76	4.78	.99	82.66	1.12	48,468	76,555
VSM-88	88.00	84.73	4.78	.99	85.66	1.12	50,179	79,257
VSM-90	90.00	86.69	4.78	.99	87.66	1.12	51,319	81,058
VSM-95	95.00	91.66	4.78	.99	92.66	1.12	54,170	85,561
VSM-100	100.00	96.62	4.78	.99	97.66	1.12	57,021	90,064
VSM-105	105.00	101.13	5.72	1.17	102.20	1.32	71,642	106,440
VSM-110	110.00	106.08	5.72	1.17	107.20	1.32	75,054	111,508
VSM-115	115.00	111.03	5.72	1.17	112.20	1.32	78,465	116,577
VSM-120	120.00	115.98	5.72	1.17	117.20	1.32	81,877	121,645
VSM-125	125.00	120.93	5.72	1.17	122.20	1.32	85,288	126,714
VSM-130	130.00	125.88	5.72	1.17	127.20	1.32	88,700	131,783
VSM-135	135.00	130.31	5.72	1.55	131.63	1.70	111,027	181,299
VSM-140	140.00	135.13	5.72	1.55	136.50	1.70	119,404	188,013
VSM-145	145.00	139.95	5.72	1.55	141.37	1.70	127,974	194,907
VSM-150	150.00	144.83	5.72	1.55	146.25	1.70	137,070	201,443
VSM-155	155.00	149.66	5.72	1.55	151.13	1.70	146,361	208,158
VSM-160	160.00	154.44	6.73	1.55	156.00	1.70	155,956	214,872
VSM-165	165.00	159.27	6.73	1.55	160.88	1.70	165,855	221,587
VSM-170	170.00	164.09	6.73	1.55	165.75	1.70	176,059	228,302
VSM-175	175.00	168.92	6.73	1.55	170.63	1.70	186,568	235,017
VSM-180	180.00	173.75	6.73	1.55	175.50	1.70	197,381	241,731
VSM-185	185.00	178.57	7.62	1.55	180.38	1.70	208,499	248,446
VSM-190	190.00	183.40	7.62	1.55	185.25	1.70	219,922	255,161
VSM-195	195.00	188.22	7.62	1.55	190.13	1.70	231,649	261,876
VSM-200	200.00	193.05	7.62	1.55	195.00	1.70	243,681	268,590
VSM-210	210.00	202.70	8.76	1.93	204.75	2.08	268,658	351,160
VSM-220	220.00	212.36	8.76	1.93	214.50	2.08	294,854	367,882
VSM-230	230.00	222.01	8.76	1.93	224.25	2.08	322,268	384,604
VSM-240	240.00	231.66	8.76	1.93	234.00	2.08	350,900	401,326
VSM-250	250.00	241.31	8.76	1.93	243.75	2.08	380,751	418,048
VSM-260	260.00	250.97	9.65	1.93	253.50	2.08	411,821	434,770
VSM-270	270.00	260.62	9.65	1.93	263.25	2.08	444,108	451,492
VSM-280	280.00	270.27	9.65	1.93	273.00	2.08	477,614	468,214
VSM-290	290.00	279.92	9.65	1.93	282.75	2.08	512,339	484,936
VSM-300	300.00	289.58	9.65	1.93	292.50	2.08	548,282	501,658

<sup>1</sup> Add suffix "-S02" for 302 stainless steel. Add suffix "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

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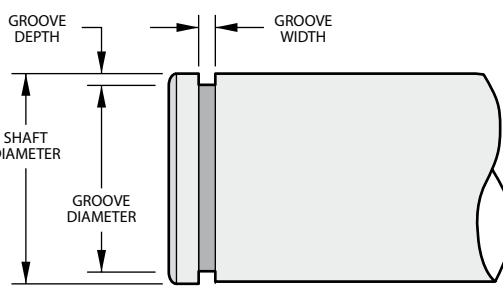
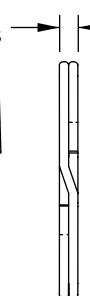
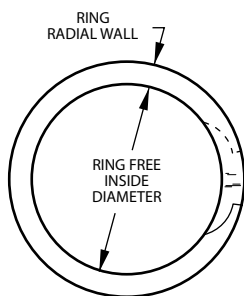
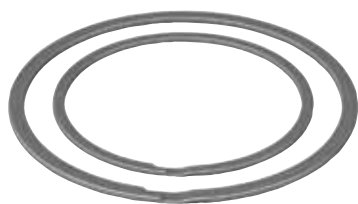
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# ES Series - Metric Aerospace Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



