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AMERICAN NATIONAL STANDARD

General Purpose Uniform Cross Section Spiral Retaining Rings

ANSI B27.6-1972

REAFFIRMED 1999

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SECRETARIAT

SOCIETY OF AUTOMOTIVE ENGINEERS
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

PUBLISHED BY

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

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FOREWORD

Formation of Subcommittee 3 was authorized by Standards Committee B27 at its meeting on November 30, 1950. Organization meeting of the Subcommittee was held on October 24, 1951 at which time it was agreed that bearing retainer rings, if included in the standard, would conform with practice of Anti-Friction Bearing Manufacturers Association and that technical development within the Subcommittee would be limited to general purpose retainer rings. Subgroups were appointed to investigate materials, adequacy of the AFBMA bearing retainer ring standard, general purpose and aeronautical ring usage.

One of the subgroups prepared a draft proposal, General Purpose Uniform Section Spiral Retaining Ring, which was circulated to members of Subcommittee 3 on May 8, 1970. The next meeting of the Subcommittee was held on February 4, 1971 at which time changes were made to satisfy comments received as a result of this ballot. It was then agreed to circulate the revised draft proposal to the ANSI B27 Standards Committee. The letter ballot was circulated on August 17, 1971. All who responded balloted affirmative. Several of the affirmative ballots offered editorial type comments. Each comment was carefully reviewed by a subgroup and minor nontechnical changes were made to the document. The Standard was duly approved by sponsors and was submitted to the American National Standards Institute for designation, as an American Standard. This was granted on July 11, 1972.

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AMERICAN NATIONAL STANDARD

GENERAL PURPOSE UNIFORM CROSS SECTION SPIRAL RETAINING RINGS

External Types – 2A01, 2A02
Internal Types – 2B01, 2B02

1.0 INTRODUCTORY NOTES

1.1 Scope

This standard is intended to cover complete general and dimensional data for two series of general purpose uniform cross section spiral retaining rings which may be used with the nominal size shafts and housings listed and in grooves of the recommended dimensions listed.

1.2 Ring Types

1.2.1 *External Rings.* The external retaining rings covered by this standard are designated Type 2A01 Light Duty and Type 2A02 Heavy Duty. Dimensions of rings, grooves and gages applicable to the various shaft sizes are given in Tables 1 and 2, respectively.

1.2.2 *Internal Rings.* The internal retaining rings covered by this standard are designated Type 2B01 Light Duty and Type 2B02 Heavy Duty. Dimensions of rings, grooves and gages applicable to the various housing bores are given in Tables 3 and 4, respectively.

1.3 Applicability

The rings denoted in this standard are intended primarily for use with the shaft, housing, and groove sizes recommended; however, in certain cases these diameters may be altered somewhat to suit the requirements of a particular design. When such changes are made, care should be taken to not alter the shaft or housing size to such an extent that the ring will take enough permanent set to allow a loose fit after the ring has been assembled into the groove. Neither should the groove diameter be altered to the extent to permit the ring to fit loosely.

1.4 Dimensions

All dimensions in this standard are in inches unless otherwise stated.

2.0 GENERAL DATA

2.1 Material

2.1.1 *Carbon Spring Steel.* Retaining rings made from carbon spring steel shall conform to the chemical composition of SAE 1070 to 1090 or AISI 1070 to 1090 or equivalent and have the following physical properties:

Material Thickness (minimum)	Rockwell Scale	Hardness	Tensile Strength (psi)
0.0067	15N	85-90	269,000-299,000
0.0142	30N	68-73	255,000-285,000
0.0213	A	72-78	221,000-251,000
0.0433	C	43-49	211,000-236,000

2.1.2 *Corrosion Resistant Steel.* Retaining rings made from corrosion resistant steel shall conform to the chemical composition of SAE 30302 or equivalent and have the following physical properties:

Material Thickness (minimum)	Rockwell Scale	Hardness	Tensile Strength (psi)
0.008	15N	83.0-86.0	210,000-250,000
0.016	30N	64.0-69.5	210,000-250,000
0.023	A	72.0-74.9	200,000-230,000
0.048	C	39.8-48.5	185,000-235,000
0.062	C	38.0-47.0	175,000-225,000

2.2 Finish

Unless otherwise specified, rings shall be furnished with a natural (as processed) finish, unplated or uncoated. Where corrosion preventative treatment is required, rings shall be plated or coated as agreed upon between the manufacturer and the purchaser. However, where plated or coated rings are subject to hydrogen embrittlement they shall be baked for three hours at 375°F, or other suitable times and temperatures,

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as soon as possible after the plating or coating operation to obviate such embrittlement.

2.3 Crimp

Unless otherwise specified by the purchaser, the following types of rings and sizes shall be uncrimped:

Ring Type	Nominal Ring Size
2A01 Light Duty External	0.500–1.500
2A02 Heavy Duty External	0.469–0.688
2B01 Light Duty Internal	0.500–1.500
2B02 Heavy Duty Internal	0.469–0.750

All other rings shall be crimped. See Fig. 2 for crimp illustration.

2.4 Removal Notches or Slots

Unless otherwise specified in the contract or order, the rings shall have removal notches or slots as follows:

Ring Type	Nominal Ring Size	Removal Provision
2A01 Light Duty External	0.500– 2.750	Notch
	2.813–11.000	Slot
2A02 Heavy Duty External	All	Notch
2B01 Light Duty Internal	0.500– 2.750	Notch
	2.813–11.000	Slot
2B02 Heavy Duty Internal	All	Notch

2.5 Dish

The dish shall be considered the height difference indicated in Figure 1 and shall not exceed the values shown in the following table:

Radial Wall	Maximum Allowable Dish
0–0.039	0.001
0.040–0.069	0.002
0.070–0.099	0.003
0.100–0.129	0.004
0.130–0.159	0.005
0.160–0.194	0.006
0.195–0.224	0.007
0.225–0.259	0.008
0.260–0.294	0.009
0.295–0.339	0.010
0.340–0.394	0.011
0.395–0.474	0.012
0.475–0.649	0.013
0.650–1.000	0.014

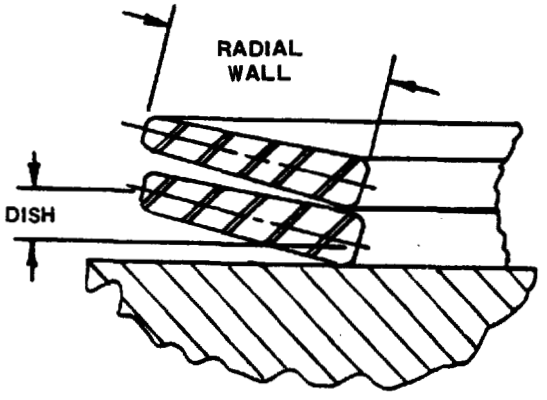


FIGURE 1

2.6 Misalignment

The leaves of the ring shall lie above each other as specified below and illustrated in Figure 2:

Nominal Ring Size	Maximum Misalignment
0.375–0.984	0.010
1.000–1.969	0.020
2.000–5.905	0.045
6.000 and above	0.070

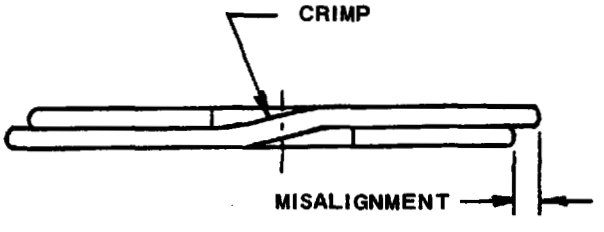


FIGURE 2

2.7 Lateral Deformation

Lateral deformation may be cutoff deformation or lateral kink as illustrated. Lateral kink usually exists over a short section of the ring circumference and is not the same as helix which is a uniform slope along the entire 360 degrees. Lateral deformation shall be inspected by placing the ring between parallel hardened and ground steel platens equipped with a deflection gage graduated in thousandths so located that readings are obtained at approximately the center of

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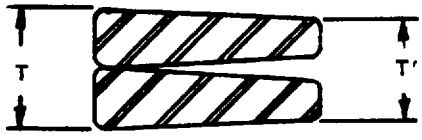
the platens. The specimen shall then be compressed under a ten (10) pound load and the distance between the platens determined. The ring shall be acceptable if this distance does not exceed the minimum recommended groove width "F". A comparatively simple inspection fixture is depicted in Figure 4.

2.8 Ring Section Edge Radius (R)

The edges of the ring material shall be rounded and the radius shall not be less than T/8 nor more than T/4 where T equals the ring thickness. Ring thickness shall be measured under 10 pounds load as illustrated in Figure 4 and described in Paragraph 2.7 but shall be measured in a location other than at the ring ends or gap.

2.9 Parallelism (P)

The side outer surfaces of the rings in the free state shall be parallel to each other within one half the total tolerance of the ring section thickness as illustrated in Figure 3.



$$P_{max} = T - T' = \frac{\text{T total tolerance}}{2}$$

FIGURE 3

2.10 Total Free Height (S)

The maximum total free height, S_{max}, (reference Column S and illustrations in Tables 1 through 4) shall not exceed the sum of the maximum section thickness T_{max} plus 0.375 × nominal section thickness T_{nom}:

$$S_{max} = T_{max} + 0.375\ T_{nom}$$

2.11 Workmanship

Retaining rings shall be free from burrs, rust, pit marks, cracks and all other defects that might affect their serviceability.

2.12 Performance Test

The suitability of the retaining rings with regard to uniformity of temper and section shall be determined by the rings being capable of successfully passing the following described tests. External rings after having been expanded to pass over external gage diameter "E" shall not in the free state be entered by external gage diameter "D" when the axes of the ring and gage are parallel. Internal rings after having been compressed to fit into internal gage diameter "E" shall not in the free state enter internal gage diameter "D" when the axes of the ring and gage are parallel.

2.13 Ring Gages

2.13.1 *External Ring Gage Diameter E.* The external ring gage diameter E is equal to the nominal shaft size, B_{nom}:

$$E = B_{nom}$$

2.13.2 *External Ring Gage Diameter D.* The external ring gage diameter D is equal to the minimum recommended groove diameter, C_{min}, minus 0.005 times the nominal shaft diameter, B_{nom}:

$$D = C_{min} - 0.005\ B_{nom}$$

2.13.3 *Internal Ring Gage Diameter E.* The internal ring gage diameter E is equal to the nominal housing size, B_{nom}:

$$E = B_{nom}$$

2.13.4 *Internal Ring Gage Diameter D.* The internal ring gage diameter D is equal to the maximum recommended groove diameter, C_{max}, plus 0.005 times the nominal housing diameter, B_{nom}:

$$D = C_{max} + 0.005\ B_{nom}$$

2.14 Designation

Nominal ring sizes are intended for use on corresponding nominal shaft sizes and housing bores. Where specifying these retaining rings on drawings, parts lists, purchase orders, etc., it is recommended the following data be included in the designation and appear in the sequence shown: Product name (noun first), including the ANSI type designation and series ; nominal ring size; material; and protective finish, if required. See examples below:

Ring Type 2A01 Light Duty External Retaining, 1.250, Steel, Cadmium Plated.

Ring Type 2B02 Heavy Duty Internal Retaining, 2.750, Corrosion Resistant Steel

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3.0 ALTERNATE GROOVE DESIGN

In applications where shafts are subjected to critical bending loads or fatigue, it is recommended that the alternate groove design specified in Figure 5 be used to minimize stress concentration.

4.0 ASSEMBLY PRECAUTIONS

Care should be exercised not to overexpand external rings or overcontract internal rings upon installation for this may lead to failure of the assembly. Rings which are radically loose in grooves should not be used.

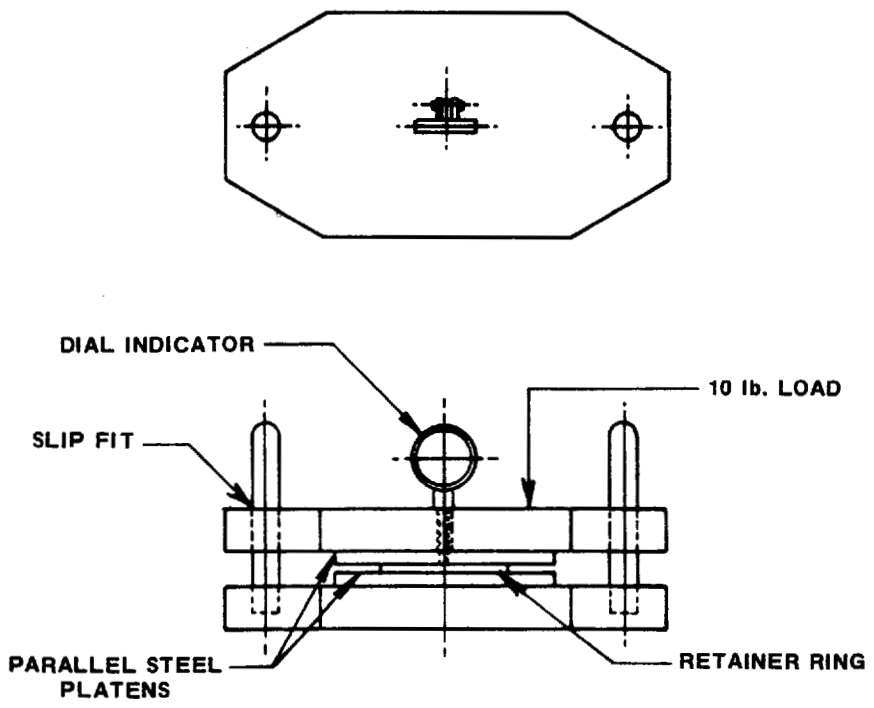


FIGURE 4 INSPECTION FIXTURE

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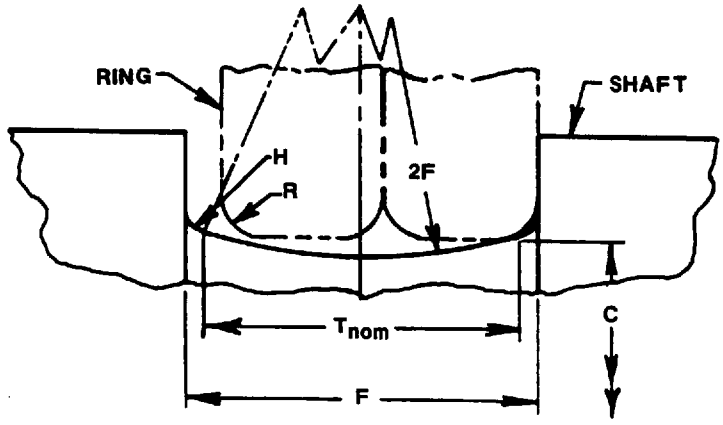


FIGURE 5 ALTERNATE GROOVE DESIGN

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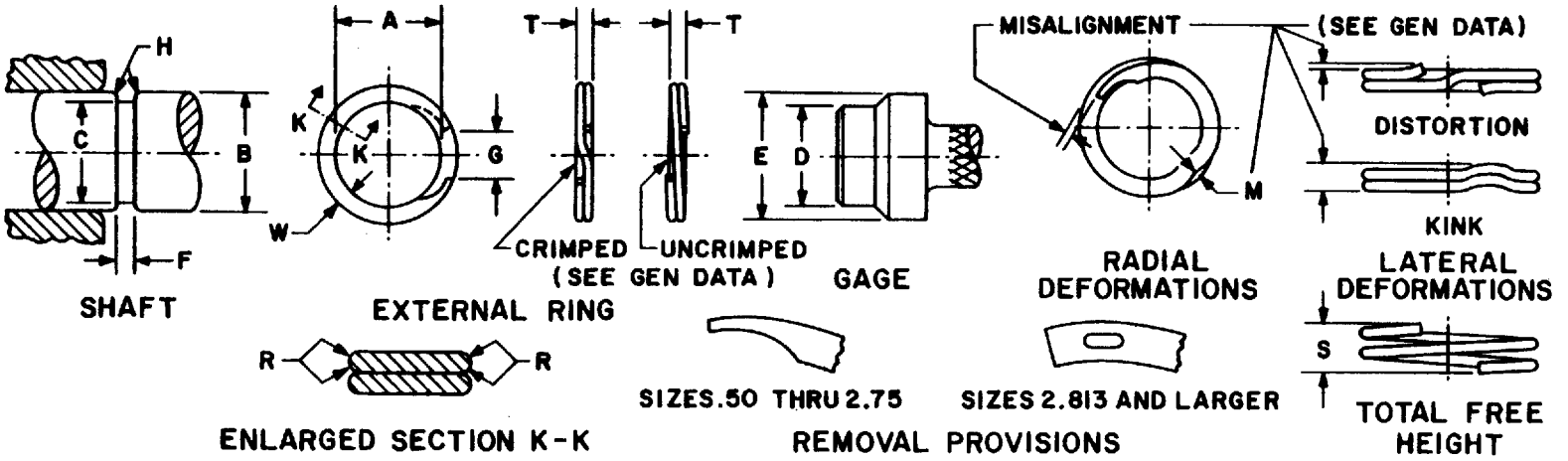


Table 1. Dimensions of Type 2A01 Light Duty External Retaining Rings, Grooves, and Gages

