



Hoopster® Retaining Rings

NEW SUPPLEMENT TO SMALLEY'S CATALOG

IDEAL FOR
THIN WALL
CYLINDERS

ENDS FLEX FOR
REMOVAL AND
INSTALLATION WITH
NO SPECIAL TOOLS

LOW
PROFILE

RADIAL
PROJECTION
MINIMAL

SHALLOW
GROOVE DEPTH

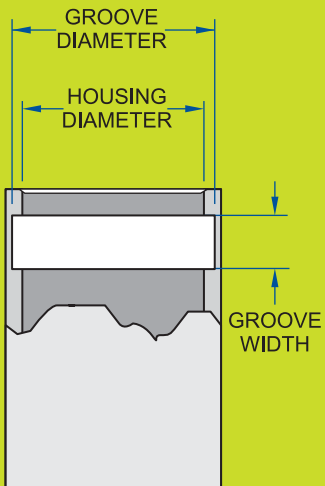
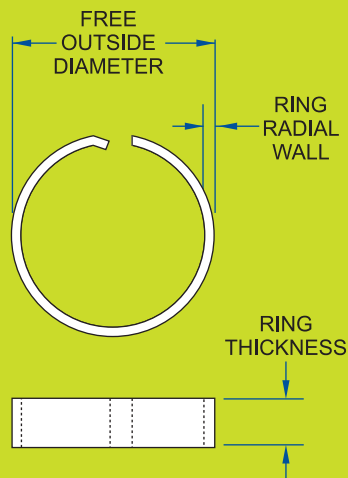
Standard In Carbon And
302 Stainless Steel

No-Tooling-Charges™
For Specials

Coiled From Flat Wire,
Not Stamped

Suitable For Medium
Or Light Loads

HH SERIES



Smalley Part Number ^{1,3}	Housing Diameter	RING			GROOVE		Groove Yield (lb) ²	
		Outside Diameter	Radial Wall	Thickness	Diameter	Width		
HH-37	.375	.400	+0.012/-0.000	.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	+0.015/-0.000	.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	+0.018/-0.000	.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	+0.020/-0.000	.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	+0.024/-0.000	.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	+0.030/-0.000	.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

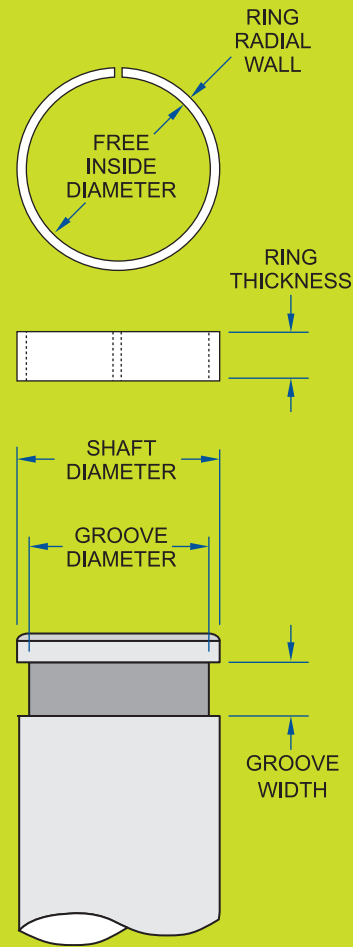
¹ Add suffix "-S02" for 302 stainless steel.

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

³ Internal (HH Series) Hoopster Rings contain a bent-end for removal.