ES-6 /  
ES-17

ES-18  
& UP

MA 4016<sup>5</sup>

**Product Dimensions** All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
ES-6 <sup>6,7</sup>	6.00	5.61	.38 - .58	.64	5.66	.74	500	3,160
ES-7 <sup>6,7</sup>	7.00	6.53	.51 - .71	.64	6.58	.74	720	3,690
ES-8 <sup>6,7</sup>	8.00	7.49	.51 - .71	.64	7.57	.74	840	4,210
ES-9 <sup>6,7</sup>	9.00	8.41	.64 - .84	.64	8.48	.74	1,140	4,740
ES-10 <sup>6,7</sup>	10.00	9.40	.64 - .84	.64	9.50	.74	1,220	5,270
ES-11 <sup>7</sup>	11.00	10.39	.76 - .96	.64	10.46	.74	1,450	5,790
ES-12	12.00	11.18	1.02 - 1.22	.60	11.29	.70	2,100	7,950
ES-13	13.00	12.13	1.14 - 1.35	.89	12.24	1.00	2,410	12,100
ES-14	14.00	13.06	1.14 - 1.35	.89	13.19	1.00	2,800	13,040
ES-15	15.00	13.98	1.14 - 1.35	.89	14.09	1.00	3,360	13,970
ES-16	16.00	14.90	1.27 - 1.48	.89	15.02	1.00	3,820	14,900
ES-17	17.00	15.82	1.27 - 1.48	.89	16.02	1.00	4,060	15,830
ES-18	18.00	16.80	1.52 - 1.73	1.07	16.92	1.20	4,730	20,150
ES-19	19.00	17.73	1.52 - 1.73	1.07	17.87	1.20	5,270	21,270
ES-20	20.00	18.62	1.52 - 1.73	1.07	18.77	1.20	6,040	22,390
ES-21	21.00	19.57	1.52 - 1.73	1.07	19.72	1.20	6,550	23,510
ES-22	22.00	20.45	1.78 - 1.98	1.07	20.62	1.20	7,390	24,630
ES-23	23.00	21.39	1.78 - 1.98	1.07	21.57	1.20	8,070	25,750
ES-24	24.00	22.35	1.78 - 1.98	1.07	22.52	1.20	8,650	26,870
ES-25	25.00	23.25	2.03 - 2.24	1.07	23.42	1.20	9,620	27,990
ES-26	26.00	24.21	2.03 - 2.24	1.07	24.42	1.20	10,000	29,110
ES-27	27.00	25.04	2.49 - 2.69	1.27	25.35	1.40	10,910	31,170
ES-28	28.00	26.00	2.49 - 2.69	1.27	26.30	1.40	11,590	32,330
ES-29	29.00	26.95	2.49 - 2.69	1.27	27.27	1.40	12,290	33,480
ES-30	30.00	27.92	2.49 - 2.69	1.27	28.25	1.40	12,860	34,640
ES-31	31.00	28.84	2.49 - 2.69	1.27	29.17	1.40	13,890	35,790
ES-32	32.00	29.77	2.49 - 2.69	1.27	30.09	1.40	14,960	36,950
ES-34	34.00	31.54	2.87 - 3.07	1.27	31.90	1.40	17,390	39,260
ES-35	35.00	32.44	2.87 - 3.07	1.27	32.80	1.40	18,750	40,410
ES-36	36.00	33.40	2.87 - 3.07	1.27	33.75	1.40	19,810	41,560
ES-37	37.00	34.24	2.87 - 3.07	1.27	34.67	1.40	21,080	42,720
ES-38	38.00	35.18	2.87 - 3.07	1.27	35.66	1.40	21,650	43,870
ES-40	40.00	37.15	3.12 - 3.33	1.57	37.55	1.75	23,960	57,090
ES-42	42.00	39.02	3.12 - 3.33	1.57	39.45	1.75	26,180	59,990
ES-45	45.00	41.77	3.12 - 3.33	1.57	42.25	1.75	30,240	64,230
ES-46	46.00	42.67	3.12 - 3.33	1.57	43.15	1.75	32,040	65,660
ES-47	47.00	43.81	3.89 - 4.09	1.57	44.31	1.75	30,900	67,080
ES-48	48.00	44.48	3.89 - 4.09	1.57	45.05	1.75	34,600	68,510
ES-50	50.00	46.69	3.89 - 4.09	1.57	47.05	1.75	36,040	71,370
ES-52	52.00	49.62	3.12 - 3.33	1.25	50.15	1.42	23,550	59,090
ES-53	53.00	50.62	3.12 - 3.33	1.25	51.15	1.42	24,000	60,230
ES-54	54.00	51.62	3.12 - 3.33	1.25	52.15	1.42	24,460	61,370
ES-55	55.00	52.62	3.38 - 3.58	1.25	53.15	1.42	24,910	62,500
ES-56	56.00	53.62	3.38 - 3.58	1.25	54.15	1.42	25,370	63,640
ES-58	58.00	55.43	3.38 - 3.58	1.25	56.01	1.42	28,250	65,910
ES-59	59.00	56.43	3.38 - 3.58	1.25	57.01	1.42	28,730	67,050

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Contact Smalley for details/information on how to order parts to be in compliance with this specification.

<sup>6</sup> No removal notch.

<sup>7</sup> Square edge wire.

Stock Items available in carbon steel and 302 and 316 stainless steel.

Product Dimensions All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
ES-60	60.00	57.43	3.38 - 3.58	1.25	58.01	1.42	29,220	68,180
ES-61	61.00	58.36	3.38 - 3.58	1.25	58.91	1.42	31,190	69,320
ES-62	62.00	59.30	3.63 - 3.84	1.25	59.91	1.42	31,710	70,460
ES-63	63.00	60.30	3.63 - 3.84	1.25	60.91	1.42	32,220	71,590
ES-64	64.00	61.25	3.63 - 3.84	1.25	61.91	1.42	32,730	72,730
ES-65	65.00	62.20	3.63 - 3.84	1.25	62.81	1.42	34,820	73,870
ES-66	66.00	63.16	3.63 - 3.84	1.25	63.79	1.42	35,680	75,000
ES-67	67.00	64.16	3.63 - 3.84	1.25	64.71	1.42	37,530	76,140
ES-68	68.00	65.08	3.89 - 4.09	1.25	65.71	1.42	38,090	77,270
ES-69	69.00	66.06	3.89 - 4.09	1.25	66.71	1.42	38,650	78,410
ES-70	70.00	67.08	3.89 - 4.09	1.25	67.71	1.42	39,210	79,550
ES-71	71.00	68.04	3.89 - 4.09	1.25	68.71	1.42	39,770	80,680
ES-72	72.00	69.00	4.11 - 4.37	1.25	69.65	1.42	41,380	81,820
ES-75	75.00	71.93	4.11 - 4.37	1.25	72.61	1.42	43,830	85,230
ES-78	78.00	74.84	4.11 - 4.37	1.55	75.55	1.73	46,730	109,910
ES-80	80.00	76.80	4.37 - 4.62	1.55	77.51	1.73	48,700	112,730
ES-82	82.00	78.72	4.37 - 4.62	1.55	79.45	1.73	51,120	115,550
ES-85	85.00	81.62	4.62 - 4.88	1.55	82.35	1.73	55,060	119,780
ES-88	88.00	84.53	4.62 - 4.88	1.55	85.31	1.73	57,860	124,000
ES-90	90.00	86.43	4.88 - 5.13	1.55	87.21	1.73	61,370	126,820
ES-95	95.00	91.37	4.88 - 5.13	1.55	92.15	1.73	66,160	133,870
ES-100	100.00	96.10	5.13 - 5.38	1.55	97.01	1.73	73,050	140,910
ES-105	105.00	100.94	5.38 - 5.64	1.55	101.85	1.73	80,780	147,960
ES-110	110.00	105.75	5.64 - 5.89	1.55	106.69	1.73	88,930	155,000
ES-115	115.00	110.59	5.89 - 6.15	1.55	111.55	1.73	96,890	162,050
ES-120	120.00	115.49	6.20 - 6.45	1.83	116.45	2.00	104,030	199,640
ES-125	125.00	120.44	6.20 - 6.45	1.83	121.45	2.00	108,360	207,960
ES-130	130.00	125.34	6.20 - 6.45	1.83	126.35	2.00	115,860	216,280
ES-135	135.00	130.20	6.20 - 6.45	1.83	131.27	2.00	122,950	224,600
ES-140	140.00	135.14	6.20 - 6.45	1.83	136.25	2.00	128,190	232,920
ES-145	145.00	140.00	6.20 - 6.45	1.83	141.17	2.00	135,590	241,230
ES-150	150.00	145.00	6.20 - 6.45	1.83	146.17	2.00	140,260	249,550
ES-155	155.00	149.33	7.72 - 8.03	2.18	150.60	2.40	166,080	307,190
ES-160	160.00	154.31	7.72 - 8.03	2.18	155.60	2.40	171,430	317,100
ES-165	165.00	159.23	7.72 - 8.03	2.18	160.60	2.40	176,790	327,010
ES-170	170.00	164.00	7.72 - 8.03	2.18	165.40	2.40	190,430	336,920
ES-175	175.00	169.00	7.72 - 8.03	2.18	170.40	2.40	196,030	346,830
ES-180	180.00	173.78	7.72 - 8.03	2.18	175.20	2.40	210,400	356,740
ES-185	185.00	178.70	7.72 - 8.03	2.18	180.20	2.40	216,240	366,650
ES-190	190.00	183.70	7.72 - 8.03	2.18	185.20	2.40	220,080	376,560
ES-195	195.00	188.43	7.72 - 8.03	2.18	190.00	2.40	237,420	386,460
ES-200	200.00	193.43	7.72 - 8.03	2.18	195.00	2.40	243,510	396,370
ES-210	210.00	202.93	9.32 - 9.63	2.18	204.60	2.40	276,140	416,190
ES-220	220.00	212.65	9.32 - 9.63	2.18	214.40	2.40	300,010	436,010
ES-230	230.00	222.60	9.32 - 9.63	2.18	224.40	2.40	313,640	455,830
ES-240	240.00	232.32	9.32 - 9.63	2.18	234.20	2.40	328,970	475,650
ES-250	250.00	241.83	9.32 - 9.63	2.18	243.80	2.40	377,440	495,470
ES-260	260.00	251.57	9.32 - 9.63	2.18	253.60	2.40	405,210	515,290
ES-270	270.00	261.30	9.32 - 9.63	2.18	263.40	2.40	433,940	535,100
ES-280	280.00	271.04	9.32 - 9.63	2.18	273.20	2.40	463,650	554,920