Shaft						Ring												Gage	
B	C		F		H	A		T		W		G		R		M	S	E	D
Nominal Size	Groove Dia.		Groove Width		Groove Radius	Free Inside Diameter		Ring Thickness		Section Width		Free Gap		Radius		Radial Deformation	Total Free Height	Dia.	Dia.
	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	+ 0.001 − 0.000	+ 0.000 − 0.001
0.500	0.476	0.472	0.033	0.030	0.005	0.467	0.454	0.027	0.023	0.048	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.500	0.470
0.531	0.507	0.503	0.033	0.030	0.005	0.498	0.485	0.027	0.023	0.048	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.531	0.506
0.551	0.527	0.523	0.033	0.030	0.005	0.518	0.505	0.027	0.023	0.048	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.551	0.520
0.562	0.538	0.534	0.033	0.030	0.005	0.529	0.516	0.027	0.023	0.048	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.562	0.531
0.594	0.572	0.566	0.033	0.030	0.005	0.561	0.548	0.027	0.023	0.048	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.594	0.563
0.625	0.597	0.591	0.033	0.030	0.005	0.585	0.572	0.027	0.023	0.058	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.625	0.588
0.656	0.628	0.622	0.033	0.030	0.005	0.617	0.604	0.027	0.023	0.058	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.656	0.619
0.669	0.641	0.635	0.033	0.030	0.005	0.629	0.616	0.027	0.023	0.058	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.669	0.632
0.687	0.659	0.653	0.033	0.030	0.005	0.647	0.634	0.027	0.023	0.058	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.687	0.650
0.718	0.690	0.684	0.033	0.030	0.005	0.679	0.666	0.027	0.023	0.058	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.718	0.681
0.750	0.722	0.716	0.039	0.036	0.005	0.710	0.697	0.033	0.029	0.068	0.060	0.344	0.156	0.008	0.004	0.010	0.044	0.750	0.712
0.781	0.753	0.747	0.039	0.036	0.005	0.741	0.728	0.033	0.029	0.068	0.060	0.344	0.156	0.008	0.004	0.010	0.044	0.781	0.743
0.812	0.784	0.778	0.039	0.036	0.005	0.771	0.758	0.033	0.029	0.068	0.060	0.344	0.156	0.008	0.004	0.010	0.044	0.812	0.774
0.843	0.815	0.809	0.039	0.036	0.005	0.803	0.790	0.033	0.029	0.068	0.060	0.344	0.156	0.008	0.004	0.010	0.044	0.843	0.805
0.875	0.841	0.835	0.039	0.036	0.005	0.828	0.815	0.033	0.029	0.068	0.060	0.344	0.156	0.008	0.004	0.010	0.044	0.875	0.831
0.906	0.872	0.866	0.039	0.036	0.005	0.860	0.847	0.033	0.029	0.068	0.060	0.344	0.156	0.008	0.004	0.010	0.044	0.906	0.862
0.937	0.903	0.897	0.039	0.036	0.005	0.889	0.876	0.033	0.029	0.068	0.060	0.375	0.187	0.008	0.004	0.010	0.044	0.937	0.892
0.968	0.928	0.922	0.045	0.042	0.005	0.916	0.903	0.039	0.035	0.078	0.070	0.375	0.187	0.009	0.005	0.010	0.053	0.968	0.917
0.984	0.944	0.938	0.045	0.042	0.005	0.930	0.917	0.039	0.035	0.078	0.070	0.375	0.187	0.009	0.005	0.010	0.053	0.984	0.935
1.000	0.960	0.954	0.045	0.042	0.005	0.946	0.933	0.039	0.035	0.078	0.070	0.375	0.187	0.009	0.005	0.010	0.053	1.000	0.949

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Table 1. Dimensions of Type 2A01 Light Duty External Retaining Rings, Grooves, and Gages (Continued)

B	C	F	H	A	T	W	G		R	M	S	E	D
1.023	0.983	0.045	0.042	0.010	0.968	0.955	0.039	0.035	0.078	0.070	0.375	0.187	0.009	0.005	0.010	0.053	1.023	0.972
1.031	0.991	0.045	0.042	0.010	0.978	0.965	0.039	0.035	0.078	0.070	0.375	0.187	0.009	0.005	0.010	0.053	1.031	0.980
1.062	1.024	0.045	0.042	0.010	1.007	0.992	0.039	0.035	0.078	0.070	0.375	0.187	0.009	0.005	0.010	0.053	1.062	1.011
1.093	1.055	0.045	0.042	0.010	1.040	1.025	0.039	0.035	0.078	0.070	0.375	0.187	0.009	0.005	0.010	0.053	1.093	1.042
1.125	1.087	0.045	0.042	0.010	1.070	1.055	0.039	0.035	0.078	0.070	0.375	0.187	0.009	0.005	0.010	0.053	1.125	1.073
1.156	1.118	0.045	0.042	0.010	1.102	1.087	0.039	0.035	0.078	0.070	0.375	0.187	0.009	0.005	0.010	0.053	1.156	1.104
1.188	1.144	0.052	0.048	0.010	1.127	1.112	0.045	0.041	0.088	0.080	0.375	0.187	0.011	0.006	0.010	0.061	1.188	1.130
1.218	1.174	0.052	0.048	0.010	1.159	1.144	0.045	0.041	0.088	0.080	0.375	0.187	0.011	0.006	0.010	0.061	1.218	1.160
1.250	1.206	0.052	0.048	0.010	1.188	1.173	0.045	0.041	0.088	0.080	0.375	0.187	0.011	0.006	0.010	0.061	1.250	1.192
1.281	1.237	0.052	0.048	0.010	1.221	1.206	0.045	0.041	0.088	0.080	0.375	0.187	0.011	0.006	0.010	0.061	1.281	1.223
1.312	1.268	0.052	0.048	0.010	1.251	1.236	0.045	0.041	0.098	0.090	0.375	0.187	0.011	0.006	0.010	0.061	1.312	1.254
1.343	1.299	0.052	0.048	0.010	1.282	1.267	0.045	0.041	0.098	0.090	0.438	0.250	0.011	0.006	0.010	0.061	1.343	1.284
1.375	1.327	0.052	0.048	0.010	1.308	1.293	0.045	0.041	0.098	0.090	0.438	0.250	0.011	0.006	0.010	0.061	1.375	1.312
1.406	1.358	0.052	0.048	0.010	1.340	1.325	0.045	0.041	0.098	0.090	0.438	0.250	0.011	0.006	0.010	0.061	1.406	1.343
1.437	1.389	0.052	0.048	0.010	1.370	1.355	0.045	0.041	0.098	0.090	0.438	0.250	0.011	0.006	0.010	0.061	1.437	1.374
1.468	1.420	0.052	0.048	0.010	1.402	1.387	0.045	0.041	0.098	0.090	0.438	0.250	0.011	0.006	0.010	0.061	1.468	1.405
1.500	1.452	0.052	0.048	0.010	1.433	1.418	0.045	0.041	0.098	0.090	0.438	0.250	0.011	0.006	0.010	0.061	1.500	1.437
1.562	1.512	0.060	0.056	0.010	1.490	1.470	0.052	0.046	0.111	0.103	0.438	0.250	0.012	0.006	0.010	0.070	1.562	1.494
1.575	1.525	0.060	0.056	0.010	1.503	1.483	0.052	0.046	0.111	0.103	0.438	0.250	0.012	0.006	0.010	0.070	1.575	1.507
1.625	1.571	0.060	0.056	0.010	1.549	1.529	0.052	0.046	0.111	0.103	0.438	0.250	0.012	0.006	0.010	0.070	1.625	1.553
1.687	1.633	0.060	0.056	0.010	1.610	1.590	0.052	0.046	0.121	0.113	0.438	0.250	0.012	0.006	0.010	0.070	1.687	1.615
1.750	1.696	0.060	0.056	0.010	1.673	1.653	0.052	0.046	0.121	0.113	0.438	0.250	0.012	0.006	0.010	0.070	1.750	1.677
1.771	1.713	0.060	0.056	0.010	1.690	1.670	0.052	0.046	0.121	0.113	0.438	0.250	0.012	0.006	0.010	0.070	1.771	1.694
1.813	1.754	0.060	0.056	0.010	1.730	1.710	0.052	0.046	0.121	0.113	0.438	0.250	0.012	0.006	0.010	0.070	1.813	1.735
1.875	1.813	0.060	0.056	0.010	1.789	1.769	0.052	0.046	0.131	0.123	0.438	0.250	0.012	0.006	0.010	0.070	1.875	1.794
1.938	1.866	0.060	0.056	0.010	1.844	1.824	0.052	0.046	0.131	0.123	0.438	0.250	0.012	0.006	0.010	0.070	1.938	1.846
1.969	1.907	0.060	0.056	0.010	1.882	1.862	0.052	0.046	0.131	0.123	0.500	0.312	0.012	0.006	0.010	0.070	1.969	1.887
2.000	1.934	0.060	0.056	0.010	1.909	1.889	0.052	0.046	0.131	0.123	0.500	0.312	0.012	0.006	0.020	0.070	2.008	1.914
2.062	1.998	0.060	0.056	0.010	1.971	1.951	0.052	0.046	0.131	0.123	0.500	0.312	0.012	0.006	0.020	0.070	2.062	1.976
2.125	2.057	0.060	0.056	0.010	2.029	2.009	0.052	0.046	0.131	0.123	0.500	0.312	0.012	0.006	0.020	0.070	2.125	2.034
2.156	2.088	0.060	0.056	0.010	2.060	2.035	0.052	0.046	0.141	0.133	0.500	0.312	0.012	0.006	0.020	0.070	2.156	2.065
2.165	2.097	0.060	0.056	0.010	2.070	2.045	0.052	0.046	0.141	0.133	0.500	0.312	0.012	0.006	0.020	0.070	2.165	2.074
2.188	2.119	0.060	0.056	0.010	2.092	2.067	0.052	0.046	0.141	0.133	0.500	0.312	0.012	0.006	0.020	0.070	2.188	2.096
2.250	2.182	0.060	0.056	0.010	2.153	2.128	0.052	0.046	0.141	0.133	0.500	0.312	0.012	0.006	0.020	0.070	2.250	2.159
2.312	2.240	0.060	0.056	0.010	2.211	2.186	0.052	0.046	0.141	0.133	0.500	0.312	0.012	0.006	0.020	0.070	2.312	2.217
2.362	2.290	0.060	0.056	0.010	2.261	2.236	0.052	0.046	0.141	0.133	0.500	0.312	0.012	0.006	0.020	0.070	2.362	2.266
2.375	2.303	0.060	0.056	0.010	2.273	2.248	0.052	0.046	0.141	0.133	0.500	0.312	0.012	0.006	0.020	0.070	2.375	2.279
2.437	2.361	0.060	0.056	0.010	2.331	2.306	0.052	0.046	0.151	0.143	0.500	0.312	0.012	0.006	0.020	0.070	2.437	2.337
2.500	2.424	0.060	0.056	0.010	2.394	2.369	0.052	0.046	0.151	0.143	0.500	0.312	0.012	0.006	0.020	0.070	2.500	2.400
2.559	2.479	0.060	0.056	0.010	2.449	2.424	0.052	0.046	0.151	0.143	0.500	0.312	0.012	0.006	0.020	0.070	2.559	2.454

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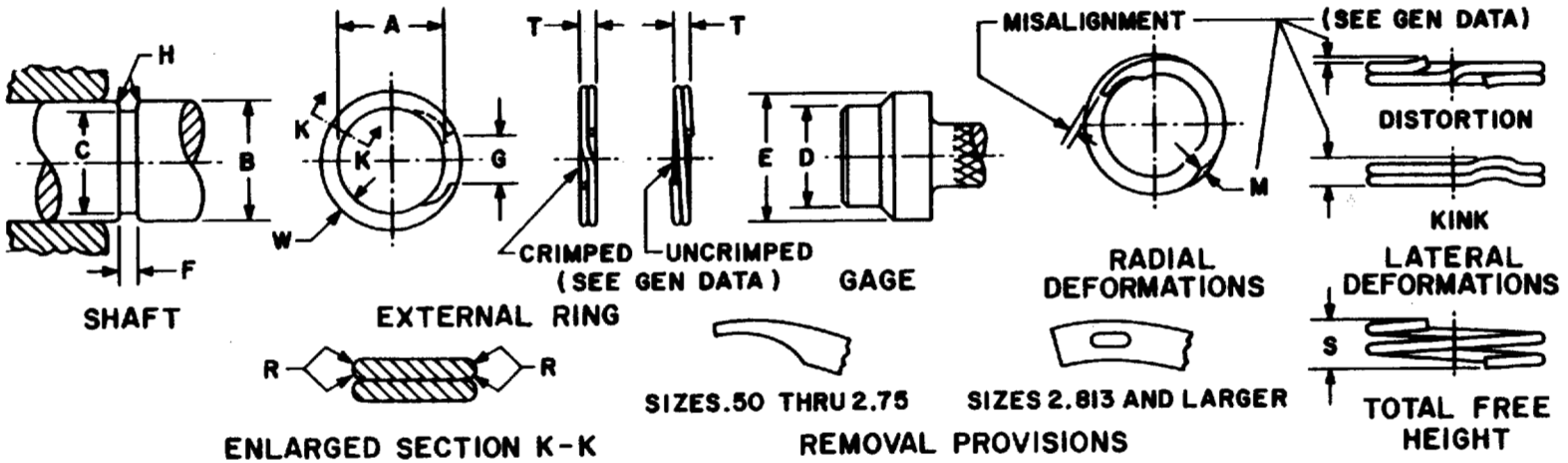


Table 1. Dimensions of Type 2A01 Light Duty External Retaining Rings, Grooves, and Gages (Continued)

Shaft						Ring												Gage	
B	C		F		H	A		T		W		G		R		M	S	E	D
Nominal Size	Groove Dia.		Groove Width		Groove Radius	Free Inside Diameter		Ring Thickness		Section Width		Free Gap		Radius		Radial Deformation	Total Free Height	Dia.	Dia.
	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	+ 0.001 − 0.000	+ 0.000 − 0.001
2.562	2.482	2.470	0.060	0.056	0.010	2.452	2.427	0.052	0.046	0.151	0.143	0.532	0.344	0.012	0.006	0.020	0.070	2.562	2.457
2.625	2.545	2.533	0.060	0.056	0.010	2.514	2.489	0.052	0.046	0.151	0.143	0.532	0.344	0.012	0.006	0.020	0.070	2.625	2.520
2.688	2.603	2.591	0.060	0.056	0.010	2.572	2.547	0.052	0.046	0.161	0.153	0.532	0.344	0.012	0.006	0.020	0.070	2.688	2.578
2.750	2.666	2.654	0.060	0.056	0.010	2.635	2.605	0.052	0.046	0.161	0.153	0.532	0.344	0.012	0.006	0.020	0.070	2.750	2.640
2.813	2.728	2.716	0.060	0.056	0.010	2.696	2.666	0.052	0.046	0.172	0.162	0.532	0.344	0.012	0.066	0.020	0.070	2.813	2.702
2.875	2.787	2.775	0.060	0.056	0.010	2.755	2.725	0.052	0.046	0.172	0.162	0.532	0.344	0.012	0.006	0.020	0.070	2.875	2.761
2.937	2.849	2.837	0.060	0.056	0.010	2.817	2.787	0.052	0.046	0.172	0.162	0.532	0.344	0.012	0.006	0.020	0.070	2.937	2.822
2.952	2.864	2.852	0.060	0.056	0.010	2.831	2.801	0.052	0.046	0.172	0.162	0.532	0.344	0.012	0.006	0.020	0.070	2.952	2.837
3.000	2.910	2.898	0.073	0.068	0.010	2.877	2.847	0.064	0.058	0.172	0.162	0.532	0.344	0.015	0.008	0.020	0.087	3.000	2.883
3.062	2.972	2.960	0.073	0.068	0.010	2.938	2.908	0.064	0.058	0.172	0.162	0.532	0.344	0.015	0.008	0.020	0.087	3.062	2.945
3.125	3.033	3.021	0.073	0.068	0.010	3.000	2.970	0.064	0.058	0.182	0.172	0.532	0.344	0.015	0.008	0.020	0.087	3.125	3.005
3.149	3.057	3.045	0.073	0.068	0.010	3.023	2.993	0.064	0.058	0.182	0.172	0.532	0.344	0.015	0.008	0.020	0.087	3.149	3.029
3.187	3.095	3.083	0.073	0.068	0.010	3.061	3.031	0.064	0.058	0.182	0.172	0.532	0.344	0.015	0.008	0.020	0.087	3.187	3.067
3.250	3.156	3.144	0.073	0.068	0.010	3.121	3.091	0.064	0.058	0.182	0.172	0.532	0.344	0.015	0.008	0.020	0.087	3.250	3.128
3.312	3.214	3.202	0.073	0.068	0.010	3.180	3.150	0.064	0.058	0.192	0.182	0.532	0.344	0.015	0.008	0.020	0.087	3.312	3.186
3.343	3.245	3.233	0.073	0.068	0.010	3.210	3.180	0.064	0.058	0.192	0.182	0.594	0.406	0.015	0.008	0.020	0.087	3.343	3.216
3.375	3.277	3.265	0.073	0.068	0.010	3.242	3.212	0.064	0.058	0.192	0.182	0.594	0.406	0.015	0.008	0.020	0.087	3.375	3.248
3.437	3.337	3.325	0.073	0.068	0.010	3.301	3.271	0.064	0.058	0.192	0.182	0.594	0.406	0.015	0.008	0.020	0.087	3.437	3.308
3.500	3.400	3.388	0.073	0.068	0.010	3.363	3.323	0.064	0.058	0.192	0.182	0.594	0.406	0.015	0.008	0.020	0.087	3.500	3.371
3.543	3.439	3.427	0.073	0.068	0.010	3.402	3.362	0.064	0.058	0.202	0.192	0.594	0.406	0.015	0.008	0.020	0.087	3.543	3.409

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Table 1. Dimensions of Type 2A01 Light Duty External Retaining Rings, Grooves, and Gages (Continued)