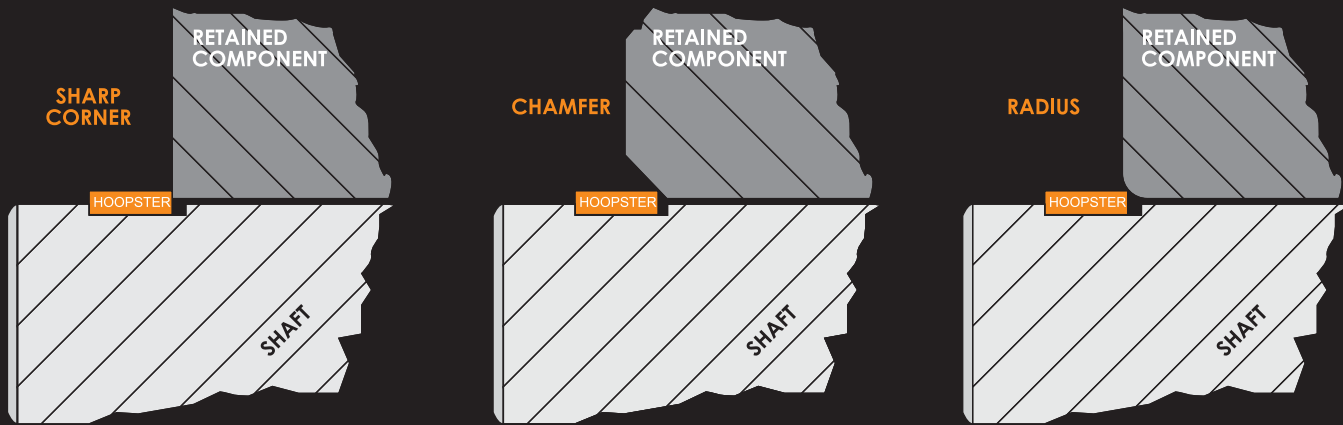
HS SERIES

Smalley Part Number ¹	Shaft Diameter	RING			GROOVE		Groove Yield (lb) ²
		Inside Diameter	Radial Wall	Thickness	Diameter	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



¹ Add suffix "-S02" for 302 stainless steel.

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



RING ABUTMENT

Unlike a conventional Spiral Retaining Ring or Snap Ring, the retained component in a Hoopster® Retaining Ring* assembly may have a corner break. Thrust load is not sacrificed when the retained component has a broken corner because the moment arm is negligible in a Hoopster design.

The 3 sketches above illustrate acceptable abutment practice.

GROOVE DESIGN AND GEOMETRY

Groove deformation is by far the most common design limitation of most retaining rings. Unlike a conventional retaining ring or snap ring that fails by deforming and twisting, the Hoopster retaining ring shows superior strength from its low profile and mechanical advantage over traditional retaining rings under load. With a Hoopster, there is no moment arm that twists the ring causing premature failure as with a conventional retaining ring.

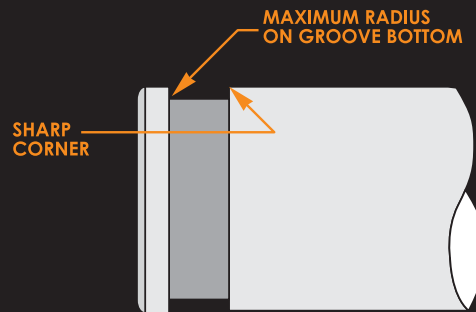
The shallow groove specification of a Hoopster makes the groove wall a critical specification, to ensure the function of the ring. To obtain maximum load capacity from a Hoopster Retaining Ring, it is essential to have sharp corners on the groove. The maximum radius on the groove bottom should be no greater than 10% of the ring's radial wall. Maintaining a sharp corner on the top of the groove is just as critical.

FORMULA:

Maximum Radius on Groove Bottom = .10b

Where:

b = Ring radial wall



THRUST CAPACITY

The shallow groove depth associated with a Hoopster, in combination with the groove material, are the controlling factors in determining thrust capacity. The Hoopster does not twist when loaded so pure thrust load based on the yield strength of the groove material maximizes the Hoopster's load carrying capacity.

FORMULA:

$$P_G = \frac{D d S_y \pi}{K}$$

Where:

- P = Allowable thrust load based on groove deformation (lb)
- D = Shaft or housing diameter (in)
- d = Groove depth (in)
- S_y = Yield strength of groove material (psi)
- K = Safety factor (2 recommended)

TYPICAL GROOVE MATERIAL YIELD STRENGTHS

Hardened Steel 8620	110,000 psi
Cold Drawn Steel 1018	70,000 psi
Hot Rolled Steel 1018	45,000 psi
Aluminum 2017	40,000 psi
Cast Iron	10-40,000 psi