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

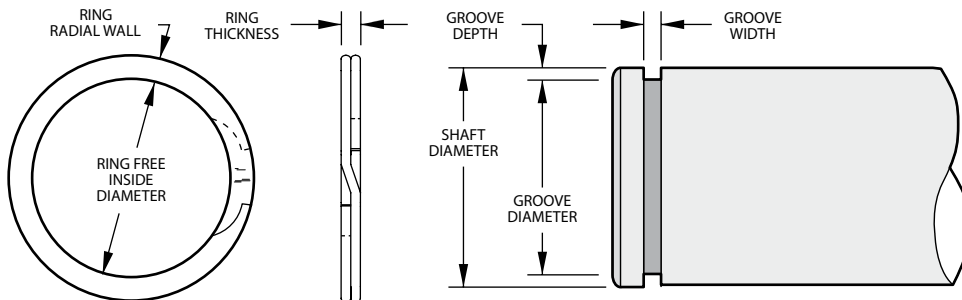
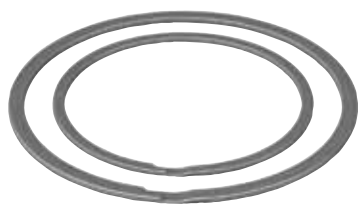
<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Contact Smalley for details/information on how to order parts to be in compliance with this specification.

# DNS Series - DIN Metric Rings

SPIROLOX RINGS EXCLUSIVELY FROM SMALLEY



Groove Compatible with DIN 471

Product Dimensions All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
DNS-13	13.00	12.27	1.40	.99	12.40	1.10	1,901	13,474
DNS-14	14.00	13.26	1.40	.99	13.40	1.10	2,047	14,510
DNS-15	15.00	14.15	1.40	.99	14.30	1.10	2,559	15,547
DNS-16	16.00	15.04	1.65	.99	15.20	1.10	3,119	16,583
DNS-17	17.00	16.04	1.65	.99	16.20	1.10	3,314	17,620
DNS-18	18.00	16.83	1.91	1.14	17.00	1.30	4,386	18,668
DNS-19	19.00	17.83	1.91	1.14	18.00	1.30	4,630	19,705
DNS-20	20.00	18.82	1.91	1.14	19.00	1.30	4,874	20,742
DNS-21	21.00	19.79	1.91	1.14	20.00	1.30	5,117	21,779
DNS-22	22.00	20.78	1.91	1.14	21.00	1.30	5,361	22,816
DNS-23	23.00	21.77	1.91	1.14	22.00	1.30	5,605	23,853
DNS-24	24.00	22.66	2.18	1.14	22.90	1.30	6,433	24,891
DNS-25	25.00	23.65	2.18	1.14	23.90	1.30	6,701	25,928
DNS-26	26.00	24.64	2.18	1.14	24.90	1.30	6,969	26,965
DNS-27	27.00	25.34	2.18	1.14	25.60	1.30	9,211	28,002
DNS-28	28.00	26.34	2.39	1.44	26.60	1.60	9,552	36,681
DNS-29	29.00	27.33	2.39	1.44	27.60	1.60	9,893	37,991
DNS-30	30.00	28.32	2.39	1.44	28.60	1.60	10,235	39,301
DNS-32	32.00	30.00	3.25	1.44	30.30	1.60	13,256	41,921
DNS-33	33.00	30.99	3.25	1.44	31.30	1.60	13,670	43,231
DNS-34	34.00	31.98	3.25	1.44	32.30	1.60	14,085	44,541
DNS-35	35.00	32.66	3.25	1.44	33.00	1.60	17,058	45,851
DNS-36	36.00	33.65	4.01	1.69	34.00	1.85	17,545	55,349
DNS-38	38.00	35.64	4.01	1.69	36.00	1.85	18,520	58,424
DNS-40	40.00	37.11	4.01	1.69	37.50	1.85	24,368	61,498
DNS-42	42.00	39.09	4.01	1.69	39.50	1.85	25,586	64,573
DNS-45	45.00	42.06	4.01	1.69	42.50	1.85	27,414	69,186
DNS-46	46.00	43.05	4.01	1.69	43.50	1.85	28,023	70,723
DNS-47	47.00	44.04	4.01	1.69	44.50	1.85	28,633	72,261
DNS-48	48.00	45.03	4.01	1.69	45.50	1.85	29,242	73,798
DNS-50	50.00	46.53	5.08	1.93	47.00	2.15	36,552	87,790
DNS-52	52.00	48.51	5.08	1.93	49.00	2.15	38,014	91,302
DNS-54	54.00	50.50	5.08	1.93	51.00	2.15	39,476	94,813
DNS-55	55.00	51.49	5.08	1.93	52.00	2.15	40,207	96,569
DNS-56	56.00	52.48	5.08	1.93	53.00	2.15	40,938	98,325
DNS-58	58.00	54.43	5.08	1.93	55.00	2.15	42,400	101,836
DNS-60	60.00	56.42	5.08	1.93	57.00	2.15	43,863	105,348
DNS-62	62.00	58.42	5.08	1.93	59.00	2.15	45,325	108,860
DNS-63	63.00	59.39	5.08	1.93	60.00	2.15	46,056	110,615
DNS-65	65.00	61.39	5.08	2.41	62.00	2.65	47,518	135,725
DNS-67	67.00	63.37	5.08	2.41	64.00	2.65	48,980	139,901
DNS-68	68.00	64.34	5.08	2.41	65.00	2.65	49,711	141,989
DNS-70	70.00	66.34	5.08	2.41	67.00	2.65	51,173	146,165
DNS-72	72.00	68.33	5.08	2.41	69.00	2.65	52,635	150,341
DNS-75	75.00	71.33	5.08	2.41	72.00	2.65	54,828	156,605