B	C	F	H	A	T	W	G	R	M	S	E	D
3.562	3.458	0.073	0.010	3.422	0.064	0.058	0.202	0.192	0.594	0.406	0.015	0.008	0.020	0.087	3.562	3.428
3.625	3.521	0.073	0.010	3.483	0.064	0.058	0.202	0.192	0.594	0.406	0.015	0.008	0.020	0.087	3.625	3.491
3.687	3.581	0.073	0.010	3.543	0.064	0.058	0.202	0.192	0.594	0.406	0.015	0.008	0.020	0.087	3.687	3.551
3.740	3.634	0.073	0.010	3.597	0.064	0.058	0.202	0.192	0.594	0.406	0.015	0.008	0.020	0.087	3.740	3.603
3.750	3.644	0.073	0.010	3.606	0.064	0.058	0.202	0.192	0.594	0.406	0.015	0.008	0.020	0.087	3.750	3.613
3.812	3.706	0.073	0.010	3.668	0.064	0.058	0.202	0.192	0.594	0.406	0.015	0.008	0.020	0.087	3.812	3.675
3.875	3.763	0.073	0.010	3.724	0.064	0.058	0.212	0.202	0.594	0.406	0.015	0.008	0.020	0.087	3.875	3.732
3.938	3.826	0.073	0.010	3.784	0.064	0.058	0.212	0.202	0.594	0.406	0.015	0.008	0.020	0.087	3.938	3.794
4.000	3.882	0.073	0.010	3.842	0.064	0.058	0.222	0.212	0.594	0.406	0.015	0.008	0.020	0.087	4.000	3.850
4.063	3.945	0.073	0.010	3.906	0.064	0.058	0.222	0.212	0.594	0.406	0.015	0.008	0.020	0.087	4.063	3.913
4.125	4.006	0.073	0.010	3.967	0.064	0.058	0.222	0.212	0.656	0.468	0.015	0.008	0.020	0.087	4.125	3.968
4.134	4.016	0.073	0.010	3.975	0.064	0.058	0.222	0.212	0.656	0.468	0.015	0.008	0.020	0.087	4.134	3.983
4.188	4.064	0.073	0.010	4.030	0.064	0.058	0.222	0.212	0.656	0.468	0.015	0.008	0.020	0.087	4.188	4.031
4.250	4.126	0.073	0.010	4.084	0.064	0.058	0.232	0.222	0.656	0.468	0.015	0.008	0.020	0.087	4.250	4.093
4.312	4.188	0.073	0.010	4.147	0.064	0.058	0.232	0.222	0.656	0.468	0.015	0.008	0.020	0.087	4.312	4.155
4.331	4.206	0.073	0.010	4.164	0.064	0.058	0.232	0.222	0.656	0.468	0.015	0.008	0.020	0.087	4.331	4.172
4.375	4.251	0.073	0.010	4.208	0.064	0.058	0.232	0.222	0.656	0.468	0.015	0.008	0.020	0.087	4.375	4.217
4.437	4.313	0.073	0.010	4.271	0.064	0.058	0.232	0.222	0.656	0.468	0.015	0.008	0.020	0.087	4.437	4.279
4.500	4.370	0.073	0.010	4.326	0.064	0.058	0.242	0.233	0.656	0.468	0.015	0.008	0.020	0.087	4.500	4.336
4.562	4.428	0.084	0.010	4.384	0.076	0.068	0.254	0.244	0.656	0.468	0.018	0.009	0.020	0.090	4.562	4.393
4.625	4.491	0.084	0.010	4.447	0.076	0.068	0.254	0.244	0.656	0.468	0.018	0.009	0.020	0.090	4.625	4.456
4.687	4.553	0.084	0.010	4.508	0.076	0.068	0.254	0.244	0.656	0.468	0.018	0.009	0.020	0.090	4.687	4.518
4.724	4.590	0.084	0.010	4.546	0.076	0.068	0.254	0.244	0.656	0.468	0.018	0.009	0.020	0.090	4.724	4.554
4.750	4.616	0.084	0.010	4.571	0.076	0.068	0.254	0.244	0.656	0.468	0.018	0.009	0.020	0.090	4.750	4.580
4.812	4.678	0.084	0.010	4.633	0.076	0.068	0.254	0.244	0.656	0.468	0.018	0.009	0.020	0.090	4.812	4.642
4.875	4.741	0.084	0.010	4.695	0.076	0.068	0.254	0.244	0.656	0.468	0.018	0.009	0.020	0.090	4.875	4.705
4.937	4.803	0.084	0.010	4.757	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	4.937	4.766
5.000	4.862	0.084	0.010	4.820	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.000	4.825
5.118	4.980	0.084	0.010	4.934	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.118	4.946
5.125	4.987	0.084	0.010	4.939	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.125	4.949
5.250	5.114	0.084	0.010	5.064	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.250	5.074
5.375	5.235	0.084	0.010	5.187	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.375	5.194
5.500	5.360	0.084	0.010	5.308	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.500	5.319
5.511	5.371	0.084	0.010	5.320	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.511	5.330
5.625	5.485	0.084	0.010	5.438	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.625	5.443
5.750	5.604	0.084	0.010	5.550	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.750	5.561
5.875	5.729	0.084	0.010	5.674	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.875	5.686
5.905	5.759	0.084	0.010	5.705	0.076	0.068	0.254	0.244	0.719	0.531	0.018	0.009	0.020	0.090	5.905	5.716
6.000	5.854	0.084	0.010	5.798	0.076	0.068	0.254	0.244	0.750	0.500	0.018	0.009	0.020	0.090	6.000	5.810
6.125	5.961	0.100	0.094	0.010	5.903	5.853	0.090	0.082	0.316	0.304	0.750	0.500	0.021	0.011	0.020	0.122	6.125	5.914

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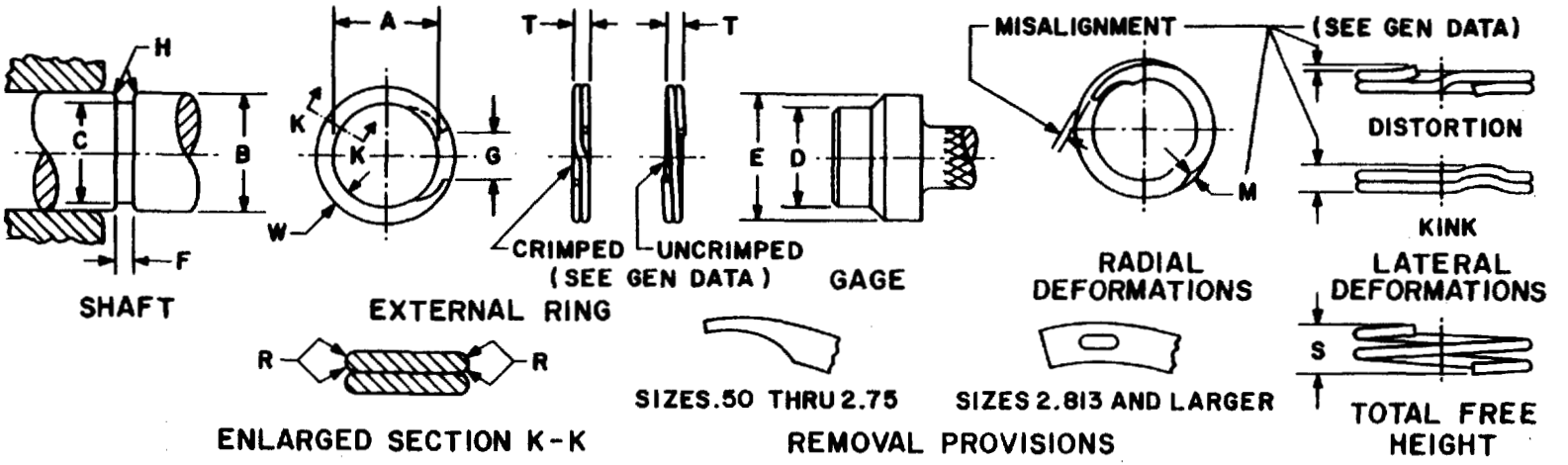


Table 1. Dimensions of Type 2A01 Light Duty External Retaining Rings, Grooves, and Gages (Continued)

Shaft						Ring												Gage	
B	C		F		H	A		T		W		G		R		M	S	E	D
Nominal Size	Groove Dia.		Groove Width		Groove Radius	Free Inside Diameter		Ring Thickness		Section Width		Free Gap		Radius		Radial Deformation	Total Free Height	Dia.	Dia.
	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	+0.001 −0.000	+ 0.000 − 0.001
6.250	6.086	6.070	0.100	0.094	0.010	6.026	5.966	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	6.250	6.039
6.299	6.135	6.119	0.100	0.094	0.010	6.076	6.016	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	6.299	6.088
6.375	6.211	6.195	0.100	0.094	0.010	6.152	6.092	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	6.375	6.163
6.500	6.336	6.320	0.100	0.094	0.010	6.274	6.214	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	6.500	6.288
6.625	6.451	6.435	0.100	0.094	0.010	6.390	6.330	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	6.625	6.402
6.750	6.576	6.560	0.100	0.094	0.010	6.513	6.453	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	6.750	6.526
6.875	6.701	6.685	0.100	0.094	0.010	6.638	6.578	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	6.875	6.651
7.000	6.826	6.810	0.100	0.094	0.010	6.761	6.701	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	7.000	6.775
7.125	6.941	6.925	0.100	0.094	0.010	6.877	6.817	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	7.125	6.889
7.250	7.066	7.050	0.100	0.094	0.010	6.999	6.939	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	7.250	7.014
7.375	7.191	7.175	0.100	0.094	0.010	7.125	7.065	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	7.375	7.138
7.500	7.316	7.300	0.100	0.094	0.010	7.250	7.180	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	7.500	7.263
7.625	7.431	7.415	0.100	0.094	0.010	7.363	7.293	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	7.625	7.377
7.750	7.556	7.540	0.100	0.094	0.010	7.486	7.416	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	7.750	7.501
7.875	7.681	7.665	0.100	0.094	0.010	7.611	7.541	0.090	0.082	0.316	0.304	0.875	0.625	0.021	0.011	0.020	0.122	7.875	7.626
8.000	7.806	7.790	0.100	0.094	0.010	7.734	7.664	0.090	0.082	0.316	0.304	1.125	0.875	0.021	0.011	0.020	0.122	8.000	7.750
8.250	8.046	8.030	0.100	0.094	0.010	7.972	7.902	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	8.250	7.989
8.500	8.296	8.280	0.100	0.094	0.010	8.220	8.150	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	8.500	8.238
8.750	8.536	8.520	0.100	0.094	0.010	8.459	8.389	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	8.750	8.476
9.000	8.786	8.770	0.100	0.094	0.010	8.707	8.637	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	9.000	8.725

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Table 1. Dimensions of Type 2A01 Light Duty External Retaining Rings, Grooves, and Gages (Continued)

B	C		F		H	A		T		W		G		R		M	S	E	D
9.250	9.026	9.010	0.100	0.094	0.010	8.945	8.875	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	9.250	8.964
9.500	9.276	9.260	0.100	0.094	0.010	9.194	9.124	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	9.500	9.213
9.750	9.516	9.500	0.100	0.094	0.010	9.432	9.362	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	9.750	9.451
10.000	9.766	9.750	0.100	0.094	0.010	9.680	9.610	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	10.000	9.700
10.250	10.006	9.990	0.100	0.094	0.010	9.918	9.848	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	10.250	9.939
10.500	10.256	10.240	0.100	0.094	0.010	10.166	10.096	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	10.500	10.188
10.750	10.496	10.480	0.100	0.094	0.010	10.405	10.335	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	10.750	10.426
11.000	10.746	10.730	0.100	0.094	0.010	10.653	10.583	0.090	0.082	0.379	0.367	1.125	0.875	0.021	0.011	0.020	0.122	11.000	10.675

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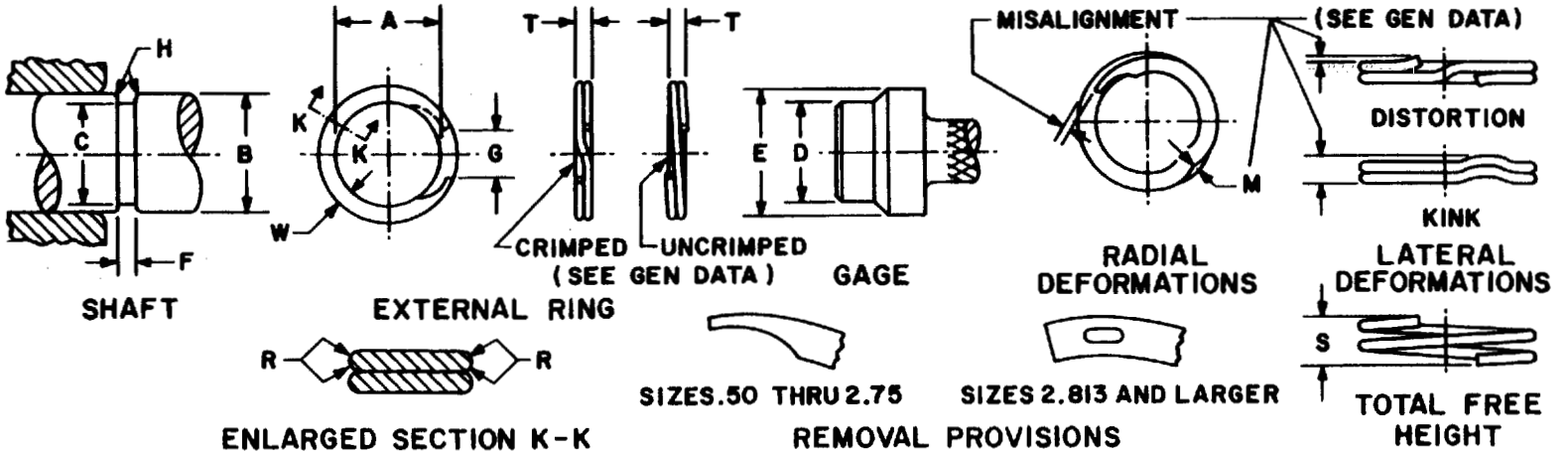


Table 2. Dimensions of Type 2A02 Heavy Duty External Retaining Rings, Grooves, and Gages

Shaft						Ring												Gage	
B	C		F		H	A		T		W		G		R		M	S	E	D
Nominal Size	Groove Dia.		Groove Width		Groove Radius	Free Inside Diameter		Ring Thickness		Section Width		Free Gap		Radius		Radial Deformation	Total Free Height	Dia.	Dia.
	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	+ 0.001 − 0.000	+ 0.000 − 0.001
0.469	0.445	0.441	0.032	0.029	0.005	0.439	0.426	0.027	0.023	0.048	0.040	0.344	0.156	0.006	0.003	0.010	0.036	0.469	0.439
0.500	0.470	0.466	0.042	0.039	0.005	0.464	0.451	0.037	0.033	0.053	0.045	0.344	0.156	0.009	0.005	0.010	0.050	0.500	0.464
0.551	0.521	0.517	0.042	0.039	0.005	0.514	0.501	0.037	0.033	0.053	0.045	0.344	0.156	0.009	0.005	0.010	0.050	0.551	0.514
0.562	0.532	0.528	0.042	0.039	0.005	0.525	0.512	0.037	0.033	0.053	0.045	0.344	0.156	0.009	0.005	0.010	0.050	0.562	0.525
0.594	0.562	0.556	0.042	0.039	0.005	0.554	0.541	0.037	0.033	0.053	0.045	0.344	0.156	0.009	0.005	0.010	0.050	0.594	0.553
0.625	0.591	0.585	0.042	0.039	0.005	0.583	0.570	0.037	0.033	0.058	0.050	0.344	0.156	0.009	0.005	0.010	0.050	0.625	0.582
0.669	0.632	0.626	0.042	0.039	0.005	0.623	0.610	0.037	0.033	0.058	0.050	0.344	0.156	0.009	0.005	0.010	0.050	0.669	0.623
0.688	0.649	0.643	0.049	0.046	0.005	0.641	0.628	0.044	0.040	0.068	0.060	0.344	0.156	0.011	0.006	0.010	0.050	0.688	0.640
0.750	0.707	0.701	0.049	0.046	0.005	0.698	0.685	0.044	0.040	0.068	0.060	0.344	0.156	0.011	0.006	0.010	0.059	0.750	0.697
0.781	0.736	0.730	0.049	0.046	0.005	0.727	0.714	0.044	0.040	0.068	0.060	0.344	0.156	0.011	0.006	0.010	0.059	0.781	0.726
0.812	0.765	0.759	0.049	0.046	0.005	0.756	0.743	0.044	0.040	0.068	0.060	0.344	0.156	0.011	0.006	0.010	0.059	0.812	0.755
0.875	0.824	0.818	0.049	0.046	0.005	0.814	0.801	0.044	0.040	0.078	0.070	0.375	0.187	0.011	0.006	0.010	0.059	0.875	0.814
0.938	0.885	0.879	0.049	0.046	0.005	0.875	0.862	0.044	0.040	0.078	0.070	0.375	0.187	0.011	0.006	0.010	0.059	0.938	0.874
0.984	0.929	0.923	0.049	0.046	0.005	0.919	0.906	0.044	0.040	0.088	0.080	0.375	0.187	0.011	0.006	0.010	0.059	0.984	0.918
1.000	0.943	0.937	0.049	0.046	0.005	0.932	0.919	0.044	0.040	0.088	0.080	0.375	0.187	0.011	0.006	0.010	0.059	1.000	0.932
1.023	0.964	0.958	0.049	0.046	0.010	0.953	0.940	0.044	0.040	0.088	0.080	0.375	0.187	0.011	0.006	0.010	0.059	1.023	0.953
1.062	1.002	0.994	0.060	0.056	0.010	0.986	0.973	0.052	0.048	0.106	0.098	0.375	0.187	0.012	0.006	0.010	0.070	1.062	0.989
1.125	1.063	1.055	0.060	0.056	0.010	1.047	1.034	0.052	0.048	0.106	0.098	0.375	0.187	0.012	0.006	0.010	0.070	1.125	1.049
1.188	1.122	1.114	0.060	0.056	0.010	1.105	1.092	0.052	0.048	0.106	0.098	0.375	0.187	0.012	0.006	0.010	0.070	1.188	1.108
1.250	1.180	1.172	0.060	0.056	0.010	1.163	1.150	0.052	0.048	0.106	0.098	0.375	0.187	0.012	0.006	0.010	0.070	1.250	1.166

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Table 2. Dimensions of Type 2A02 Heavy Duty External Retaining Rings, Grooves, and Gages (Continued)

