

Material and Performance Requirements of Retainer Rings**FOREWORD:**

During the November 2005 update, section 3.2.1 was added to clarify the spiral flatness. This requirement is in line with Industry Standards.

1. **SCOPE:** This standard covers the material and performance requirements of E type, external and internal retainer rings for use on shafts and in bores.

Assembly information is covered in the Appendix.

1.1 REFERENCES:

WSD-M1A283-B50/51/52

Steel, cross reference for standard parts.

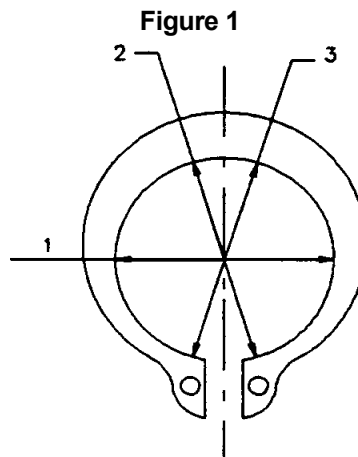
2. **MATERIAL:** Retainer rings shall be made from steel to WSD-M1A283-B50/51/52 hardened and tempered or austempered to 430 - 580HV.

3. PERFORMANCE:**3.1 PERMANENT SET****3.1.1 PERMANENT SET - EXTERNAL RETAINER RINGS**

A sample ring shall be expanded until it will just assemble on a shaft that has a diameter 1% larger than the nominal shaft diameter d_1 for the retainer ring to be tested. The ring shall show no signs of cracking when viewed at 10x magnification.

Measure the ring in 3 places as shown in Figure 1 and compute the average of the 3 dimensions obtained. The average diameter shall be less than the minimum groove diameter specified in Table A2 of the Appendix for the nominal size of the ring.

Repeat this procedure 3 more times with the same ring. No increase in permanent set is acceptable.

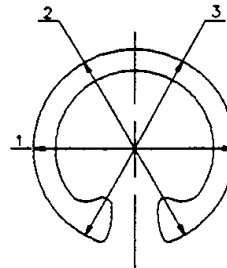


- 3.1.2 **PERMANENT SET - INTERNAL RETAINER RINGS:** A sample ring shall be compressed until the lugs touch. The ring shall show no signs of cracking when viewed at 10x magnification.

Measure the ring in 3 places as shown in Figure 2 and compute the average of the 3 dimensions obtained. The average diameter shall be greater than the maximum groove diameter specified in Table A1 of the Appendix for the nominal size of the ring.

Repeat this procedure 3 more times with the same ring. No increase in permanent set is acceptable.

Figure 2.



- 3.1.3 **PERMANENT SET - E TYPE RETAINER RINGS:** The ring shall be assembled in the minimum groove diameter as specified in Table A3 appropriate to the size of retainer ring to be tested. There shall be contact of all 3 lug points.

- 3.2 **DISHING:** Dishing (See Figure 3) shall not exceed the dimensions specified in Table 1 when received at Ford.

3.2.1 SPIRAL FLATNESS

Spiral flatness, defined as misalignment of the ends shall meet the following:
1.5 x material thickness up to 100mm nominal diameter and 1.8 for sizes over 100mm.

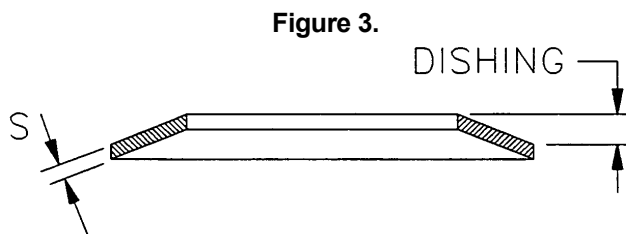


Figure 3.

Table 1.

Thickness s		Permissible Dishing
0.25	- 0.55	0.05
0.6	- 1	0.08
1.1	- 2.4	0.13
2.5	- 3.2	0.25
4	- 4.8	0.4

3.3 BENDING TEST:

The retainer ring shall be clamped as shown in Figure 4 and bent through 30°. There shall be no sign of fracture when view at 10x magnification.

Figure 4.