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.  
<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.  
<sup>3</sup> Based on a safety factor of 3.  
<sup>4</sup> See pages 132-133 for How to Order.

Stock Items available in carbon steel and 302 and 316 stainless steel.

Product Dimensions All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
DNS-77	77.00	73.33	5.08	2.41	74.00	2.65	56,290	160,782
DNS-78	78.00	74.33	5.08	2.41	75.00	2.65	57,021	162,870
DNS-80	80.00	75.81	6.02	2.41	76.50	2.65	68,231	167,046
DNS-82	82.00	77.81	6.02	2.41	78.50	2.65	69,936	171,222
DNS-85	85.00	80.80	6.27	2.91	81.50	3.15	72,495	214,309
DNS-88	88.00	83.80	6.27	2.91	84.50	3.15	75,054	221,873
DNS-90	90.00	85.80	6.27	2.91	86.50	3.15	76,759	226,915
DNS-95	95.00	90.80	6.27	2.91	91.50	3.15	81,024	239,522
DNS-98	98.00	93.79	6.27	2.91	94.50	3.15	83,583	247,086
DNS-100	100.00	95.79	6.27	2.91	96.50	3.15	85,288	252,128
DNS-102	102.00	97.29	6.73	3.89	98.00	4.15	99,422	343,778
DNS-105	105.00	100.28	6.73	3.89	101.00	4.15	102,346	353,889
DNS-108	108.00	103.25	6.73	3.89	104.00	4.15	105,270	364,000
DNS-110	110.00	105.23	6.73	3.89	106.00	4.15	107,220	370,741
DNS-115	115.00	110.19	6.73	3.89	111.00	4.15	112,093	387,593
DNS-120	120.00	115.16	6.73	3.89	116.00	4.15	116,967	404,445
DNS-125	125.00	120.12	6.73	3.89	121.00	4.15	121,840	421,297
DNS-130	130.00	125.07	6.73	3.89	126.00	4.15	126,714	438,149
DNS-135	135.00	130.02	6.73	3.89	131.00	4.15	131,588	455,001
DNS-140	140.00	134.98	6.73	3.89	136.00	4.15	136,461	471,852
DNS-145	145.00	139.93	6.73	3.89	141.00	4.15	141,335	488,704
DNS-150	150.00	143.91	7.92	3.89	145.00	4.15	182,761	505,556
DNS-155	155.00	148.89	7.92	3.89	150.00	4.15	188,853	522,408
DNS-160	160.00	153.85	7.92	3.89	155.00	4.15	194,945	539,260
DNS-165	165.00	158.80	7.92	3.89	160.00	4.15	201,037	556,112
DNS-170	170.00	163.75	7.92	3.89	165.00	4.15	207,129	572,964
DNS-175	175.00	168.73	7.92	3.89	170.00	4.15	213,221	589,815
DNS-180	180.00	173.69	7.92	3.89	175.00	4.15	219,313	606,667
DNS-185	185.00	178.66	7.92	3.89	180.00	4.15	225,405	623,519
DNS-190	190.00	183.59	7.92	3.89	185.00	4.15	231,497	640,371
DNS-195	195.00	188.54	7.92	3.89	190.00	4.15	237,589	657,223
DNS-200	200.00	193.54	7.92	3.89	195.00	4.15	243,681	674,075
DNS-205	205.00	197.54	11.05	4.86	199.00	5.15	299,727	863,214
DNS-210	210.00	202.54	11.05	4.86	204.00	5.15	307,038	884,268
DNS-220	220.00	212.47	11.05	4.86	214.00	5.15	321,659	926,376
DNS-230	230.00	222.40	11.05	4.86	224.00	5.15	336,280	968,484
DNS-240	240.00	232.33	11.05	4.86	234.00	5.15	350,900	1,010,592
DNS-250	250.00	242.24	11.05	4.86	244.00	5.15	365,521	1,052,700
DNS-260	260.00	250.19	12.70	4.86	252.00	5.15	506,856	1,094,808
DNS-270	270.00	260.15	12.70	4.86	262.00	5.15	526,351	1,136,916
DNS-280	280.00	270.08	12.70	4.86	272.00	5.15	545,845	1,179,024
DNS-290	290.00	279.98	12.70	4.86	282.00	5.15	565,340	1,221,132
DNS-300	300.00	289.92	12.70	4.86	292.00	5.15	584,834	1,263,241
DNS-310	310.00	297.84	15.81	5.87	300.00	6.20	755,411	1,576,625
DNS-320	320.00	307.84	15.81	5.87	310.00	6.20	779,779	1,627,484
DNS-330	330.00	317.75	15.81	5.87	320.00	6.20	804,147	1,678,342
DNS-340	340.00	327.69	15.81	5.87	330.00	6.20	828,515	1,729,201
DNS-350	350.00	337.64	15.81	5.87	340.00	6.20	852,883	1,780,060
DNS-360	360.00	347.57	15.81	5.87	350.00	6.20	877,251	1,830,919
DNS-370	370.00	357.48	15.81	5.87	360.00	6.20	901,619	1,881,778
DNS-380	380.00	367.41	15.81	5.87	370.00	6.20	925,987	1,932,637
DNS-390	390.00	377.34	15.81	5.87	380.00	6.20	950,355	1,983,496
DNS-400	400.00	387.25	15.81	5.87	390.00	6.20	974,723	2,034,354