B	C	F	H	A	T	W	G	R	M	S	E	D
1.312	1.236	0.060	0.010	1.205	0.052	0.121	0.375	0.012	0.010	0.070	1.312	1.222
	1.228	0.056	0.010	1.218	0.048	0.113	0.187	0.006	0.010	0.070	1.312	1.222
1.375	1.295	0.060	0.010	1.264	0.052	0.121	0.375	0.012	0.010	0.070	1.375	1.280
	1.287	0.056	0.010	1.277	0.048	0.113	0.187	0.006	0.010	0.070	1.375	1.280
1.438	1.354	0.060	0.010	1.323	0.052	0.121	0.442	0.012	0.010	0.070	1.438	1.339
	1.346	0.056	0.010	1.336	0.048	0.113	0.254	0.006	0.010	0.070	1.438	1.339
1.500	1.410	0.060	0.010	1.372	0.052	0.121	0.442	0.012	0.010	0.070	1.500	1.395
	1.402	0.056	0.010	1.385	0.048	0.113	0.254	0.006	0.010	0.070	1.500	1.395
1.562	1.473	0.072	0.010	1.433	0.065	0.131	0.442	0.015	0.010	0.088	1.562	1.455
	1.463	0.068	0.010	1.453	0.059	0.123	0.254	0.008	0.010	0.088	1.562	1.455
1.625	1.534	0.072	0.010	1.493	0.065	0.131	0.442	0.015	0.010	0.088	1.625	1.516
	1.524	0.068	0.010	1.513	0.059	0.123	0.254	0.008	0.010	0.088	1.625	1.516
1.687	1.594	0.072	0.010	1.553	0.065	0.131	0.442	0.015	0.010	0.088	1.687	1.576
	1.584	0.068	0.010	1.573	0.059	0.123	0.254	0.008	0.010	0.088	1.687	1.576
1.750	1.655	0.072	0.010	1.613	0.065	0.131	0.442	0.015	0.010	0.088	1.750	1.636
	1.645	0.068	0.010	1.633	0.059	0.123	0.254	0.008	0.010	0.088	1.750	1.636
1.771	1.674	0.072	0.010	1.631	0.065	0.131	0.442	0.015	0.010	0.088	1.771	1.655
	1.664	0.068	0.010	1.651	0.059	0.123	0.254	0.008	0.010	0.088	1.771	1.655
1.812	1.713	0.072	0.010	1.670	0.065	0.131	0.442	0.015	0.010	0.088	1.812	1.694
	1.703	0.068	0.010	1.690	0.059	0.123	0.254	0.008	0.010	0.088	1.812	1.694
1.875	1.774	0.072	0.010	1.731	0.065	0.153	0.442	0.015	0.010	0.088	1.875	1.755
	1.764	0.068	0.010	1.751	0.059	0.161	0.254	0.008	0.010	0.088	1.875	1.755
1.969	1.862	0.072	0.010	1.818	0.065	0.153	0.442	0.015	0.010	0.088	1.969	1.842
	1.852	0.068	0.010	1.838	0.059	0.161	0.254	0.008	0.010	0.088	1.969	1.842
2.000	1.891	0.072	0.010	1.847	0.065	0.153	0.442	0.015	0.020	0.088	2.000	1.871
	1.881	0.068	0.010	1.867	0.059	0.161	0.254	0.008	0.020	0.088	2.000	1.871
2.062	1.952	0.091	0.010	1.907	0.081	0.161	0.500	0.019	0.020	0.110	2.062	1.930
	1.940	0.086	0.010	1.932	0.075	0.161	0.312	0.010	0.020	0.110	2.062	1.930
2.125	2.009	0.091	0.010	1.964	0.081	0.171	0.500	0.019	0.020	0.110	2.125	1.986
	1.997	0.086	0.010	1.989	0.075	0.161	0.312	0.010	0.020	0.110	2.125	1.986
2.156	2.038	0.091	0.010	1.993	0.081	0.171	0.500	0.019	0.020	0.110	2.156	2.015
	2.026	0.086	0.010	2.018	0.075	0.161	0.312	0.010	0.020	0.110	2.156	2.015
2.250	2.126	0.091	0.010	2.080	0.081	0.171	0.500	0.019	0.020	0.110	2.250	2.103
	2.114	0.086	0.010	2.105	0.075	0.161	0.312	0.010	0.020	0.110	2.250	2.103
2.312	2.184	0.091	0.010	2.138	0.081	0.171	0.500	0.019	0.020	0.110	2.312	2.161
	2.172	0.086	0.010	2.163	0.075	0.161	0.312	0.010	0.020	0.110	2.312	2.161
2.375	2.245	0.091	0.010	2.198	0.081	0.204	0.500	0.019	0.020	0.110	2.375	2.221
	2.233	0.086	0.010	2.223	0.075	0.194	0.312	0.019	0.020	0.110	2.375	2.221
2.437	2.305	0.091	0.010	2.258	0.081	0.204	0.500	0.019	0.020	0.110	2.437	2.281
	2.293	0.086	0.010	2.283	0.075	0.194	0.312	0.019	0.020	0.110	2.437	2.281
2.500	2.366	0.091	0.010	2.318	0.081	0.204	0.500	0.019	0.020	0.110	2.500	2.342
	2.354	0.086	0.010	2.343	0.075	0.194	0.312	0.019	0.020	0.110	2.500	2.342
2.559	2.425	0.091	0.010	2.377	0.081	0.204	0.500	0.019	0.020	0.110	2.559	2.400
	2.413	0.086	0.010	2.402	0.075	0.195	0.312	0.019	0.020	0.110	2.559	2.400
2.625	2.487	0.091	0.010	2.439	0.081	0.204	0.500	0.019	0.020	0.110	2.625	2.462
	2.475	0.086	0.010	2.464	0.075	0.194	0.312	0.019	0.020	0.110	2.625	2.462
2.687	2.547	0.091	0.010	2.498	0.081	0.204	0.500	0.019	0.020	0.110	2.687	2.522
	2.535	0.086	0.010	2.523	0.075	0.194	0.312	0.019	0.020	0.110	2.687	2.522
2.750	2.608	0.108	0.010	2.554	0.096	0.229	0.625	0.023	0.020	0.130	2.750	2.582
	2.596	0.103	0.010	2.584	0.090	0.219	0.375	0.012	0.020	0.130	2.750	2.582
2.875	2.727	0.108	0.010	2.672	0.096	0.229	0.625	0.023	0.020	0.130	2.875	2.701
	2.715	0.103	0.010	2.702	0.090	0.219	0.375	0.012	0.020	0.130	2.875	2.701
2.937	2.785	0.108	0.010	2.730	0.096	0.229	0.625	0.023	0.020	0.130	2.937	2.758
	2.773	0.103	0.010	2.760	0.090	0.219	0.375	0.012	0.020	0.130	2.937	2.758
3.000	2.844	0.108	0.010	2.788	0.096	0.229	0.625	0.023	0.020	0.130	3.000	2.817
	2.832	0.103	0.010	2.818	0.090	0.219	0.375	0.012	0.020	0.130	3.000	2.817
3.062	2.904	0.108	0.010	2.848	0.096	0.229	0.625	0.023	0.020	0.130	3.062	2.877
	2.892	0.103	0.010	2.878	0.090	0.219	0.375	0.012	0.020	0.130	3.062	2.877
3.125	2.963	0.108	0.010	2.906	0.096	0.229	0.625	0.023	0.020	0.130	3.125	2.935
	2.951	0.103	0.010	2.936	0.090	0.219	0.375	0.012	0.020	0.130	3.125	2.935
3.156	2.992	0.108	0.010	2.935	0.096	0.229	0.625	0.023	0.020	0.130	3.156	2.964
	2.980	0.103	0.010	2.965	0.090	0.219	0.375	0.012	0.020	0.130	3.156	2.964
3.250	3.082	0.108	0.010	3.024	0.096	0.229	0.625	0.023	0.020	0.130	3.250	3.066
	3.070	0.103	0.010	3.054	0.090	0.219	0.375	0.012	0.020	0.130	3.250	3.066
3.344	3.172	0.108	0.010	3.114	0.096	0.229	0.625	0.023	0.020	0.130	3.344	3.143
	3.160	0.103	0.010	3.144	0.090	0.219	0.375	0.012	0.020	0.130	3.344	3.143
3.437	3.263	0.108	0.010	3.204	0.096	0.229	0.625	0.023	0.020	0.130	3.437	3.234
	3.251	0.103	0.010	3.234	0.090	0.219	0.375	0.012	0.020	0.130	3.437	3.234
3.500	3.322	0.125	0.010	3.258	0.114	0.264	0.657	0.027	0.020	0.155	3.500	3.293
	3.310	0.120	0.010	3.293	0.108	0.274	0.469	0.027	0.014	0.155	3.500	3.293
3.543	3.363	0.125	0.010	3.298	0.114	0.264	0.657	0.027	0.020	0.155	3.543	3.333
	3.351	0.120	0.010	3.333	0.108	0.274	0.469	0.027	0.014	0.155	3.543	3.333
3.625	3.441	0.125	0.010	3.376	0.114	0.264	0.657	0.027	0.020	0.155	3.625	3.411
	3.429	0.120	0.010	3.411	0.108	0.264	0.469	0.027	0.014	0.155	3.625	3.411
3.687	3.499	0.125	0.010	3.434	0.114	0.264	0.657	0.027	0.020	0.155	3.687	3.469
	3.487	0.120	0.010	3.469	0.108	0.264	0.469	0.027	0.014	0.155	3.687	3.469
3.750	3.558	0.125	0.010	3.492	0.114	0.264	0.657	0.027	0.020	0.155	3.750	3.527
	3.546	0.120	0.010	3.527	0.108	0.264	0.469	0.027	0.014	0.155	3.750	3.527
3.875	3.667	0.125	0.010	3.612	0.114	0.264	0.657	0.027	0.020	0.155	3.875	3.648
	3.679	0.120	0.010	3.647	0.108	0.274	0.469	0.027	0.014	0.155	3.875	3.648

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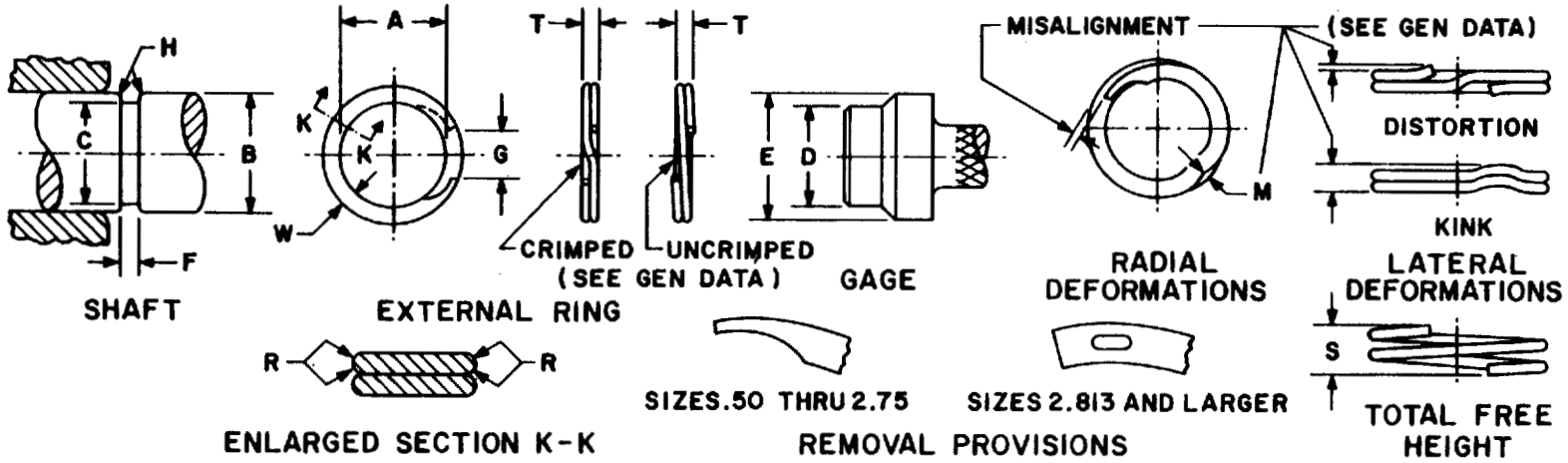


Table 2. Dimensions of Type 2A02 Heavy Duty External Retaining Rings, Grooves, and Gages (Continued)

Shaft						Ring												Gage	
B	C		F		H	A		T		W		G		R		M	S	E	D
Nominal Size	Groove Dia.		Groove Width		Groove Radius	Free Inside Diameter		Ring Thickness		Section Width		Free Gap		Radius		Radial Deformation	Total Free Height	Dia.	Dia.
	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	+ 0.001 − 0.000	+ 0.000 − 0.001
3.938	3.740	3.728	0.125	0.120	0.010	3.708	3.673	0.114	0.108	0.274	0.264	0.657	0.469	0.027	0.014	0.020	0.155	3.938	3.708
4.000	3.798	3.786	0.125	0.120	0.010	3.765	3.730	0.114	0.108	0.274	0.264	0.657	0.469	0.027	0.014	0.020	0.155	4.000	3.766
4.250	4.071	4.059	0.125	0.120	0.010	4.037	4.002	0.114	0.108	0.274	0.264	0.657	0.469	0.027	0.014	0.020	0.155	4.250	4.038
4.375	4.196	4.184	0.125	0.120	0.010	4.161	4.126	0.114	0.108	0.274	0.264	0.657	0.469	0.027	0.014	0.020	0.155	4.375	4.162
4.500	4.316	4.304	0.125	0.120	0.010	4.280	4.245	0.114	0.108	0.274	0.264	0.657	0.469	0.027	0.014	0.020	0.155	4.500	4.282
4.750	4.556	4.544	0.125	0.120	0.010	4.518	4.483	0.114	0.108	0.274	0.264	0.657	0.469	0.027	0.014	0.020	0.155	4.750	4.520
5.000	4.796	4.784	0.125	0.120	0.010	4.756	4.721	0.114	0.108	0.274	0.264	0.844	0.656	0.027	0.014	0.020	0.155	5.000	4.782
5.250	5.037	5.023	0.145	0.139	0.010	4.995	4.945	0.131	0.123	0.354	0.342	0.844	0.656	0.031	0.016	0.020	0.178	5.250	4.997
5.500	5.272	5.258	0.145	0.139	0.010	5.228	5.178	0.131	0.123	0.354	0.342	0.844	0.656	0.031	0.016	0.020	0.178	5.500	5.231
5.750	5.512	5.498	0.145	0.139	0.010	5.466	5.416	0.131	0.123	0.354	0.342	0.844	0.656	0.031	0.016	0.020	0.178	5.750	5.469
6.000	5.752	5.738	0.145	0.139	0.010	5.705	5.655	0.131	0.123	0.354	0.342	0.844	0.656	0.031	0.016	0.020	0.178	6.000	5.708
6.250	5.993	5.977	0.182	0.174	0.010	5.938	5.878	0.161	0.151	0.422	0.410	0.844	0.656	0.039	0.020	0.020	0.219	6.250	5.665
6.500	6.233	6.217	0.182	0.174	0.010	6.181	6.121	0.161	0.151	0.422	0.410	0.844	0.656	0.039	0.020	0.020	0.219	6.500	5.892
6.750	6.473	6.457	0.182	0.174	0.010	6.410	6.350	0.161	0.151	0.422	0.410	0.844	0.656	0.039	0.020	0.020	0.219	6.750	6.423
7.000	6.713	6.697	0.182	0.174	0.010	6.648	6.588	0.161	0.151	0.422	0.410	0.844	0.656	0.039	0.020	0.020	0.219	7.000	6.662
7.250	6.950	6.934	0.182	0.174	0.010	6.891	6.821	0.161	0.151	0.441	0.429	1.000	0.750	0.039	0.020	0.020	0.219	7.250	6.898
7.500	7.188	7.172	0.217	0.209	0.010	7.130	7.060	0.192	0.182	0.441	0.429	1.000	0.750	0.046	0.023	0.020	0.261	7.500	7.135
7.750	7.428	7.412	0.217	0.209	0.010	7.368	7.298	0.192	0.182	0.441	0.429	1.000	0.750	0.046	0.023	0.020	0.261	7.750	7.373
8.000	7.668	7.652	0.217	0.209	0.010	7.606	7.536	0.192	0.182	0.441	0.429	1.000	0.750	0.046	0.023	0.020	0.261	8.000	7.585
8.250	7.908	7.892	0.217	0.209	0.010	7.845	7.775	0.192	0.182	0.441	0.429	1.000	0.750	0.046	0.023	0.020	0.261	8.250	7.851

Table 2. Dimensions of Type 2A02 Heavy Duty External Retaining Rings, Grooves, and Gages (Continued)

B	C		F		H	A		T		W		G		R		M	S	E	D
8.500	8.148	8.132	0.217	0.209	0.010	8.083	8.013	0.192	0.182	0.441	0.429	1.000	0.750	0.046	0.023	0.020	0.261	8.500	8.090
8.750	8.391	8.375	0.217	0.209	0.010	8.324	8.254	0.192	0.182	0.441	0.429	1.000	0.750	0.046	0.023	0.020	0.261	8.750	8.331
9.000	8.628	8.612	0.217	0.209	0.010	8.560	8.490	0.192	0.182	0.505	0.490	1.000	0.750	0.046	0.023	0.020	0.261	9.000	8.567
9.250	8.868	8.852	0.217	0.209	0.010	8.798	8.728	0.192	0.182	0.505	0.490	1.000	0.750	0.046	0.023	0.020	0.261	9.250	8.822
9.500	9.108	9.092	0.217	0.209	0.010	9.036	8.966	0.192	0.182	0.505	0.490	1.000	0.750	0.046	0.023	0.020	0.261	9.500	9.045
9.750	9.346	9.330	0.217	0.209	0.010	9.275	9.205	0.192	0.182	0.507	0.493	1.031	0.750	0.046	0.023	0.020	0.261	9.750	9.281
10.000	9.583	9.567	0.217	0.209	0.010	9.508	9.438	0.192	0.182	0.507	0.493	1.031	0.750	0.046	0.023	0.020	0.261	10.000	9.517
10.250	9.824	9.804	0.217	0.209	0.010	9.745	9.655	0.192	0.182	0.507	0.493	1.500	1.250	0.046	0.023	0.020	0.261	10.250	9.753
10.500	10.064	10.044	0.217	0.209	0.010	9.984	9.894	0.192	0.182	0.507	0.493	1.500	1.250	0.046	0.023	0.020	0.261	10.500	9.992
10.750	10.303	10.283	0.217	0.209	0.010	10.221	10.131	0.192	0.182	0.507	0.493	1.500	1.250	0.046	0.023	0.020	0.261	10.750	10.229
11.000	10.543	10.523	0.217	0.209	0.010	10.459	10.369	0.192	0.182	0.507	0.493	1.500	1.250	0.046	0.023	0.020	0.261	11.000	10.468
11.250	10.782	10.762	0.217	0.209	0.010	10.692	10.602	0.192	0.182	0.507	0.493	1.500	1.250	0.046	0.023	0.020	0.261	11.250	10.706
11.500	11.021	11.001	0.217	0.209	0.010	10.934	10.844	0.192	0.182	0.567	0.552	1.500	1.250	0.046	0.023	0.020	0.261	11.500	10.944
11.750	11.260	11.240	0.217	0.209	0.010	11.171	11.081	0.192	0.182	0.567	0.552	1.500	1.250	0.046	0.023	0.020	0.261	11.750	11.181
12.000	11.500	11.480	0.217	0.209	0.010	11.410	11.320	0.192	0.182	0.567	0.552	1.500	1.250	0.046	0.023	0.020	0.261	12.000	11.420
12.250	11.739	11.719	0.217	0.209	0.010	11.647	11.557	0.192	0.182	0.567	0.552	1.500	1.250	0.046	0.023	0.020	0.261	12.250	11.658
12.500	11.979	11.959	0.217	0.209	0.010	11.885	11.795	0.192	0.182	0.567	0.552	1.500	1.250	0.046	0.023	0.020	0.261	12.500	11.897
12.750	12.220	12.196	0.217	0.209	0.010	12.124	12.014	0.192	0.182	0.567	0.552	1.813	1.437	0.046	0.023	0.020	0.261	12.750	12.132
13.000	12.460	12.436	0.217	0.209	0.010	12.361	12.251	0.192	0.182	0.667	0.652	1.813	1.437	0.046	0.023	0.020	0.261	13.000	12.371
13.250	12.699	12.675	0.217	0.209	0.010	12.598	12.488	0.192	0.182	0.667	0.652	1.813	1.437	0.046	0.023	0.020	0.261	13.250	12.609
13.500	12.939	12.915	0.217	0.209	0.010	12.837	12.727	0.192	0.182	0.667	0.652	1.813	1.437	0.046	0.023	0.020	0.261	13.500	12.848
13.750	13.178	13.154	0.217	0.209	0.010	13.074	12.964	0.192	0.182	0.667	0.652	1.813	1.437	0.046	0.023	0.020	0.261	13.750	13.085
14.000	13.417	13.393	0.217	0.209	0.010	13.311	13.201	0.192	0.182	0.667	0.652	1.813	1.437	0.046	0.023	0.020	0.261	14.000	13.323
14.250	13.656	13.632	0.217	0.209	0.010	13.548	13.438	0.192	0.182	0.667	0.652	1.813	1.437	0.046	0.023	0.020	0.261	14.250	13.561
14.500	13.896	13.872	0.217	0.209	0.010	13.787	13.677	0.192	0.182	0.755	0.740	1.813	1.437	0.046	0.023	0.020	0.261	14.500	13.824
14.750	14.135	14.111	0.217	0.209	0.010	14.024	13.914	0.192	0.182	0.755	0.740	1.813	1.437	0.046	0.023	0.020	0.261	14.750	14.037
15.000	14.375	14.351	0.217	0.209	0.010	14.262	14.152	0.192	0.182	0.755	0.740	1.813	1.437	0.046	0.023	0.020	0.261	15.000	14.276

