

government and industry standards

ADHERENCE TO STANDARDS

Truarc ring and plier products are designed to meet specific government and industry standards. If they are ordered to a specific standard, that standard must be stated on the purchase order. When the order is received, it is understood that the latest revision of the standard will apply.

Waldes Truarc Inc. inspects the hardness of Truarc retaining rings according to Mil. Std. 105 Level S4 AQL 0.25%. All other critical characteristics are inspected to MIL Std. 105 Level S4 AQL 1.0%. For critical applications, special inspection procedures can be provided for an additional charge.

For retaining rings:

- Department of Defense Military Specification MIL-R-21248B.
- Department of Defense Military Standards MS 16624 through MS 16634, MS 90707, MS 90708, MS 3215 through MS 3217 and MIL-STD-1515A.

[National Aircraft Standards *NAS 669 (basic internal type)* and *NAS 670 (basic external type)* have been superseded by Department of Defense Military Standards *MS 16625* and *MS 16624*, respectively. All orders received for *NAS 669* and *NAS 670* rings will be processed to conform with the latest revisions of the Military Standards.]

For pliers:

- Federal Specification GGG-P-480E (GSA-FSS)

Truarc products also are covered by the Government's Federal Manufacturers Code and Federal Stock Number coding system. These are described briefly at the end of this section.

MIL-R-21248B and MS 16624 thru MS 16634, MS 90707, MS 90708, MS 3215 thru MS 3217 and MIL-STD-1515A

Military Specifications MIL-R-21248B and Military Standards MS 16624 thru MS 16634, MS 90707, MS 90708, MS 3215 through MS 3217 and MIL-STD-1515A apply to various types of Truarc rings which are designated as

RING CHARACTERISTICS

Dish is considered any height difference occurring between the inner and outer peripheries of the ring (Figure 1, below). For specific limits, see Table 1, below.

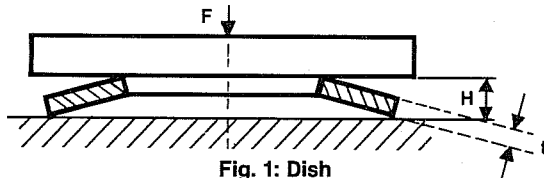


Fig. 1: Dish

Table 1: Limitations of Dish

For applicable ring series, the following parameters will apply:		
Ring Thickness (in.) (t)	Max. Allow. Dish (in.) (H-t)	Thrust Load (lbs.) (F)
0.010 - 0.015	0.002	2
0.025 - 0.035	0.003	5
0.042 - 0.093	0.005	10
0.109 - 0.125	0.010	15
0.156 - 0.187	0.015	20

"Rings, Retaining—Tapered and Reduced Section Types"

These documents are fully coordinated military standards which have been approved by the Department of Defense. They represent the widest possible basis of agreement among the various military agencies. Unlike previous standards which satisfied the needs of a single military agency MIL-R-21248B and MS 16624 through MS 16634, MS 90707, MS 90708, MS 3215 through MS 3217 and MIL-STD 1515A have been coordinated with all of the Services, with the specific objective of superseding individual Service standards.

The MIL-R is a procurement document intended primarily for inspectors and quality control personnel. It defines Government procurement requirements for the sixteen ring types covered in the Military Standards. The specification includes all dimensions required for receiving inspection, as well as allowable design irregularities, correct lot sampling sizes, and acceptable quality levels prescribed by MIL-STD-105.

MS 16624 thru MS 16634, MS 90707, MS 90708 and MS 3215 thru MS 3217 are intended for use by designers and draftsmen. They include complete ring dimensions and specifications; available materials and finishes, listed by Federal Specification numbers, and complete Rockwell hardness ranges according to ring size and material.

FEDERAL SPECIFICATION GGG-P-480E (GSA-FSS)

Federal Specification GGG-P-480E covers a number of different assembly tools, including Truarc retaining ring pliers. It is intended for use by procurement, inspection and production personnel.