<sup>1</sup> Add suffix "-S02" for 302 stainless steel, "-S16" for 316 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

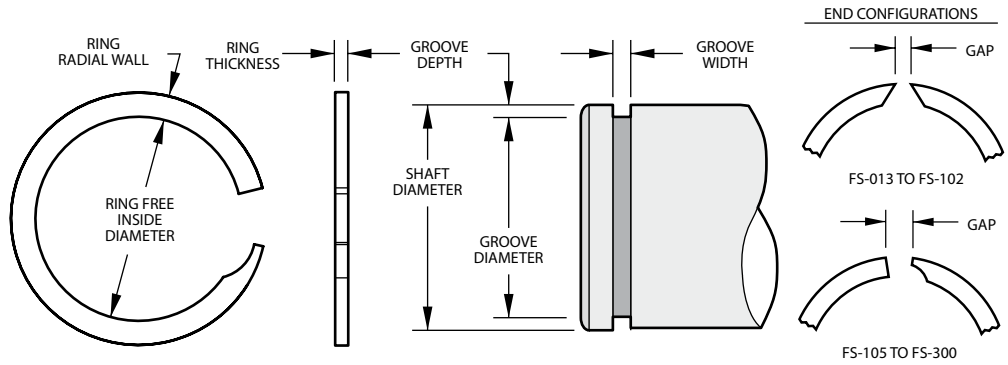
<sup>4</sup> See pages 132-133 for How to Order.



# FS Series - Metric Constant Section Rings



Groove Compatible with DIN 471



Product Dimensions All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1,4,5</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
FS-013	13.00	12.27	1.40	.94	12.40	1.10	1,931	10,591
FS-014	14.00	13.31	1.40	.94	13.40	1.10	2,077	11,396
FS-015	15.00	14.15	1.40	.94	14.30	1.10	2,602	12,224
FS-016	16.00	14.98	1.65	.94	15.20	1.10	3,172	13,029
FS-017	17.00	16.06	1.65	.94	16.20	1.10	3,367	13,838
FS-018	18.00	16.82	1.90	1.15	17.00	1.30	4,457	17,953
FS-019	19.00	17.81	1.90	1.15	18.00	1.30	4,702	18,941
FS-020	20.00	18.80	1.90	1.15	19.00	1.30	4,951	19,928
FS-021	21.00	19.79	1.90	1.15	20.00	1.30	5,200	20,942
FS-022	22.00	20.83	1.90	1.15	21.00	1.30	5,445	21,930
FS-023	23.00	21.77	1.90	1.15	22.00	1.30	5,698	22,939
FS-024	24.00	22.50	2.15	1.15	22.90	1.30	6,539	23,927
FS-025	25.00	23.70	2.15	1.15	23.90	1.30	6,806	24,914
FS-026	26.00	24.64	2.15	1.15	24.90	1.30	7,082	25,929
FS-027	27.00	25.50	2.15	1.15	25.90	1.30	7,353	26,916
FS-028	28.00	26.32	3.25	1.44	26.60	1.60	9,702	33,179
FS-029	29.00	27.15	3.25	1.44	27.60	1.60	10,053	34,385
FS-030	30.00	28.35	3.25	1.44	28.60	1.60	10,395	35,559
FS-032	32.00	29.87	3.25	1.44	30.30	1.60	13,073	37,939
FS-033	33.00	31.07	3.25	1.44	31.30	1.60	13,478	39,113
FS-034	34.00	31.96	3.25	1.44	32.30	1.60	13,892	40,319
FS-035	35.00	32.57	3.25	1.44	33.00	1.60	16,899	41,493
FS-036	36.00	33.64	4.01	1.69	34.00	1.85	17,375	50,038
FS-038	38.00	35.62	4.01	1.69	36.00	1.85	18,344	52,827
FS-040	40.00	37.02	4.01	1.69	37.50	1.85	24,265	55,621
FS-042	42.00	39.08	4.01	1.69	39.50	1.85	25,484	58,410
FS-045	45.00	42.05	4.01	1.69	42.50	1.85	27,303	62,578
FS-046	46.00	43.10	4.01	1.69	43.50	1.85	27,904	63,952
FS-047	47.00	44.03	4.01	1.69	44.50	1.85	28,504	65,331
FS-048	48.00	44.89	4.01	1.69	45.50	1.85	29,118	66,741
FS-050	50.00	46.50	5.08	1.93	47.00	2.15	36,529	75,282
FS-052	52.00	48.48	5.08	1.93	49.00	2.15	37,974	78,266
FS-054	54.00	50.46	5.08	1.93	51.00	2.15	39,438	81,287
FS-055	55.00	51.45	5.08	1.93	52.00	2.15	40,163	82,777
FS-056	56.00	52.44	5.08	1.93	53.00	2.15	40,906	84,307
FS-058	58.00	54.42	5.08	1.93	55.00	2.15	42,352	87,287
FS-060	60.00	56.55	5.08	1.93	57.00	2.15	43,819	90,308
FS-062	62.00	58.32	5.08	1.93	59.00	2.15	45,283	93,328
FS-063	63.00	59.37	5.08	1.93	60.00	2.15	46,008	94,823
FS-065	65.00	61.35	5.08	2.41	62.00	2.65	47,471	116,641
FS-067	67.00	63.35	5.08	2.41	64.00	2.65	48,939	120,240
FS-068	68.00	64.45	5.08	2.41	65.00	2.65	49,660	122,019
FS-070	70.00	66.22	5.08	2.41	67.00	2.65	51,128	125,618
FS-072	72.00	68.28	5.08	2.41	69.00	2.65	52,591	129,221
FS-075	75.00	71.25	5.08	2.41	72.00	2.65	54,780	134,599

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.

Stock Items available in carbon steel and 302 stainless steel.