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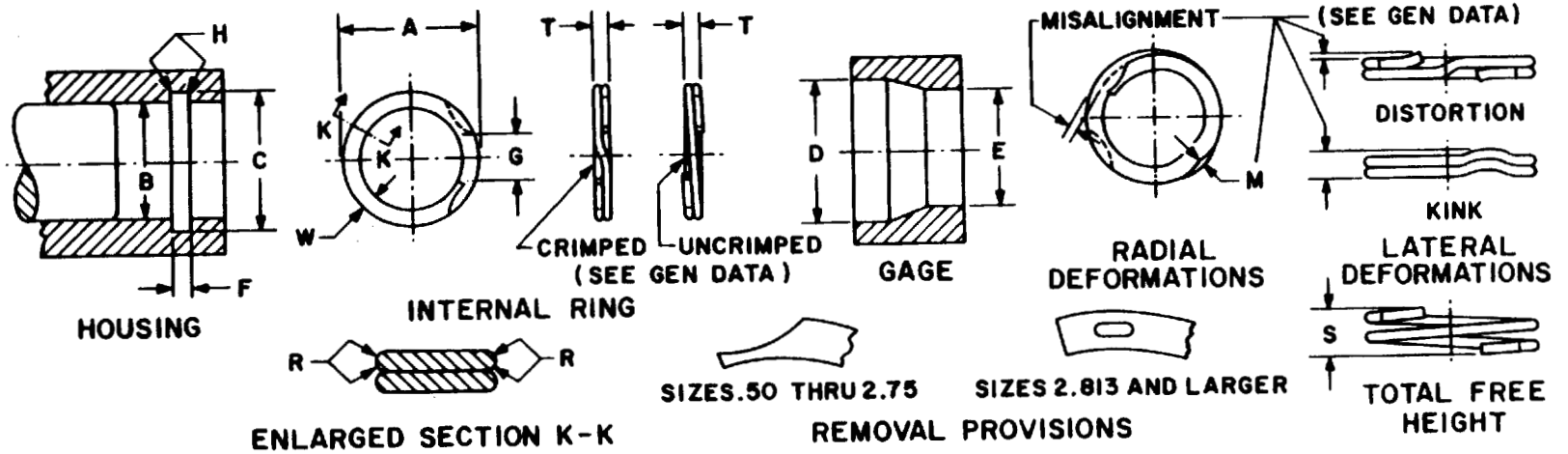


Table 3. Dimensions of Type 2B01 Light Duty Internal Retaining Rings, Grooves, and Gages

Housing						Ring												Gage	
B	C		F		H	A		T		W		G		R		M	S	D	E
Nominal Size	Groove Dia.		Groove Width		Groove Radius	Free Outside Diameter		Ring Thickness		Section Width		Free Gap		Radius		Radial Deformation	Total Free Height	Dia.	Dia.
	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	+ 0.001 − 0.000	+ 0.000 − 0.001
0.500	0.528	0.524	0.033	0.030	0.005	0.545	0.532	0.027	0.023	0.048	0.040	0.407	0.281	0.006	0.003	0.010	0.036	0.531	0.500
0.512	0.540	0.536	0.033	0.030	0.005	0.557	0.544	0.027	0.023	0.048	0.040	0.407	0.281	0.006	0.003	0.010	0.036	0.543	0.512
0.531	0.559	0.555	0.033	0.030	0.005	0.577	0.564	0.027	0.023	0.048	0.040	0.407	0.281	0.006	0.003	0.010	0.036	0.562	0.531
0.562	0.590	0.586	0.033	0.030	0.005	0.607	0.594	0.027	0.023	0.048	0.040	0.407	0.281	0.006	0.003	0.010	0.036	0.593	0.562
0.594	0.621	0.617	0.033	0.030	0.005	0.639	0.626	0.027	0.023	0.048	0.040	0.438	0.312	0.006	0.003	0.010	0.036	0.624	0.594
0.625	0.653	0.649	0.033	0.030	0.005	0.671	0.658	0.027	0.023	0.048	0.040	0.438	0.312	0.006	0.003	0.010	0.036	0.656	0.625
0.656	0.684	0.680	0.033	0.030	0.005	0.702	0.689	0.027	0.023	0.048	0.040	0.438	0.312	0.006	0.003	0.010	0.036	0.687	0.656
0.687	0.715	0.711	0.033	0.030	0.005	0.733	0.720	0.027	0.023	0.048	0.040	0.438	0.312	0.006	0.003	0.010	0.036	0.718	0.687
0.718	0.746	0.742	0.033	0.030	0.005	0.764	0.751	0.027	0.023	0.048	0.040	0.438	0.312	0.006	0.003	0.010	0.036	0.750	0.718
0.750	0.784	0.780	0.039	0.036	0.005	0.803	0.790	0.033	0.029	0.068	0.060	0.438	0.312	0.008	0.004	0.010	0.044	0.788	0.750
0.777	0.811	0.805	0.039	0.036	0.005	0.830	0.817	0.033	0.029	0.068	0.060	0.438	0.312	0.008	0.004	0.010	0.044	0.815	0.777
0.781	0.815	0.809	0.039	0.036	0.005	0.834	0.821	0.033	0.029	0.068	0.060	0.438	0.312	0.008	0.004	0.010	0.044	0.819	0.781
0.812	0.846	0.840	0.039	0.036	0.005	0.866	0.853	0.033	0.029	0.068	0.060	0.438	0.312	0.008	0.004	0.010	0.044	0.850	0.812
0.843	0.883	0.877	0.039	0.036	0.005	0.902	0.889	0.033	0.029	0.068	0.060	0.438	0.312	0.008	0.004	0.010	0.044	0.887	0.843
0.866	0.906	0.900	0.039	0.036	0.005	0.926	0.913	0.033	0.029	0.068	0.060	0.469	0.343	0.008	0.004	0.010	0.044	0.910	0.866
0.875	0.915	0.909	0.039	0.036	0.005	0.935	0.922	0.033	0.029	0.068	0.060	0.469	0.343	0.008	0.004	0.010	0.044	0.915	0.875
0.906	0.946	0.940	0.039	0.036	0.005	0.962	0.949	0.033	0.029	0.068	0.060	0.469	0.343	0.008	0.004	0.010	0.044	0.951	0.906
0.938	0.978	0.972	0.039	0.036	0.005	0.999	0.986	0.033	0.029	0.068	0.060	0.469	0.343	0.008	0.004	0.010	0.044	0.983	0.938
0.968	1.018	1.012	0.045	0.042	0.005	1.038	1.025	0.039	0.035	0.078	0.070	0.469	0.343	0.009	0.005	0.010	0.053	1.023	0.968
0.987	1.033	1.027	0.045	0.042	0.005	1.054	1.041	0.039	0.035	0.078	0.070	0.469	0.343	0.009	0.005	0.010	0.053	1.038	0.987

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Table 3. Dimensions of Type 2B01 Light Duty Internal Retaining Rings, Grooves, and Gages (Continued)

B	C		F		H	A		T		W		G		R		M	S	D	E
1.000	1.046	1.040	0.045	0.042	0.005	1.067	1.054	0.039	0.035	0.078	0.070	0.469	0.343	0.009	0.005	0.010	0.053	1.051	1.000
1.023	1.069	1.063	0.045	0.042	0.010	1.091	1.078	0.039	0.035	0.078	0.070	0.469	0.343	0.009	0.005	0.010	0.053	1.074	1.023
1.031	1.077	1.071	0.045	0.042	0.010	1.097	1.084	0.039	0.035	0.078	0.070	0.469	0.343	0.009	0.005	0.010	0.053	1.082	1.031
1.062	1.108	1.100	0.045	0.042	0.010	1.132	1.117	0.039	0.035	0.078	0.070	0.501	0.375	0.009	0.005	0.010	0.053	1.113	1.062
1.093	1.139	1.131	0.045	0.042	0.010	1.162	1.147	0.039	0.035	0.078	0.070	0.501	0.375	0.009	0.005	0.010	0.053	1.144	1.093
1.125	1.171	1.163	0.045	0.042	0.010	1.195	1.180	0.039	0.035	0.078	0.070	0.501	0.375	0.009	0.005	0.010	0.053	1.177	1.125
1.156	1.202	1.194	0.045	0.042	0.010	1.225	1.210	0.039	0.035	0.078	0.070	0.501	0.375	0.009	0.005	0.010	0.053	1.208	1.156
1.188	1.240	1.232	0.052	0.048	0.010	1.264	1.249	0.045	0.041	0.088	0.080	0.501	0.375	0.011	0.006	0.010	0.061	1.246	1.188
1.218	1.270	1.262	0.052	0.048	0.010	1.293	1.278	0.045	0.041	0.088	0.080	0.501	0.375	0.011	0.006	0.010	0.061	1.268	1.218
1.250	1.302	1.294	0.052	0.048	0.010	1.327	1.312	0.045	0.041	0.088	0.080	0.501	0.375	0.011	0.006	0.010	0.061	1.308	1.250
1.281	1.333	1.325	0.052	0.048	0.010	1.357	1.342	0.045	0.041	0.088	0.080	0.501	0.375	0.011	0.006	0.010	0.061	1.339	1.281
1.312	1.364	1.356	0.052	0.048	0.010	1.389	1.374	0.045	0.041	0.088	0.080	0.594	0.406	0.011	0.006	0.010	0.061	1.371	1.312
1.343	1.399	1.391	0.052	0.048	0.010	1.423	1.408	0.045	0.041	0.088	0.080	0.594	0.406	0.011	0.006	0.010	0.061	1.406	1.343
1.375	1.431	1.423	0.052	0.048	0.010	1.457	1.442	0.045	0.041	0.098	0.090	0.594	0.406	0.011	0.006	0.010	0.061	1.438	1.375
1.406	1.462	1.454	0.052	0.048	0.010	1.487	1.472	0.045	0.041	0.098	0.090	0.594	0.406	0.011	0.006	0.010	0.061	1.469	1.406
1.437	1.493	1.485	0.052	0.048	0.010	1.519	1.504	0.045	0.041	0.098	0.090	0.594	0.406	0.011	0.006	0.010	0.061	1.500	1.437
1.456	1.512	1.504	0.052	0.048	0.010	1.538	1.523	0.045	0.041	0.098	0.090	0.594	0.406	0.011	0.006	0.010	0.061	1.519	1.456
1.468	1.524	1.516	0.052	0.048	0.010	1.550	1.535	0.045	0.041	0.098	0.090	0.594	0.406	0.011	0.006	0.010	0.061	1.531	1.468
1.500	1.556	1.548	0.052	0.048	0.010	1.582	1.567	0.045	0.041	0.098	0.090	0.594	0.406	0.011	0.006	0.010	0.061	1.564	1.500
1.562	1.622	1.612	0.060	0.056	0.010	1.654	1.634	0.052	0.046	0.111	0.103	0.688	0.500	0.012	0.006	0.010	0.070	1.630	1.562
1.574	1.638	1.628	0.060	0.056	0.010	1.669	1.649	0.052	0.046	0.111	0.103	0.688	0.500	0.012	0.006	0.010	0.070	1.646	1.574
1.625	1.689	1.679	0.060	0.056	0.010	1.721	1.701	0.052	0.046	0.111	0.103	0.688	0.500	0.012	0.006	0.010	0.070	1.697	1.625
1.653	1.717	1.707	0.060	0.056	0.010	1.750	1.730	0.052	0.046	0.111	0.103	0.688	0.500	0.012	0.006	0.010	0.070	1.725	1.653
1.687	1.755	1.745	0.060	0.056	0.010	1.788	1.768	0.052	0.046	0.121	0.113	0.688	0.500	0.012	0.006	0.010	0.070	1.763	1.687
1.750	1.818	1.808	0.060	0.056	0.010	1.854	1.834	0.052	0.046	0.121	0.113	0.688	0.500	0.012	0.006	0.010	0.070	1.827	1.750
1.813	1.880	1.870	0.060	0.056	0.010	1.914	1.894	0.052	0.046	0.121	0.113	0.688	0.500	0.012	0.006	0.010	0.070	1.889	1.813
1.850	1.922	1.912	0.060	0.056	0.010	1.957	1.937	0.052	0.046	0.121	0.113	0.688	0.500	0.012	0.006	0.010	0.070	1.931	1.850
1.875	1.947	1.937	0.060	0.056	0.010	1.980	1.960	0.052	0.046	0.121	0.113	0.688	0.500	0.012	0.006	0.010	0.070	1.956	1.875
1.938	2.010	2.000	0.060	0.056	0.010	2.045	2.025	0.052	0.046	0.121	0.113	0.688	0.500	0.012	0.006	0.010	0.070	2.020	1.938
2.000	2.076	2.066	0.060	0.056	0.010	2.111	2.091	0.052	0.046	0.131	0.123	0.719	0.531	0.012	0.006	0.020	0.070	2.086	2.000
2.047	2.123	2.113	0.060	0.056	0.010	2.158	2.138	0.052	0.046	0.131	0.123	0.719	0.531	0.012	0.006	0.020	0.070	2.133	2.047
2.062	2.138	2.126	0.060	0.056	0.010	2.179	2.154	0.052	0.046	0.131	0.123	0.719	0.531	0.012	0.006	0.020	0.070	2.148	2.062
2.125	2.201	2.189	0.060	0.056	0.010	2.242	2.217	0.052	0.046	0.131	0.123	0.719	0.531	0.012	0.006	0.020	0.070	2.212	2.125
2.165	2.245	2.233	0.060	0.056	0.010	2.285	2.260	0.052	0.046	0.141	0.133	0.719	0.531	0.012	0.006	0.020	0.070	2.256	2.165
2.188	2.268	2.256	0.060	0.056	0.010	2.309	2.284	0.052	0.046	0.141	0.133	0.719	0.531	0.012	0.006	0.020	0.070	2.279	2.188
2.250	2.330	2.318	0.060	0.056	0.010	2.372	2.347	0.052	0.046	0.141	0.133	0.719	0.531	0.012	0.006	0.020	0.070	2.341	2.250
2.312	2.396	2.384	0.060	0.056	0.010	2.428	2.403	0.052	0.046	0.141	0.133	0.719	0.531	0.012	0.006	0.020	0.070	2.408	2.312
2.375	2.459	2.447	0.060	0.056	0.010	2.501	2.476	0.052	0.046	0.141	0.133	0.719	0.531	0.012	0.006	0.020	0.070	2.471	2.375
2.437	2.525	2.513	0.060	0.056	0.010	2.568	2.543	0.052	0.046	0.151	0.143	0.719	0.531	0.012	0.006	0.020	0.070	2.537	2.437

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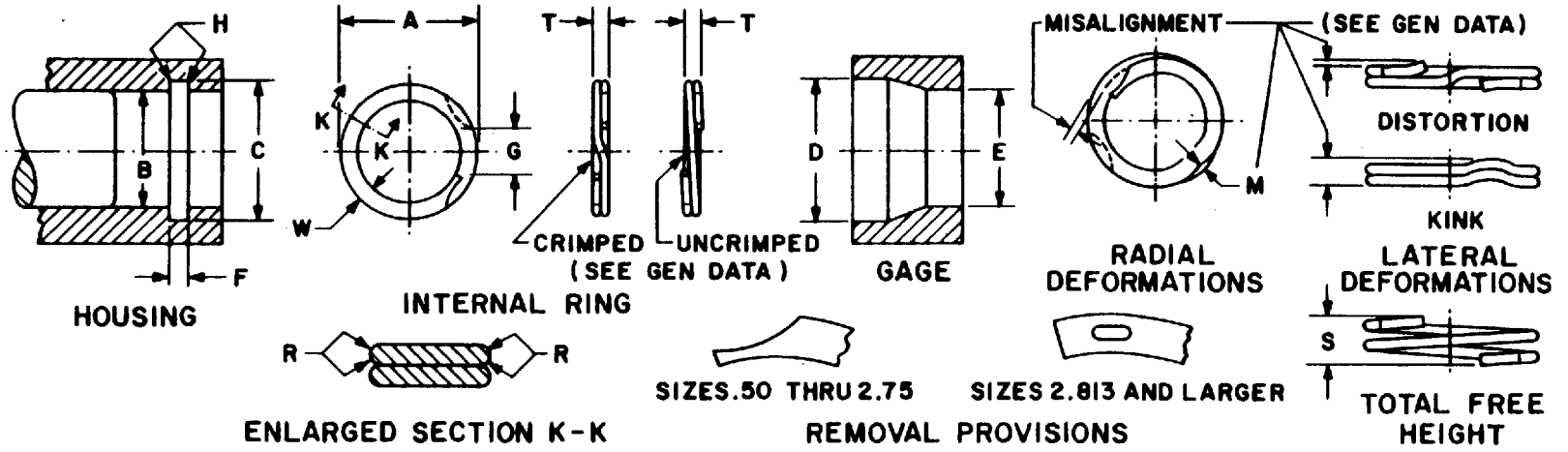


Table 3. Dimensions of Type 2B01 Light Duty Internal Retaining Rings, Grooves, and Gages (Continued)