The specification contains descriptions, illustrations and dimensions for pliers used for both internal and external type retaining rings. Material and finish specifications also are included, together with sampling, inspection and test procedures.

FEDERAL MANUFACTURERS CODE

This is a master listing of Government suppliers arranged alphabetically. Waldes Truarc/Industrial Retaining Ring has been assigned Code No. 97464. (Waldes No. 79136)

Burr is a raised solid protrusion caused by the metal shearing process (Figure 2, below). For specific limits, see Table 2, below.

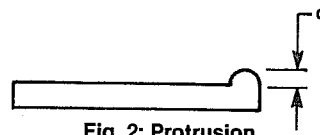


Fig. 2: Protrusion

Table 2: Limitations of Burr

For all series except push-on rings, the following parameters will apply:	
Material Thickness (in.)	Max. Allow. Burr (In.)
0.010 - 0.020	0.001
0.025	0.0015
0.035 - 0.109	0.002
0.125 and over	0.003

Overall Height is illustrated in figure 3, below. For specific limits, see Table 3, right.

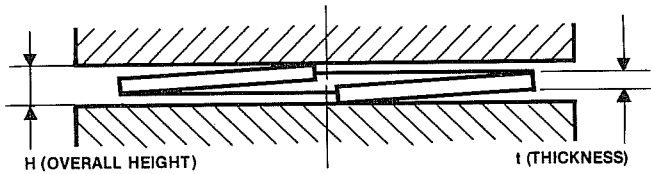


Fig. 3: Overall Height

Table 3: Limitations of Overall Height

- For applicable axial rings, the overall height shall not exceed . . . 3t
- For applicable radial rings, the overall height shall not exceed . . . 1½t for ring sizes up to and including .50" . . . 2t for ring sizes over .50".

Permanent Set is the difference between the ring diameter in the free condition and the diameter after the ring has been expanded or compressed. After the ring is installed in the specified groove or on the specified shaft, it should resist turning easily by hand.

CODING SYSTEMS

The tables below provide a quick cross-reference between Truarc, MIL-R and MS coding systems. Table 4 lists rings numbers and nomenclature. Tables 5 and 6 show materials and protective finishes.

Table 4: Truarc Series Numbers, MS and MIL-R Numbers

TRUARC CODING		MILITARY STANDARDS MS NO.	MIL-R-21248B CODING	
SERIES NO.	NOMENCLATURE		TYPE	CLASS
N5000	Basic, internal	16625	I-Flat	1
N5001	Bowed, internal	16629	II-Bowed	1
N5002	Beveled, internal	16631	III-Beveled	1
5008	Inverted, internal	16627	I-Flat	3
5100	Basic, external	16624	I-Flat	2
5101	Bowed, external	16628	II-Bowed	2
5102	Beveled, external	16630	III-Beveled	2
5103	Crescent®	16632	I-Flat	6
5107	Interlocking	90708	I-Flat	8
5108	Inverted, external	16626	I-Flat	4
5131	Bowed E-Ring	16634	II-Bowed	3
5133	E-Ring	16633	I-Flat	5
5139	Prong-Lock®	3216	II-Bowed	4
5144	Reinforced E-Ring	3215	I-Flat	9
5160	Heavy-Duty	3217	I-Flat	10
5555	GripinG®	90707	I-Flat	7

Table 5: Truarc Material Coding and MS Specifications

Truarc Code	MS Specification (As amended by MIL-R-21248B)
S	Steel, Carbon, Federal Standard 66. Nos. 1060 thru 1090
H	Steel, Corrosion resisting, passivated AMS 5520 or equivalent
C	Beryllium Copper, Federal Specification QQ-C-533

Table 6: Truarc Protective Finish Coding and MS Specifications

Truarc Code	MS Specification (As amended by MIL-R-21248B)
ZD	MIL-C-81562A or Zinc Plating, QQ Z-325B, Class 3 Type II
PP	Phosphate Coating, MIL-P-16232D, Type Z