Product Dimensions All dimensions in millimeters unless otherwise specified.

Smalley Part Number <sup>1, 4, 5</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (N) <sup>2</sup>	Ring Shear (N) <sup>3</sup>
FS-077	77.00	73.23	5.08	2.41	74.00	2.65	56,230	138,153
FS-078	78.00	74.06	5.08	2.41	75.00	2.65	56,968	139,977
FS-080	80.00	75.70	6.02	2.41	76.50	2.65	68,342	143,575
FS-082	82.00	77.68	6.02	2.41	78.50	2.65	70,033	147,134
FS-085	85.00	80.65	6.30	2.91	81.50	3.15	72,595	175,656
FS-088	88.00	83.60	6.30	2.91	84.50	3.15	75,175	181,906
FS-090	90.00	85.80	6.30	2.91	86.50	3.15	76,865	185,998
FS-095	95.00	90.68	6.30	2.91	91.50	3.15	81,140	196,340
FS-098	98.00	93.70	6.30	2.91	94.50	3.15	83,702	202,536
FS-100	100.00	95.50	6.30	2.91	96.50	3.15	85,415	206,682
FS-102	102.00	97.23	6.30	2.91	98.50	3.15	87,127	210,828
FS-105	105.00	99.83	6.73	3.89	101.00	4.15	102,687	276,951
FS-108	108.00	102.87	6.73	3.89	104.00	4.15	105,619	284,855
FS-110	110.00	104.90	6.73	3.89	106.00	4.15	107,580	290,149
FS-115	115.00	109.85	6.73	3.89	111.00	4.15	112,473	303,346
FS-120	120.00	115.06	6.73	3.89	116.00	4.15	117,344	316,478
FS-125	125.00	119.75	6.73	3.89	121.00	4.15	122,237	329,676
FS-130	130.00	124.70	6.73	3.89	126.00	4.15	127,130	342,873
FS-135	135.00	129.65	6.73	3.89	131.00	4.15	132,023	356,071
FS-140	140.00	134.42	6.73	3.89	136.00	4.15	136,916	369,269
FS-145	145.00	139.55	6.73	3.89	141.00	4.15	141,809	382,467
FS-150	150.00	143.50	8.03	3.89	145.00	4.15	181,986	395,665
FS-155	155.00	148.45	8.03	3.89	150.00	4.15	188,026	408,796
FS-160	160.00	153.40	8.03	3.89	155.00	4.15	194,094	421,994
FS-165	165.00	158.40	8.03	3.89	160.00	4.15	200,166	435,192
FS-170	170.00	163.30	8.03	3.89	165.00	4.15	206,237	448,683
FS-175	175.00	168.25	8.03	3.89	170.00	4.15	212,305	461,890
FS-180	180.00	173.20	8.03	3.89	175.00	4.15	218,377	475,097
FS-185	185.00	177.62	8.03	3.89	180.00	4.15	224,417	488,232
FS-190	190.00	183.35	8.03	3.89	185.00	4.15	230,489	501,439
FS-195	195.00	188.05	8.03	3.89	190.00	4.15	236,556	514,646
FS-200	200.00	193.00	8.03	3.89	195.00	4.15	242,628	527,853
FS-205	205.00	196.95	11.05	4.87	199.00	5.15	299,454	641,438
FS-210	210.00	201.67	11.05	4.87	204.00	5.15	306,763	657,096
FS-220	220.00	211.80	11.05	4.87	214.00	5.15	321,344	688,327
FS-230	230.00	221.70	11.05	4.87	224.00	5.15	335,961	719,638
FS-240	240.00	231.89	11.05	4.87	234.00	5.15	350,578	750,953
FS-250	250.00	241.50	11.05	4.87	244.00	5.15	365,199	782,264
FS-260	260.00	249.59	12.70	4.87	252.00	5.15	505,300	813,500
FS-270	270.00	259.30	12.70	4.87	262.00	5.15	524,748	844,811
FS-280	280.00	268.83	12.70	4.87	272.00	5.15	544,200	876,126
FS-290	290.00	279.10	12.70	4.87	282.00	5.15	563,599	907,357
FS-300	300.00	289.00	12.70	4.87	292.00	5.15	583,051	938,673

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 310 N/mm<sup>2</sup> and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

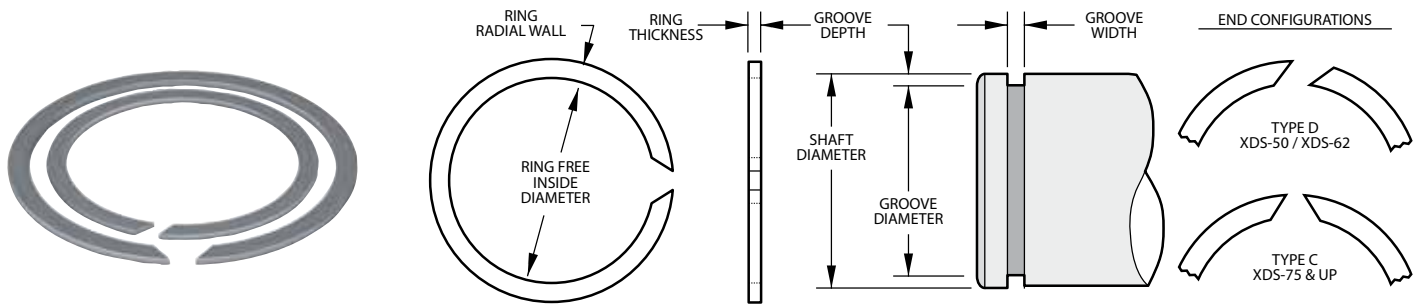
<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.

## Get CAD downloads

Simplify your design process by downloading CAD models of standard retaining rings and wave springs at [www.smalley.com/cad-models](http://www.smalley.com/cad-models).