Housing						Ring												Gage	
B	C		F		H	A		T		W		G		R		M	S	D	E
Nominal Size	Groove Dia.		Groove Width		Groove Radius	Free Outside Diameter		Ring Thickness		Section Width		Free Gap		Radius		Radial Deformation	Total Free Height	Dia.	Dia.
	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	+ 0.001 − 0.000	+ 0.000 − 0.001
2.440	2.528	2.516	0.060	0.056	0.010	2.571	2.546	0.052	0.046	0.151	0.143	0.719	0.531	0.012	0.006	0.020	0.070	2.540	2.440
2.500	2.588	2.576	0.060	0.056	0.010	2.631	2.606	0.052	0.046	0.151	0.143	0.907	0.719	0.012	0.006	0.020	0.070	2.610	2.500
2.531	2.623	2.611	0.060	0.056	0.010	2.666	2.641	0.052	0.046	0.151	0.143	0.907	0.719	0.012	0.006	0.020	0.070	2.636	2.531
2.562	2.654	2.642	0.060	0.056	0.010	2.698	2.673	0.052	0.046	0.151	0.143	0.907	0.719	0.012	0.006	0.020	0.070	2.667	2.562
2.625	2.717	2.705	0.060	0.056	0.010	2.761	2.736	0.052	0.046	0.151	0.143	0.907	0.719	0.012	0.006	0.020	0.070	2.730	2.625
2.677	2.773	2.761	0.060	0.056	0.010	2.814	2.789	0.052	0.046	0.161	0.153	0.907	0.719	0.012	0.006	0.020	0.070	2.786	2.677
2.688	2.784	2.772	0.060	0.056	0.010	2.828	2.803	0.052	0.046	0.161	0.153	0.907	0.719	0.012	0.006	0.020	0.070	2.797	2.688
2.750	2.847	2.835	0.060	0.056	0.010	2.890	2.865	0.052	0.046	0.161	0.153	0.907	0.719	0.012	0.006	0.020	0.070	2.861	2.750
2.813	2.909	2.897	0.060	0.056	0.010	2.954	2.929	0.052	0.046	0.161	0.153	0.907	0.719	0.012	0.006	0.020	0.070	2.923	2.813
2.834	2.934	2.922	0.060	0.056	0.010	2.979	2.954	0.052	0.046	0.172	0.162	0.907	0.719	0.012	0.006	0.020	0.070	2.948	2.834
2.875	2.975	2.963	0.060	0.056	0.010	3.020	2.995	0.052	0.046	0.172	0.162	0.907	0.719	0.012	0.006	0.020	0.070	2.989	2.875
2.937	3.037	3.025	0.060	0.056	0.010	3.083	3.058	0.052	0.046	0.172	0.162	0.907	0.719	0.012	0.006	0.020	0.070	3.052	2.937
2.952	3.052	3.040	0.060	0.056	0.010	3.098	3.073	0.052	0.046	0.172	0.162	0.907	0.719	0.012	0.006	0.020	0.070	3.067	2.952
3.000	3.102	3.090	0.073	0.068	0.010	3.147	3.122	0.064	0.058	0.172	0.162	0.907	0.719	0.015	0.008	0.020	0.087	3.117	3.000
3.062	3.164	3.152	0.073	0.068	0.010	3.216	3.186	0.064	0.058	0.172	0.162	0.907	0.719	0.015	0.008	0.020	0.087	3.179	3.062
3.125	3.229	3.217	0.073	0.068	0.010	3.281	3.251	0.064	0.058	0.182	0.172	0.907	0.719	0.015	0.008	0.020	0.087	3.245	3.125
3.149	3.253	3.241	0.073	0.068	0.010	3.306	3.276	0.064	0.058	0.182	0.172	1.125	0.875	0.015	0.008	0.020	0.087	3.269	3.149
3.187	3.289	3.277	0.073	0.068	0.010	3.341	3.311	0.064	0.058	0.182	0.172	1.125	0.875	0.015	0.008	0.020	0.087	3.305	3.187
3.250	3.356	3.344	0.073	0.068	0.010	3.409	3.379	0.064	0.058	0.182	0.172	1.125	0.875	0.015	0.008	0.020	0.087	3.372	3.250
3.312	3.422	3.410	0.073	0.068	0.010	3.476	3.446	0.064	0.058	0.192	0.182	1.125	0.875	0.015	0.008	0.020	0.087	3.439	3.312

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Table 3. Dimensions of Type 2B01 Light Duty Internal Retaining Rings, Grooves, and Gages (Continued)

B	C	F	H	A	T	W	G	R	M	S	D	E
3.346	3.456	0.073	0.068	0.010	3.509	3.479	0.064	0.058	0.192	0.182	1.125	0.875	0.015	0.008	0.020	0.087	3.473	3.346
3.375	3.485	0.073	0.068	0.010	3.539	3.509	0.064	0.058	0.192	0.182	1.125	0.875	0.015	0.008	0.020	0.087	3.502	3.375
3.437	3.549	0.073	0.068	0.010	3.604	3.574	0.064	0.058	0.192	0.182	1.125	0.875	0.015	0.008	0.020	0.087	3.566	3.437
3.500	3.612	0.073	0.068	0.010	3.666	3.636	0.064	0.058	0.192	0.182	1.125	0.875	0.015	0.008	0.020	0.087	3.630	3.500
3.543	3.659	0.073	0.068	0.010	3.714	3.684	0.064	0.058	0.202	0.192	1.125	0.875	0.015	0.008	0.020	0.087	3.677	3.543
3.562	3.678	0.073	0.068	0.010	3.733	3.703	0.064	0.058	0.202	0.192	1.125	0.875	0.015	0.008	0.020	0.087	3.696	3.562
3.625	3.743	0.073	0.068	0.010	3.799	3.769	0.064	0.058	0.202	0.192	1.125	0.875	0.015	0.008	0.020	0.087	3.761	3.625
3.687	3.805	0.073	0.068	0.010	3.862	3.832	0.064	0.058	0.202	0.192	1.125	0.875	0.015	0.008	0.020	0.087	3.823	3.687
3.740	3.858	0.073	0.068	0.010	3.915	3.885	0.064	0.058	0.202	0.192	1.125	0.875	0.015	0.008	0.020	0.087	3.877	3.740
3.750	3.868	0.073	0.068	0.010	3.924	3.894	0.064	0.058	0.202	0.192	1.125	0.875	0.015	0.008	0.020	0.087	3.887	3.750
3.812	3.936	0.073	0.068	0.010	3.993	3.963	0.064	0.058	0.212	0.202	1.125	0.875	0.015	0.008	0.020	0.087	3.955	3.812
3.875	3.999	0.073	0.068	0.010	4.055	4.025	0.064	0.058	0.212	0.202	1.313	1.063	0.015	0.008	0.020	0.087	4.018	3.875
3.938	3.987	0.073	0.068	0.010	4.119	4.089	0.064	0.058	0.212	0.202	1.313	1.063	0.015	0.008	0.020	0.087	4.082	3.938
4.000	4.062	0.073	0.068	0.010	4.187	4.157	0.064	0.058	0.222	0.212	1.313	1.063	0.015	0.008	0.020	0.087	4.150	4.000
4.063	4.130	0.073	0.068	0.010	4.252	4.222	0.064	0.058	0.222	0.212	1.313	1.063	0.015	0.008	0.020	0.087	4.213	4.063
4.125	4.193	0.073	0.068	0.010	4.319	4.284	0.064	0.058	0.222	0.212	1.313	1.063	0.015	0.008	0.020	0.087	4.276	4.125
4.188	4.255	0.073	0.068	0.010	4.382	4.347	0.064	0.058	0.222	0.212	1.313	1.063	0.015	0.008	0.020	0.087	4.338	4.188
4.250	4.317	0.073	0.068	0.010	4.451	4.416	0.064	0.058	0.232	0.222	1.313	1.063	0.015	0.008	0.020	0.087	4.407	4.250
4.312	4.386	0.073	0.068	0.010	4.514	4.479	0.064	0.058	0.232	0.222	1.313	1.063	0.015	0.008	0.020	0.087	4.470	4.312
4.330	4.448	0.073	0.068	0.010	4.532	4.497	0.064	0.058	0.232	0.222	1.313	1.063	0.015	0.008	0.020	0.087	4.488	4.330
4.375	4.511	0.073	0.068	0.010	4.578	4.543	0.064	0.058	0.232	0.222	1.313	1.063	0.015	0.008	0.020	0.087	4.533	4.375
4.437	4.579	0.073	0.068	0.010	4.646	4.611	0.064	0.058	0.242	0.232	1.313	1.063	0.015	0.008	0.020	0.087	4.601	4.437
4.500	4.642	0.073	0.068	0.010	4.709	4.674	0.064	0.058	0.242	0.232	1.313	1.063	0.015	0.008	0.020	0.087	4.665	4.500
4.527	4.669	0.073	0.068	0.010	4.736	4.701	0.064	0.058	0.242	0.232	1.313	1.063	0.015	0.008	0.020	0.087	4.692	4.527
4.562	4.704	0.073	0.068	0.010	4.772	4.737	0.064	0.058	0.242	0.232	1.313	1.063	0.015	0.008	0.020	0.087	4.727	4.562
4.625	4.771	0.084	0.079	0.010	4.838	4.803	0.076	0.068	0.254	0.244	1.313	1.063	0.018	0.009	0.020	0.090	4.794	4.625
4.687	4.833	0.084	0.079	0.010	4.902	4.867	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	4.856	4.687
4.724	4.870	0.084	0.079	0.010	4.938	4.903	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	4.894	4.724
4.750	4.896	0.084	0.079	0.010	4.965	4.930	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	4.920	4.750
4.812	4.958	0.084	0.079	0.010	5.028	4.993	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	4.982	4.812
4.875	5.021	0.084	0.079	0.010	5.090	5.055	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	5.045	4.875
4.921	5.067	0.084	0.079	0.010	5.137	5.102	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	5.092	4.921
4.937	5.087	0.084	0.079	0.010	5.157	5.122	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	5.112	4.937
5.000	5.150	0.084	0.079	0.010	5.220	5.185	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	5.175	5.000
5.118	5.268	0.084	0.079	0.010	5.339	5.304	0.076	0.068	0.254	0.224	1.625	1.375	0.018	0.009	0.020	0.090	5.294	5.118
5.125	5.275	0.084	0.079	0.010	5.346	5.311	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	5.301	5.125
5.250	5.400	0.084	0.079	0.010	5.481	5.436	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	5.426	5.250
5.375	5.529	0.084	0.079	0.010	5.611	5.566	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	5.556	5.375
5.500	5.654	0.084	0.079	0.010	5.738	5.693	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	5.682	5.500
5.511	5.665	0.084	0.079	0.010	5.748	5.703	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	5.693	5.511

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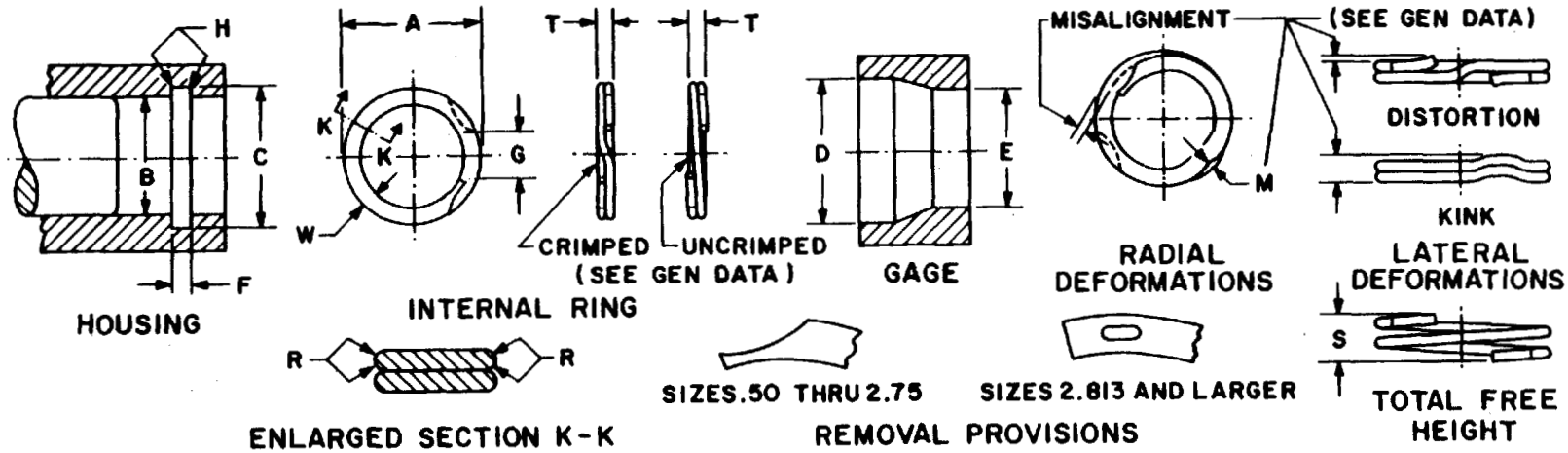


Table 3. Dimensions of Type 2B01 Light Duty Internal Retaining Rings, Grooves, and Gages (Continued)

Housing						Ring												Gage	
B	C		F		H	A		T		W		G		R		M	S	D	E
Nominal Size	Groove Dia.		Groove Width		Groove Radius	Free Outside Diameter		Ring Thickness		Section Width		Free Gap		Radius		Radial Deformation	Total Free Height	Dia.	Dia.
	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	+ 0.001 − 0.000	+ 0.000 − 0.001
5.625	5.779	5.765	0.084	0.079	0.010	5.863	5.818	0.076	0.068	0.254	0.244	1.625	1.375	0.018	0.009	0.020	0.090	5.807	5.625
5.708	5.868	5.854	0.084	0.079	0.010	5.954	5.909	0.076	0.068	0.254	0.244	1.875	1.625	0.018	0.009	0.020	0.090	5.897	5.708
5.750	5.910	5.896	0.084	0.079	0.010	5.995	5.950	0.076	0.068	0.254	0.244	1.875	1.625	0.018	0.009	0.020	0.090	5.939	5.750
5.875	6.035	6.021	0.084	0.079	0.010	6.122	6.077	0.076	0.068	0.254	0.244	1.875	1.625	0.018	0.009	0.020	0.090	6.064	5.875
5.905	6.065	6.051	0.084	0.079	0.010	6.151	6.106	0.076	0.068	0.254	0.244	1.875	1.625	0.018	0.009	0.020	0.090	6.095	5.905
6.000	6.160	6.146	0.084	0.079	0.010	6.247	6.202	0.076	0.068	0.254	0.244	1.875	1.625	0.018	0.009	0.020	0.090	6.190	6.000
6.125	6.305	6.289	0.100	0.094	0.010	6.394	6.349	0.090	0.082	0.316	0.304	1.875	1.625	0.021	0.011	0.020	0.122	6.336	6.125
6.250	6.430	6.414	0.100	0.094	0.010	6.529	6.474	0.090	0.082	0.316	0.304	1.875	1.625	0.021	0.011	0.020	0.122	6.461	6.250
6.299	6.479	6.463	0.100	0.094	0.010	6.579	6.524	0.090	0.082	0.316	0.304	1.875	1.625	0.021	0.011	0.020	0.122	6.510	6.299
6.375	6.555	6.539	0.100	0.094	0.010	6.656	6.601	0.090	0.082	0.316	0.304	1.875	1.625	0.021	0.011	0.020	0.122	6.587	6.375
6.500	6.680	6.664	0.100	0.094	0.010	6.781	6.726	0.090	0.082	0.316	0.304	1.875	1.625	0.021	0.011	0.020	0.122	6.713	6.500
6.625	6.815	6.799	0.100	0.094	0.010	6.918	6.863	0.090	0.082	0.316	0.304	1.875	1.625	0.021	0.011	0.020	0.122	6.848	6.625
6.692	6.882	6.866	0.100	0.094	0.010	6.986	6.931	0.090	0.082	0.316	0.304	1.875	1.625	0.021	0.011	0.020	0.122	6.915	6.692
6.750	6.940	6.924	0.100	0.094	0.010	7.042	6.987	0.090	0.082	0.316	0.304	1.875	1.625	0.021	0.011	0.020	0.122	6.974	6.750
6.875	7.065	7.049	0.100	0.094	0.010	7.169	7.114	0.090	0.082	0.316	0.304	1.875	1.625	0.021	0.011	0.020	0.122	7.099	6.875
7.000	7.190	7.174	0.100	0.094	0.010	7.294	7.239	0.090	0.082	0.316	0.304	1.875	1.625	0.021	0.011	0.020	0.122	7.225	7.000
7.086	7.286	7.270	0.100	0.094	0.010	7.392	7.337	0.090	0.082	0.316	0.304	2.313	2.063	0.021	0.011	0.020	0.122	7.321	7.086
7.125	7.325	7.309	0.100	0.094	0.010	7.431	7.376	0.090	0.082	0.316	0.304	2.313	2.063	0.021	0.011	0.020	0.122	7.361	7.125
7.250	7.450	7.434	0.100	0.094	0.010	7.566	7.501	0.090	0.082	0.316	0.304	2.313	2.063	0.021	0.011	0.020	0.122	7.486	7.250
7.375	7.575	7.559	0.100	0.094	0.010	7.693	7.628	0.090	0.082	0.316	0.304	2.313	2.063	0.021	0.011	0.020	0.122	7.412	7.375

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Table 3. Dimensions of Type 2B01 Light Duty Internal Retaining Rings, Grooves, and Gages (Continued)

B	C		F	H	A	T	W	G	R	M	S	D	E
7.480	7.680	7.664	0.100	0.010	7.799	0.090	0.316	2.313	0.021	0.011	0.020	0.122	7.717	7.480
7.500	7.700	7.684	0.100	0.010	7.819	0.090	0.316	2.313	0.021	0.011	0.020	0.122	7.738	7.500
7.625	7.835	7.819	0.100	0.010	7.955	0.090	0.316	2.313	0.021	0.011	0.020	0.122	7.873	7.625
7.750	7.960	7.944	0.100	0.010	8.079	0.090	0.316	2.313	0.021	0.011	0.020	0.122	7.999	7.750
7.875	8.085	8.069	0.100	0.010	8.196	0.090	0.316	2.313	0.021	0.011	0.020	0.122	8.124	7.875
8.000	8.210	8.194	0.100	0.010	8.331	0.090	0.316	2.313	0.021	0.011	0.020	0.122	8.250	8.000
8.250	8.470	8.454	0.100	0.010	8.593	0.090	0.379	2.313	0.021	0.011	0.020	0.122	8.511	8.250
8.267	8.487	8.471	0.100	0.010	8.611	0.090	0.379	2.313	0.021	0.011	0.020	0.122	8.528	8.267
8.464	8.684	8.668	0.100	0.010	8.809	0.090	0.379	2.313	0.021	0.011	0.020	0.122	8.726	8.464
8.500	8.720	8.704	0.100	0.010	8.845	0.090	0.379	2.313	0.021	0.011	0.020	0.122	8.763	8.500
8.750	8.980	8.964	0.100	0.010	9.106	0.090	0.379	2.313	0.021	0.011	0.020	0.122	9.024	8.750
8.858	9.088	9.072	0.100	0.010	9.216	0.090	0.379	2.313	0.021	0.011	0.020	0.122	9.132	8.858
9.000	9.230	9.214	0.100	0.010	9.358	0.090	0.379	2.313	0.021	0.011	0.020	0.122	9.275	9.000
9.055	9.295	9.279	0.100	0.010	9.424	0.090	0.379	2.313	0.021	0.011	0.020	0.122	9.340	9.055
9.250	9.490	9.474	0.100	0.010	9.620	0.090	0.379	2.313	0.021	0.011	0.020	0.122	9.536	9.250
9.448	9.688	9.672	0.100	0.010	9.820	0.090	0.379	2.313	0.021	0.011	0.020	0.122	9.735	9.448
9.500	9.740	9.724	0.100	0.010	9.871	0.090	0.379	2.313	0.021	0.011	0.020	0.122	9.788	9.500
9.750	10.000	9.984	0.100	0.010	10.133	0.090	0.379	2.313	0.021	0.011	0.020	0.122	10.049	9.750
10.000	10.250	10.234	0.100	0.010	10.385	0.090	0.379	2.313	0.021	0.011	0.020	0.122	10.300	10.000
10.250	10.510	10.494	0.100	0.010	10.647	0.090	0.379	2.313	0.021	0.011	0.020	0.122	10.561	10.250
10.500	10.760	10.744	0.100	0.010	10.899	0.090	0.379	2.313	0.021	0.011	0.020	0.122	10.813	10.500
10.750	11.020	11.004	0.100	0.010	11.160	0.090	0.379	2.313	0.021	0.011	0.020	0.122	11.074	10.750
11.000	11.270	11.254	0.100	0.010	11.412	0.090	0.379	2.313	0.021	0.011	0.020	0.122	11.325	11.000