# XAS Series - Constant Section Rings



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1, 4, 5</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
XAS-31	.312	.281	.040	.025	.290	.028	243	977
XAS-34	.344	.312	.040	.025	.322	.028	267	1,077
XAS-35	.354	.320	.040	.025	.330	.028	300	1,108
XAS-37	.375	.341	.040	.025	.351	.028	318	1,174
XAS-39	.393	.359	.040	.025	.369	.028	333	1,231
XAS-40	.406	.372	.040	.025	.382	.028	344	1,271
XAS-43	.438	.402	.040	.025	.412	.028	402	1,371
XAS-46	.469	.433	.040	.025	.443	.028	431	1,468
XAS-50	.500	.464	.048	.035	.474	.039	459	2,073
XAS-55	.551	.514	.048	.035	.524	.039	526	2,285
XAS-56	.562	.524	.048	.035	.534	.039	556	2,331
XAS-59	.594	.555	.048	.035	.566	.039	588	2,463
XAS-62	.625	.586	.062	.035	.597	.039	619	2,592
XAS-66	.669	.630	.062	.035	.640	.039	686	2,774
XAS-68	.688	.644	.062	.042	.656	.046	778	3,458
XAS-75	.750	.703	.062	.042	.716	.046	901	3,770
XAS-78	.781	.733	.062	.042	.745	.046	994	3,926
XAS-81	.812	.764	.062	.042	.776	.046	1,033	4,082
XAS-87	.875	.820	.078	.042	.835	.046	1,237	4,398
XAS-93	.938	.881	.078	.042	.896	.046	1,392	4,715
XAS-98	.984	.925	.078	.042	.940	.046	1,530	4,946
XAS-100	1.000	.941	.093	.042	.956	.046	1,555	5,027
XAS-102	1.023	.962	.093	.042	.977	.046	1,663	5,142
XAS-106	1.062	1.000	.093	.050	1.016	.056	1,727	6,272
XAS-112	1.125	1.060	.093	.050	1.075	.056	1,988	6,644
XAS-118	1.188	1.121	.093	.050	1.136	.056	2,183	7,017
XAS-125	1.250	1.179	.093	.050	1.194	.056	2,474	7,383
XAS-131	1.312	1.232	.093	.050	1.250	.056	2,875	7,749
XAS-137	1.375	1.291	.109	.050	1.309	.056	3,207	8,121
XAS-143	1.438	1.351	.109	.050	1.370	.056	3,456	8,493
XAS-150	1.500	1.408	.109	.050	1.430	.056	3,711	8,859
XAS-156	1.562	1.467	.125	.062	1.490	.068	3,975	11,002
XAS-162	1.625	1.527	.125	.062	1.551	.068	4,250	11,446
XAS-168	1.687	1.581	.125	.062	1.611	.068	4,531	11,882
XAS-175	1.750	1.640	.125	.062	1.670	.068	4,948	12,326
XAS-177	1.771	1.657	.141	.062	1.687	.068	5,258	12,474
XAS-181	1.812	1.698	.141	.062	1.728	.068	5,379	12,763
XAS-187	1.875	1.759	.156	.062	1.789	.068	5,699	13,206
XAS-196	1.969	1.849	.156	.062	1.879	.068	6,263	13,869
XAS-200	2.000	1.880	.156	.062	1.910	.068	6,362	14,087
XAS-206	2.062	1.936	.156	.078	1.966	.086	6,996	17,491
XAS-212	2.125	1.997	.156	.078	2.027	.086	7,360	18,025
XAS-215	2.156	2.026	.156	.078	2.056	.086	7,620	18,288
XAS-225	2.250	2.116	.156	.078	2.146	.086	8,270	19,085
XAS-231	2.312	2.174	.187	.078	2.204	.086	8,825	19,611
XAS-237	2.375	2.235	.187	.078	2.265	.086	9,233	20,145
XAS-243	2.437	2.295	.187	.078	2.325	.086	9,647	20,671
XAS-250	2.500	2.356	.187	.078	2.386	.086	10,073	21,206

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.

Stock Items available in carbon steel and 302 stainless steel.

Product Dimensions All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1, 4, 5</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
XAS-255	2.559	2.413	.187	.078	2.443	.086	10,491	21,706
XAS-262	2.625	2.475	.187	.078	2.505	.086	11,133	22,266
XAS-268	2.687	2.535	.187	.078	2.565	.086	11,586	22,792
XAS-275	2.750	2.594	.187	.093	2.624	.103	12,246	27,992
XAS-287	2.875	2.713	.187	.093	2.743	.103	13,413	29,264
XAS-293	2.937	2.771	.187	.093	2.801	.103	14,117	29,895
XAS-300	3.000	2.830	.218	.093	2.860	.103	14,844	30,536
XAS-306	3.062	2.890	.218	.093	2.920	.103	15,367	31,167
XAS-312	3.125	2.951	.218	.093	2.981	.103	15,904	31,809
XAS-315	3.156	2.980	.218	.093	3.010	.103	16,285	32,124
XAS-325	3.250	3.070	.250	.093	3.100	.103	17,230	33,081
XAS-334	3.344	3.160	.250	.093	3.190	.103	18,201	34,038
XAS-343	3.437	3.251	.250	.093	3.281	.103	18,950	34,984
XAS-350	3.500	3.305	.250	.109	3.340	.120	19,792	40,017
XAS-354	3.543	3.346	.250	.109	3.381	.120	20,286	40,508
XAS-362	3.625	3.423	.250	.109	3.458	.120	21,396	41,446
XAS-368	3.687	3.482	.250	.109	3.517	.120	22,153	42,155
XAS-375	3.750	3.541	.250	.109	3.576	.120	23,061	42,875
XAS-387	3.875	3.657	.281	.109	3.697	.120	24,378	44,304
XAS-393	3.938	3.713	.281	.109	3.758	.120	25,052	45,024
XAS-400	4.000	3.771	.281	.109	3.816	.120	26,012	45,733
XAS-425	4.250	4.016	.281	.109	4.066	.120	27,638	48,592
XAS-437	4.375	4.141	.281	.109	4.191	.120	28,451	50,021
XAS-450	4.500	4.255	.312	.109	4.310	.120	30,218	51,450
XAS-475	4.750	4.495	.312	.109	4.550	.120	33,576	54,308
XAS-500	5.000	4.730	.312	.109	4.790	.120	37,110	57,167
XAS-525	5.250	4.970	.375	.125	5.030	.139	40,821	65,732
XAS-550	5.500	5.206	.375	.125	5.266	.139	45,486	68,862
XAS-575	5.750	5.446	.375	.125	5.506	.139	49,586	71,992
XAS-590	5.900	5.600	.375	.125	5.656	.139	50,880	73,870
XAS-600	6.000	5.687	.375	.125	5.746	.139	53,863	75,122
XAS-625	6.250	5.916	.437	.156	5.986	.174	58,316	94,130
XAS-650	6.500	6.151	.437	.156	6.226	.174	62,946	97,895
XAS-675	6.750	6.386	.437	.156	6.466	.174	67,752	101,660
XAS-700	7.000	6.621	.437	.156	6.706	.174	72,736	105,426
XAS-725	7.250	6.840	.500	.187	6.930	.209	81,996	124,330
XAS-750	7.500	7.090	.500	.187	7.180	.209	84,823	128,617
XAS-800	8.000	7.560	.500	.187	7.660	.209	96,133	137,191
XAS-850	8.500	8.050	.500	.187	8.160	.209	102,141	145,766
XAS-900	9.000	8.545	.500	.187	8.660	.209	108,149	154,340
XAS-925	9.250	8.800	.500	.187	8.910	.209	111,153	158,627
XAS-950	9.500	9.040	.500	.187	9.160	.209	114,158	162,915
XAS-1000	10.000	9.535	.500	.187	9.660	.209	120,166	171,489