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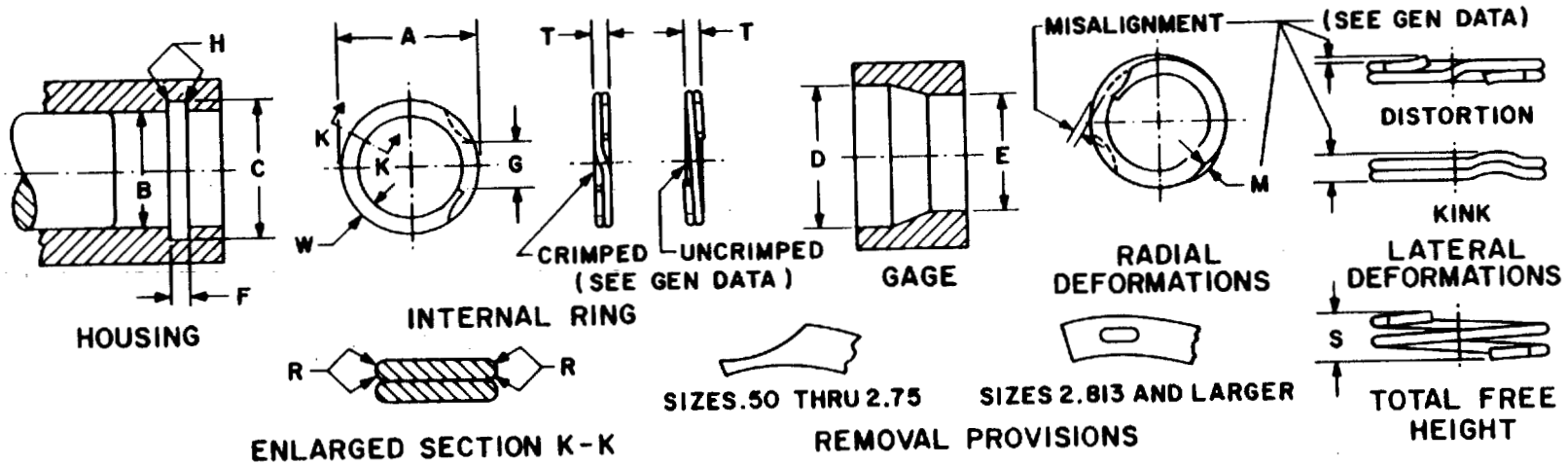


Table 4. Dimensions of Type 2B02 Heavy Duty Internal Retaining Rings, Grooves, and Gages

Housing						Ring												Gage	
B	C		F		H	A		T		W		G		R		M	S	D	E
Nominal Size	Groove Dia.		Groove Width		Groove Radius	Free Outside Diameter		Ring Thickness		Section Width		Free Gap		Radius		Radial Deformation	Total Free Height	Dia.	Dia.
	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	+ 0.001 − 0.000	+ 0.000 − 0.001
0.500	0.532	0.528	0.042	0.039	0.005	0.551	0.538	0.037	0.033	0.048	0.040	0.438	0.312	0.009	0.005	0.010	0.050	0.535	0.500
0.512	0.544	0.540	0.042	0.039	0.005	0.563	0.550	0.037	0.033	0.048	0.040	0.438	0.312	0.009	0.005	0.010	0.050	0.547	0.512
0.562	0.598	0.594	0.042	0.039	0.005	0.618	0.605	0.037	0.033	0.058	0.050	0.438	0.312	0.009	0.005	0.010	0.050	0.601	0.562
0.625	0.667	0.663	0.042	0.039	0.005	0.688	0.675	0.037	0.033	0.058	0.050	0.438	0.312	0.009	0.005	0.010	0.050	0.670	0.625
0.688	0.734	0.730	0.042	0.039	0.005	0.756	0.743	0.037	0.033	0.068	0.060	0.469	0.343	0.009	0.005	0.010	0.050	0.737	0.688
0.750	0.798	0.794	0.042	0.039	0.005	0.820	0.807	0.037	0.033	0.068	0.060	0.469	0.343	0.009	0.005	0.010	0.050	0.802	0.750
0.777	0.828	0.822	0.049	0.046	0.005	0.849	0.836	0.044	0.040	0.078	0.070	0.469	0.343	0.011	0.006	0.010	0.059	0.832	0.777
0.812	0.865	0.859	0.049	0.046	0.005	0.886	0.873	0.044	0.040	0.078	0.070	0.469	0.343	0.011	0.006	0.010	0.059	0.869	0.812
0.866	0.923	0.917	0.049	0.046	0.005	0.944	0.931	0.044	0.040	0.078	0.070	0.469	0.343	0.011	0.006	0.010	0.059	0.927	0.866
0.875	0.934	0.928	0.049	0.046	0.005	0.956	0.943	0.044	0.040	0.088	0.080	0.469	0.343	0.011	0.006	0.010	0.059	0.938	0.875
0.901	0.962	0.956	0.049	0.046	0.005	0.985	0.972	0.044	0.040	0.088	0.080	0.469	0.343	0.011	0.006	0.010	0.059	0.961	0.901
0.938	1.003	0.997	0.049	0.046	0.005	1.026	1.013	0.044	0.040	0.088	0.080	0.469	0.343	0.011	0.006	0.010	0.059	1.008	0.938
1.000	1.069	1.063	0.049	0.046	0.005	1.093	1.080	0.044	0.040	0.088	0.080	0.501	0.375	0.011	0.006	0.010	0.059	1.074	1.000
1.023	1.094	1.088	0.049	0.046	0.010	1.118	1.105	0.044	0.040	0.088	0.080	0.501	0.375	0.011	0.006	0.010	0.059	1.099	1.023
1.062	1.134	1.126	0.060	0.056	0.010	1.151	1.138	0.052	0.048	0.106	0.098	0.501	0.375	0.012	0.006	0.010	0.070	1.139	1.062
1.125	1.201	1.193	0.060	0.056	0.010	1.218	1.205	0.052	0.048	0.106	0.098	0.501	0.375	0.012	0.006	0.010	0.070	1.207	1.125
1.188	1.266	1.258	0.060	0.056	0.010	1.284	1.271	0.052	0.048	0.106	0.098	0.501	0.375	0.012	0.006	0.010	0.070	1.272	1.188
1.250	1.334	1.326	0.060	0.056	0.010	1.352	1.339	0.052	0.048	0.106	0.098	0.501	0.375	0.012	0.006	0.010	0.070	1.340	1.250
1.312	1.400	1.392	0.060	0.056	0.010	1.419	1.406	0.052	0.048	0.121	0.113	0.501	0.375	0.012	0.006	0.010	0.070	1.407	1.312
1.375	1.465	1.457	0.060	0.056	0.010	1.484	1.471	0.052	0.048	0.121	0.113	0.501	0.375	0.012	0.006	0.010	0.070	1.464	1.375

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Table 4. Dimensions of Type 2B02 Heavy Duty Internal Retaining Rings, Grooves, and Gages (Continued)

B	C		F		H	A		T		W		G		R		M	S	D	E
1.439	1.532	1.524	0.060	0.056	0.010	1.552	1.539	0.052	0.048	0.121	0.113	0.594	0.406	0.012	0.006	0.010	0.070	1.539	1.439
1.456	1.552	1.544	0.060	0.056	0.010	1.572	1.559	0.052	0.048	0.121	0.113	0.594	0.406	0.012	0.006	0.010	0.070	1.559	1.456
1.500	1.598	1.590	0.060	0.056	0.010	1.618	1.605	0.052	0.048	0.121	0.113	0.594	0.406	0.012	0.006	0.010	0.070	1.606	1.500
1.562	1.663	1.653	0.072	0.068	0.010	1.695	1.675	0.065	0.059	0.131	0.123	0.719	0.531	0.015	0.008	0.010	0.088	1.671	1.562
1.625	1.730	1.720	0.072	0.068	0.010	1.762	1.742	0.065	0.059	0.131	0.123	0.719	0.531	0.015	0.008	0.010	0.088	1.738	1.625
1.653	1.760	1.750	0.072	0.068	0.010	1.792	1.772	0.065	0.059	0.131	0.123	0.719	0.531	0.015	0.008	0.010	0.088	1.768	1.653
1.688	1.797	1.787	0.072	0.068	0.010	1.830	1.810	0.065	0.059	0.131	0.123	0.719	0.531	0.015	0.008	0.010	0.088	1.805	1.688
1.750	1.863	1.853	0.072	0.068	0.010	1.896	1.876	0.065	0.059	0.131	0.123	0.719	0.531	0.015	0.008	0.010	0.088	1.872	1.750
1.812	1.927	1.917	0.072	0.068	0.010	1.960	1.940	0.065	0.059	0.131	0.123	0.719	0.531	0.015	0.008	0.010	0.088	1.936	1.812
1.850	1.967	1.957	0.072	0.068	0.010	2.001	1.981	0.065	0.059	0.161	0.154	0.719	0.531	0.015	0.008	0.010	0.088	1.976	1.850
1.875	1.994	1.984	0.072	0.068	0.010	2.028	2.008	0.065	0.059	0.161	0.154	0.719	0.531	0.015	0.008	0.010	0.088	2.003	1.875
1.938	2.061	2.051	0.072	0.068	0.010	2.095	2.075	0.065	0.059	0.161	0.154	0.719	0.531	0.015	0.008	0.010	0.088	2.071	1.938
2.000	2.127	2.117	0.072	0.068	0.010	2.162	2.142	0.065	0.059	0.161	0.154	0.813	0.563	0.015	0.008	0.020	0.088	2.137	2.000
2.062	2.192	2.180	0.091	0.086	0.010	2.226	2.201	0.081	0.075	0.172	0.162	0.813	0.563	0.019	0.010	0.020	0.110	2.202	2.062
2.125	2.257	2.245	0.091	0.086	0.010	2.292	2.267	0.081	0.075	0.172	0.162	0.813	0.563	0.019	0.010	0.020	0.110	2.268	2.125
2.188	2.324	2.312	0.091	0.086	0.010	2.359	2.334	0.081	0.075	0.172	0.162	0.813	0.563	0.019	0.010	0.020	0.110	2.335	2.188
2.250	2.388	2.376	0.091	0.086	0.010	2.424	2.399	0.081	0.075	0.172	0.162	0.813	0.563	0.019	0.010	0.020	0.110	2.399	2.250
2.312	2.456	2.444	0.091	0.086	0.010	2.492	2.467	0.081	0.075	0.204	0.194	0.813	0.563	0.019	0.010	0.020	0.110	2.468	2.312
2.375	2.523	2.511	0.091	0.086	0.010	2.560	2.535	0.081	0.075	0.204	0.194	0.813	0.563	0.019	0.010	0.020	0.110	2.535	2.375
2.440	2.590	2.578	0.091	0.086	0.010	2.627	2.602	0.081	0.075	0.204	0.194	0.813	0.563	0.019	0.010	0.020	0.110	2.602	2.440
2.500	2.654	2.642	0.091	0.086	0.010	2.692	2.667	0.081	0.075	0.204	0.194	1.000	0.750	0.019	0.010	0.020	0.110	2.667	2.500
2.531	2.687	2.675	0.091	0.086	0.010	2.725	2.700	0.081	0.075	0.204	0.194	1.000	0.750	0.019	0.010	0.020	0.110	2.700	2.531
2.562	2.720	2.708	0.108	0.103	0.010	2.763	2.733	0.096	0.090	0.229	0.219	1.000	0.750	0.023	0.012	0.020	0.130	2.733	2.562
2.625	2.787	2.775	0.108	0.103	0.010	2.831	2.801	0.096	0.090	0.229	0.219	1.000	0.750	0.023	0.012	0.020	0.130	2.800	2.625
2.688	2.854	2.842	0.108	0.103	0.010	2.898	2.868	0.096	0.090	0.229	0.219	1.000	0.750	0.023	0.012	0.020	0.130	2.867	2.688
2.750	2.920	2.908	0.108	0.103	0.010	2.964	2.934	0.096	0.090	0.229	0.219	1.000	0.750	0.023	0.012	0.020	0.130	2.934	2.750
2.813	2.986	2.974	0.108	0.103	0.010	3.031	3.001	0.096	0.090	0.229	0.219	1.000	0.750	0.023	0.012	0.020	0.130	3.000	2.813
2.834	3.012	3.000	0.108	0.103	0.010	3.057	3.027	0.096	0.090	0.229	0.219	1.000	0.750	0.023	0.012	0.020	0.130	3.026	2.834
2.875	3.057	3.045	0.108	0.103	0.010	3.102	3.072	0.096	0.090	0.229	0.219	1.000	0.750	0.023	0.012	0.020	0.130	3.071	2.875
3.000	3.188	3.176	0.108	0.103	0.010	3.234	3.204	0.096	0.090	0.229	0.219	1.000	0.750	0.023	0.012	0.020	0.130	3.203	3.000
3.062	3.254	3.242	0.125	0.120	0.010	3.306	3.271	0.114	0.108	0.285	0.275	1.188	0.838	0.027	0.014	0.020	0.155	3.269	3.062
3.125	3.321	3.309	0.125	0.120	0.010	3.373	3.338	0.114	0.108	0.285	0.275	1.188	0.838	0.027	0.014	0.020	0.155	3.337	3.125
3.157	3.354	3.342	0.125	0.120	0.010	3.406	3.371	0.114	0.108	0.285	0.275	1.188	0.838	0.027	0.014	0.020	0.155	3.370	3.157
3.250	3.452	3.440	0.125	0.120	0.010	3.505	3.470	0.114	0.108	0.285	0.275	1.188	0.838	0.027	0.014	0.020	0.155	3.468	3.250
3.346	3.552	3.540	0.125	0.120	0.010	3.606	3.571	0.114	0.108	0.285	0.275	1.188	0.838	0.027	0.014	0.020	0.155	3.569	3.346
3.469	3.681	3.669	0.125	0.120	0.010	3.736	3.701	0.114	0.108	0.285	0.275	1.188	0.838	0.027	0.014	0.020	0.155	3.698	3.469
3.500	3.716	3.704	0.125	0.120	0.010	3.771	3.736	0.114	0.108	0.285	0.275	1.188	0.838	0.027	0.014	0.020	0.155	3.734	3.500
3.543	3.761	3.749	0.125	0.120	0.010	3.816	3.781	0.114	0.108	0.285	0.275	1.188	0.838	0.027	0.014	0.020	0.155	3.779	3.543
3.562	3.782	3.770	0.125	0.120	0.010	3.837	3.802	0.114	0.108	0.285	0.275	1.188	0.838	0.027	0.014	0.020	0.155	3.800	3.562
3.625	3.847	3.835	0.125	0.120	0.010	3.903	3.868	0.114	0.108	0.285	0.275	1.188	0.838	0.027	0.014	0.020	0.155	3.865	3.625

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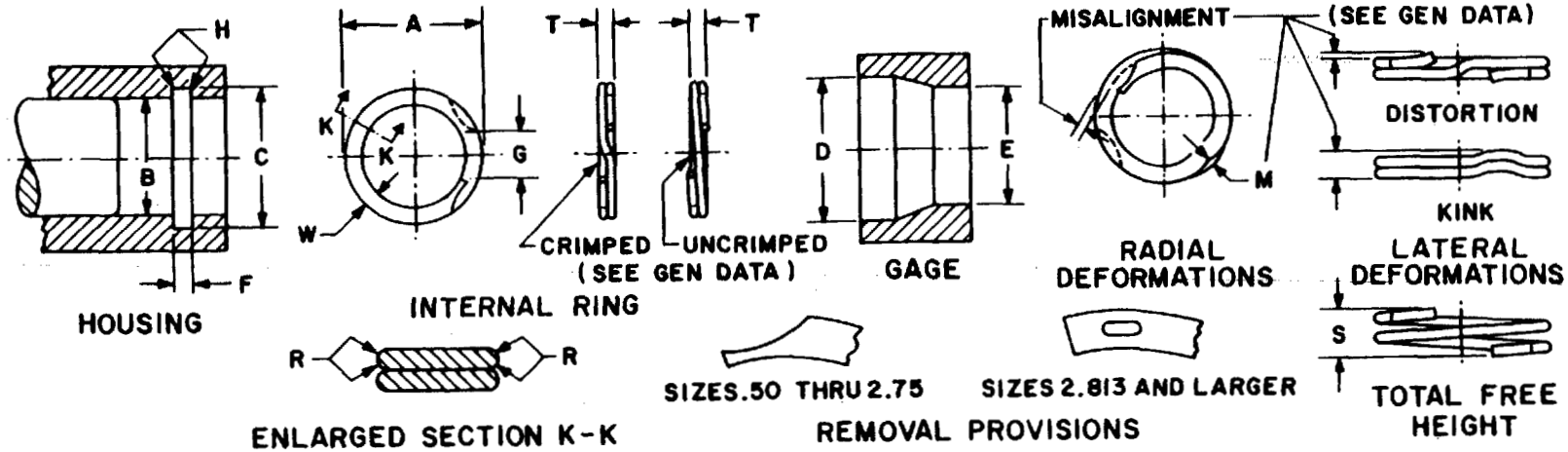


Table 4. Dimensions of Type 2B02 Heavy Duty Internal Retaining Rings, Grooves, and Gages (Continued)

Housing						Ring												Gage	
B	C		F		H	A		T		W		G		R		M	S	D	E
Nominal Size	Groove Dia.		Groove Width		Groove Radius	Free Outside Diameter		Ring Thickness		Section Width		Free Gap		Radius		Radial Deformation	Total Free Height	Dia.	Dia.
	Max	Min	Max	Min	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	+ 0.001 − 0.000	+ 0.000 − 0.001
3.750	3.980	3.968	0.125	0.120	0.010	4.037	4.002	0.114	0.108	0.316	0.304	1.438	1.188	0.027	0.014	0.020	0.155	3.999	3.750
3.875	4.113	4.101	0.125	0.120	0.010	4.171	4.136	0.114	0.108	0.316	0.304	1.438	1.188	0.027	0.014	0.020	0.155	4.132	3.875
3.938	4.180	4.168	0.125	0.120	0.010	4.238	4.203	0.114	0.108	0.316	0.304	1.438	1.188	0.027	0.014	0.020	0.155	4.200	3.938
4.000	4.246	4.234	0.125	0.120	0.010	4.305	4.270	0.114	0.108	0.316	0.304	1.438	1.188	0.027	0.014	0.020	0.155	4.266	4.000
4.125	4.345	4.333	0.125	0.120	0.010	4.404	4.369	0.114	0.108	0.316	0.304	1.438	1.188	0.027	0.014	0.020	0.155	4.366	4.125
4.250	4.476	4.464	0.125	0.120	0.010	4.536	4.501	0.114	0.108	0.316	0.304	1.438	1.188	0.027	0.014	0.020	0.155	4.497	4.250
4.330	4.562	4.550	0.125	0.120	0.010	4.623	4.588	0.114	0.108	0.316	0.304	1.438	1.188	0.027	0.014	0.020	0.155	4.584	4.330
4.500	4.741	4.729	0.125	0.120	0.010	4.803	4.768	0.114	0.108	0.316	0.304	1.438	1.188	0.027	0.014	0.020	0.155	4.764	4.500
4.625	4.871	4.859	0.125	0.120	0.010	4.934	4.899	0.114	0.108	0.316	0.304	1.438	1.188	0.027	0.014	0.020	0.155	4.894	4.625
4.750	5.001	4.989	0.125	0.120	0.010	5.065	5.030	0.114	0.108	0.316	0.304	1.438	1.188	0.027	0.014	0.020	0.155	5.025	4.750
5.000	5.266	5.254	0.125	0.120	0.010	5.332	5.297	0.114	0.108	0.316	0.304	1.938	1.688	0.027	0.014	0.020	0.155	5.280	5.000
5.250	5.527	5.513	0.145	0.139	0.010	5.609	5.559	0.131	0.123	0.354	0.342	1.938	1.688	0.031	0.016	0.020	0.178	5.553	5.250
5.375	5.567	5.553	0.145	0.139	0.010	5.740	5.690	0.131	0.123	0.354	0.342	1.938	1.688	0.031	0.016	0.020	0.178	5.594	5.375
5.500	5.777	5.763	0.145	0.139	0.010	5.860	5.810	0.131	0.123	0.354	0.342	1.938	1.688	0.031	0.016	0.020	0.178	5.805	5.500
5.750	6.027	6.013	0.145	0.139	0.010	6.112	6.062	0.131	0.123	0.354	0.342	1.938	1.688	0.031	0.016	0.020	0.178	6.056	5.750
6.000	6.277	6.263	0.145	0.139	0.010	6.364	6.314	0.131	0.123	0.354	0.342	1.938	1.688	0.031	0.016	0.020	0.178	6.307	6.000
6.250	6.538	6.522	0.182	0.174	0.010	6.631	6.576	0.161	0.151	0.384	0.372	1.938	1.688	0.038	0.019	0.020	0.218	6.569	6.250
6 500	6.798	6.782	0.182	0.174	0.010	6.893	6.838	0.161	0.151	0.384	0.372	1.938	1.688	0.038	0.019	0.020	0.218	6.831	6.500
6.625	6.933	6.917	0.182	0.174	0.010	7.029	6.974	0.161	0.151	0.384	0.372	1.938	1.688	0.038	0.019	0.020	0.218	6.966	6.625
6.750	7.063	7.047	0.182	0.174	0.010	7.160	7.105	0.161	0.151	0.384	0.372	1.938	1.688	0.038	0.019	0.020	0.218	7.097	6.750

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Table 4. Dimensions of Type 2B02 Heavy Duty Internal Retaining Rings, Grooves, and Gages (Continued)

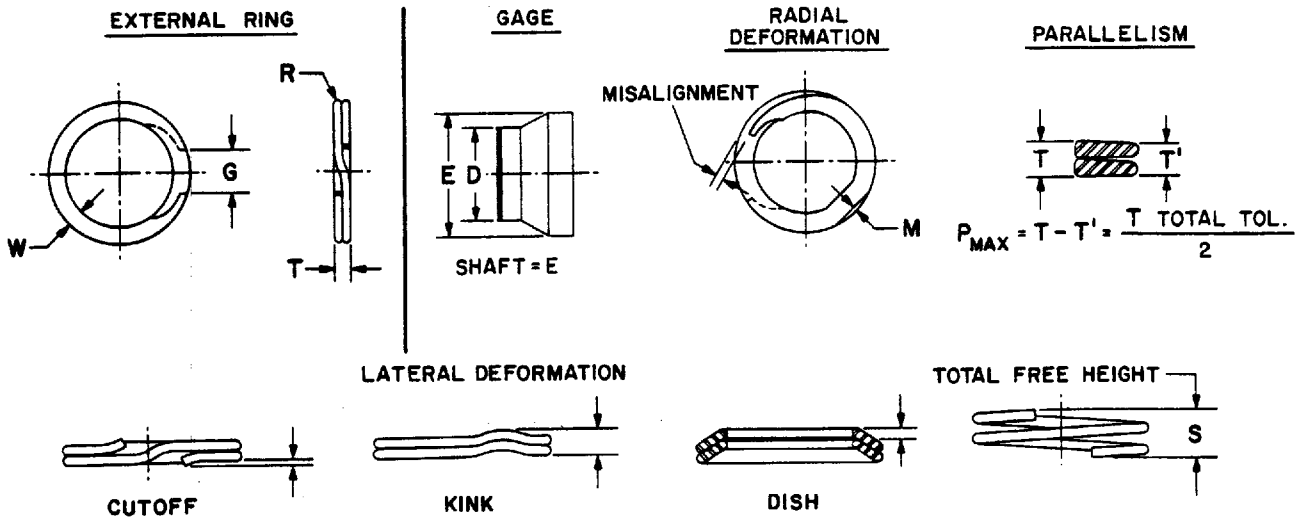
B	C		F	H	A		T		W	G		R	M	S	D	E
7.000	7.323	7.307	0.182	0.174	0.010	7.421	7.366	0.161	0.151	0.384	0.372	2.625	2.375	0.038	0.019	0.020	0.218	7.358	7.000
7.250	7.583	7.567	0.217	0.209	0.010	7.698	7.628	0.192	0.182	0.422	0.410	2.625	2.375	0.046	0.023	0.020	0.261	7.619	7.250
7.500	7.848	7.832	0.217	0.209	0.010	7.965	7.895	0.192	0.182	0.422	0.410	2.625	2.375	0.046	0.023	0.020	0.261	7.886	7.500
7.750	8.108	8.092	0.217	0.209	0.010	8.227	8.157	0.192	0.182	0.422	0.410	2.625	2.375	0.046	0.023	0.020	0.261	8.147	7.750
8.000	8.368	8.352	0.217	0.209	0.010	8.489	8.419	0.192	0.182	0.422	0.410	2.625	2.375	0.046	0.023	0.020	0.261	8.408	8.000
8.250	8.628	8.612	0.217	0.209	0.010	8.750	8.680	0.192	0.182	0.441	0.429	2.625	2.375	0.046	0.023	0.020	0.261	8.669	8.250
8.500	8.888	8.872	0.217	0.209	0.010	9.012	8.942	0.192	0.182	0.441	0.429	2.625	2.375	0.046	0.023	0.020	0.261	8.931	8.500
8.750	9.153	9.137	0.217	0.209	0.010	9.279	9.209	0.192	0.182	0.441	0.429	2.625	2.375	0.046	0.023	0.020	0.261	9.197	8.750
9.000	9.413	9.397	0.217	0.209	0.010	9.541	9.471	0.192	0.182	0.441	0.429	2.625	2.375	0.046	0.023	0.020	0.261	9.458	9.000
9.250	9.677	9.661	0.217	0.209	0.010	9.807	9.737	0.192	0.182	0.441	0.429	2.625	2.375	0.046	0.023	0.020	0.261	9.723	9.250
9.500	9.938	9.922	0.217	0.209	0.010	10.070	10.000	0.192	0.182	0.505	0.490	3.125	2.875	0.046	0.023	0.020	0.261	9.986	9.500
9.750	10.197	10.181	0.217	0.209	0.010	10.330	10.260	0.192	0.182	0.505	0.490	3.125	2.875	0.046	0.023	0.020	0.261	10.246	9.750
10.000	10.458	10.442	0.217	0.209	0.010	10.593	10.523	0.192	0.182	0.505	0.490	3.125	2.875	0.046	0.023	0.020	0.261	10.508	10.000
10.250	10.719	10.703	0.217	0.209	0.010	10.856	10.786	0.192	0.182	0.505	0.490	3.125	2.875	0.046	0.023	0.020	0.261	10.770	10.250
10.500	10.978	10.962	0.217	0.209	0.010	11.117	11.047	0.192	0.182	0.505	0.490	3.125	2.875	0.046	0.023	0.020	0.261	11.031	10.500
10.750	11.244	11.224	0.217	0.209	0.010	11.433	11.313	0.192	0.182	0.505	0.490	3.125	2.875	0.046	0.023	0.020	0.261	11.298	10.750
11.000	11.505	11.485	0.217	0.209	0.010	11.695	11.575	0.192	0.182	0.505	0.490	3.125	2.875	0.046	0.023	0.020	0.261	11.560	11.000
11.250	11.766	11.746	0.217	0.209	0.010	11.958	11.838	0.192	0.182	0.505	0.490	3.125	2.875	0.046	0.023	0.020	0.261	11.822	11.250
11.500	12.028	12.008	0.217	0.209	0.010	12.222	12.102	0.192	0.182	0.567	0.552	3.750	3.500	0.046	0.023	0.020	0.261	12.086	11.500
11.750	12.289	12.269	0.217	0.209	0.010	12.485	12.365	0.192	0.182	0.567	0.552	3.750	3.500	0.046	0.023	0.020	0.261	12.348	11.750
12.000	12.550	12.530	0.217	0.209	0.010	12.748	12.628	0.192	0.182	0.567	0.552	3.750	3.500	0.046	0.023	0.020	0.261	12.610	12.000
12.250	12.811	12.791	0.217	0.209	0.010	13.111	12.891	0.192	0.182	0.567	0.552	3.750	3.500	0.046	0.023	0.020	0.261	12.872	12.250
12.500	13.073	13.053	0.217	0.209	0.010	13.274	13.154	0.192	0.182	0.567	0.552	3.750	3.500	0.046	0.023	0.020	0.261	13.136	12.500
12.750	13.336	13.312	0.217	0.209	0.010	13.537	13.417	0.192	0.182	0.567	0.552	3.750	3.500	0.046	0.023	0.020	0.261	13.400	12.750
13.000	13.597	13.573	0.217	0.209	0.010	13.820	13.680	0.192	0.182	0.567	0.552	3.750	3.500	0.046	0.023	0.020	0.261	13.662	13.000
13.250	13.858	13.834	0.217	0.209	0.010	14.083	13.943	0.192	0.182	0.567	0.552	3.750	3.500	0.046	0.023	0.020	0.261	13.924	13.250
13.500	14.120	14.096	0.217	0.209	0.010	14.347	14.207	0.192	0.182	0.567	0.552	3.750	3.500	0.046	0.023	0.020	0.261	14.188	13.500
13.750	14.381	14.357	0.217	0.209	0.010	14.610	14.470	0.192	0.182	0.567	0.552	3.750	3.500	0.046	0.023	0.020	0.261	14.426	13.750
14.000	14.642	14.618	0.217	0.209	0.010	14.872	14.732	0.192	0.182	0.567	0.552	4.438	4.062	0.046	0.023	0.020	0.261	14.712	14.000
14.250	14.903	14.879	0.217	0.209	0.010	15.135	14.995	0.192	0.182	0.567	0.552	4.438	4.062	0.046	0.023	0.020	0.261	14.974	14.250
14.500	15.165	15.141	0.217	0.209	0.010	15.399	15.259	0.192	0.182	0.755	0.740	4.438	4.062	0.046	0.023	0.020	0.261	15.238	14.500
14.750	15.426	15.402	0.217	0.209	0.010	15.662	15.522	0.192	0.182	0.755	0.740	4.438	4.062	0.046	0.023	0.020	0.261	15.500	14.750
15.000	15.687	15.663	0.217	0.209	0.010	15.925	15.785	0.192	0.182	0.755	0.740	4.438	4.062	0.046	0.023	0.020	0.261	15.762	15.000

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APPENDIX I

RECOMMENDED STANDARD DRAWING FORMAT, RING, RETAINING TYPES 2A01 & 2A02

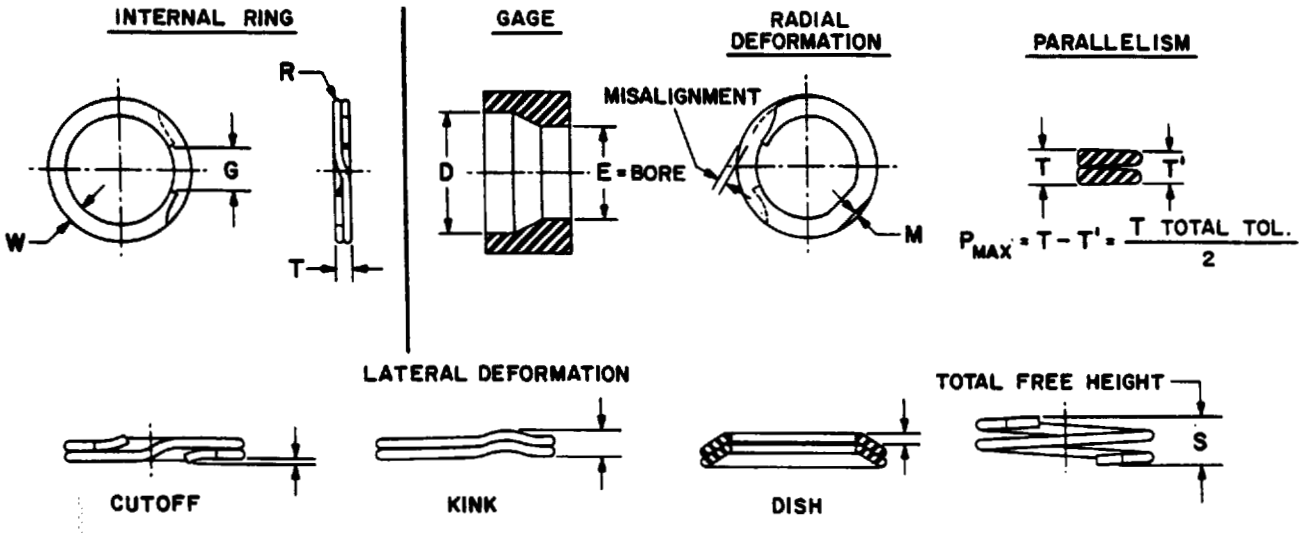


Ring Thickness	T	•	± •
Section Width	W	•	± •
Gap	G	•	− •
Radius or Corner Break	R	•	− •
Radial Deformation	M	•	MAX
Parallelism	P	•	MAX
Total Free Height	S	•	MAX
Rockwell Hardness		C 43–59	
After Expansion Over Gage Dia	E	•	− •
In Free State Must Not Be Entered by Gage Dia	D	•	− •
Recommended Groove Dia		•	− •
Recommended Minimum Groove Width		•	
Effective Ring Thickness, Including Lateral Deformation, When Ring is Placed Between Parallel Platens with 10 Lb Load		•	MAX

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APPENDIX I (CONTINUED)

RECOMMENDED STANDARD DRAWING FORMAT, RING, RETAINING TYPES 2B01 & 2B02



Ring Thickness	T	• ± •
Section Width	W	• ± •
Gap	G	• − •
Radius or Corner Break	R	• − •
Radial Deformation	M	• MAX
Parallelism	P	• MAX
Total Free Height	S	• MAX
Rockwell Hardness		C 43–59
After Compression to Enter Gage Dia	E	• − •
In Free State Must Not Be Entered by Gage Dia	D	• − •
Recommended Groove Dia		• − •
Recommended Minimum Groove Width		•
Effective Ring Thickness, Including Lateral Deformation, When Ring is Placed Between Parallel Platens with 10 Lb Load		MAX

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AMERICAN NATIONAL STANDARDS FOR SCREW THREADS, BOLTS, NUTS, RIVETS, SCREWS, WASHERS, MACHINE RINGS, AND SIMILAR FASTENERS

Unified Screw Threads	B1.1–1960
Unified Screw Threads-Metric Translation	B1.1a–1968
Gages and Gaging for Unified Screw Threads	B1.2–1966
Nomenclature, Definitions, and Letter Symbols for Screw Threads	B1.7–1965
Unified Miniature Screw Threads	B1.10–1958
Microscope Objective Thread	B1.11–1958
Class 5 Interference – Fit Thread	B1.12–1963
Small Solid Rivets (7/16 Inch Nominal Diameter and Smaller)	B18.1.1–1972
Large Rivets (1/2 Inch Nominal Diameter and Larger)	B18.1.2–1972
Square and Hex Bolts and Screws	B18.2.1–1972
Square and Hex Nuts	B18.2.2–1972
Socket Cap, Shoulder and Set Screws	B18.3–1969
Round Head Bolts	B18.5–1971
Wood Screws	B18.6.1–1972
Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws	B18.6.2–1972
Machine Screws and Machine Screw Nuts	B18.6.3–1972
Slotted and Recessed Head Tapping Screws and Metallic Drive Screws	B18.6.4–1966
General Purpose Semi-Tubular Rivets, Full Tubular Rivets, Split Rivets and Rivet Caps	B18.7–1966
Clevis Pins and Cotter Pins	B18.8.1–1972
Plow Bolts	B18.9–1958 (R. 1971)
Track Bolts and Nuts	B18.10–1963
Miniature Screws	B18.11–1961
Glossary of Terms for Mechanical Fasteners	B18.12–1962
Screw and Washer Assemblies – Sems	B18.13–1965
Forged Eyebolts	B18.15–1969
Wing Nuts, Thumb Screws, and Wing Screws	B18.17–1968
Lock Washers	B18.21.1–1972
Plain Washers	B27.2–1965
Beveled Washers	B27.4–1967
General Purpose Rectangular Uniform Section Retaining Rings	B27.5–1969
General Purpose Uniform Cross Section Spiral Retaining Rings	B27.6–1972

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