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

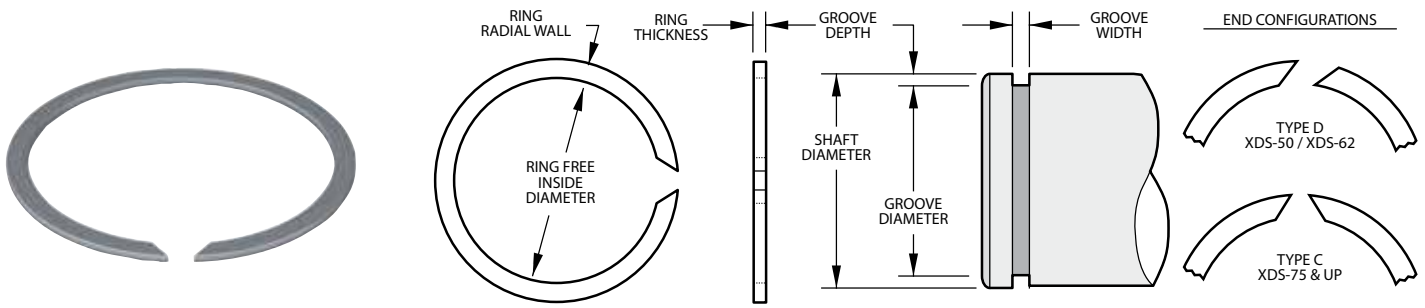
<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.

# XDS Series - Constant Section Rings



**Product Dimensions** All dimensions in inches unless otherwise specified.

Smalley Part Number <sup>1, 4, 5</sup>	Shaft Diameter	Ring			Groove		Thrust Capacity	
		Inside Diameter	Radial Wall	Thickness	Diameter	Width	Groove Yield (lb) <sup>2</sup>	Ring Shear (lb) <sup>3</sup>
XDS-50	.500	.465	.048	.035	.474	.039	459	2,073
XDS-62	.625	.587	.062	.035	.597	.039	619	2,592
XDS-75	.750	.704	.078	.042	.716	.046	901	3,770
XDS-87	.875	.823	.093	.042	.833	.046	1,299	4,398
XDS-100	1.000	.944	.093	.042	.954	.046	1,626	5,027
XDS-112	1.125	1.065	.125	.042	1.077	.046	1,909	5,655
XDS-118	1.187	1.120	.125	.042	1.135	.046	2,182	5,967
XDS-125	1.250	1.179	.125	.042	1.194	.046	2,474	6,283
XDS-131	1.312	1.232	.125	.042	1.252	.046	2,782	6,595
XDS-137	1.375	1.289	.125	.042	1.309	.046	3,207	6,912
XDS-143	1.437	1.349	.125	.042	1.369	.046	3,454	7,223
XDS-150	1.500	1.410	.125	.042	1.430	.046	3,711	7,540
XDS-162	1.625	1.520	.156	.042	1.545	.046	4,595	8,168
XDS-168	1.687	1.582	.156	.042	1.607	.046	4,770	8,480
XDS-175	1.750	1.645	.156	.042	1.670	.046	4,948	8,796
XDS-193	1.937	1.832	.156	.042	1.857	.046	5,477	9,736
XDS-200	2.000	1.895	.156	.042	1.920	.046	5,655	10,053
XDS-218	2.187	2.082	.156	.042	2.107	.046	6,184	10,993
XDS-225	2.250	2.145	.156	.042	2.170	.046	6,362	11,310
XDS-237	2.375	2.270	.156	.042	2.295	.046	6,715	11,938
XDS-250	2.500	2.390	.156	.042	2.420	.046	7,069	12,566
XDS-275	2.750	2.596	.187	.062	2.626	.068	12,052	19,369
XDS-293	2.937	2.783	.187	.062	2.813	.068	12,871	20,687
XDS-300	3.000	2.846	.187	.062	2.876	.068	13,148	21,130
XDS-312	3.125	2.965	.187	.062	3.000	.068	13,806	22,011
XDS-325	3.250	3.090	.187	.062	3.125	.068	14,358	22,891
XDS-337	3.375	3.215	.187	.062	3.250	.068	14,910	23,772
XDS-350	3.500	3.340	.187	.062	3.375	.068	15,463	24,652
XDS-375	3.750	3.570	.218	.078	3.610	.086	18,555	31,809
XDS-400	4.000	3.820	.218	.078	3.860	.086	19,792	33,929
XDS-425	4.250	4.070	.218	.078	4.110	.086	21,029	36,050
XDS-450	4.500	4.320	.218	.078	4.360	.086	22,266	38,170
XDS-475	4.750	4.560	.218	.078	4.610	.086	23,503	40,291
XDS-500	5.000	4.800	.218	.078	4.860	.086	24,740	42,412
XDS-550	5.500	5.280	.250	.093	5.340	.103	31,102	55,983
XDS-600	6.000	5.775	.250	.093	5.840	.103	33,929	61,073
XDS-650	6.500	6.270	.250	.093	6.340	.103	36,757	66,162
XDS-700	7.000	6.765	.250	.093	6.840	.103	39,584	71,251
XDS-750	7.500	7.245	.281	.109	7.320	.120	47,713	85,750
XDS-800	8.000	7.740	.281	.109	7.820	.120	50,894	91,466

<sup>1</sup> Add suffix "-S02" for 302 stainless steel.

<sup>2</sup> Based on a groove material yield strength of 45,000 psi and a safety factor of 2.

<sup>3</sup> Based on a safety factor of 3.

<sup>4</sup> See pages 132-133 for How to Order.

<sup>5</sup> Square edge wire.