

Materials

Standard material for retaining rings is carbon spring steel (SAE 1060-1090/UNS G10600-G10900). Rings can also be produced in our standard stainless steel (PH 15-7 Mo/UNS S15700) with 420 type cold rolled stainless steel (UNS S42000) as an option and in our standard beryllium copper (Alloy #25/UNS C17200) with copper alloy C72900 and phosphor bronze (Alloy#5218/UNS C52180) as options.

Please note that the availability of rings in the stainless steel and copper materials is subject to prior inquiry and acceptance of a formal quotation.

Rings can also be produced one gauge thicker or thinner than standard sizes. Again, such orders are subject to prior inquiry and acceptance of a formal quotation.

Characteristics of each material follow:

CARBON SPRING STEEL - This steel is known for its high strength, and reliability in retaining ring applications. Since carbon spring steel is subject to corrosion, such rings are treated with a protective coating to ensure some corrosion resistance. For long-term corrosion protection, a zinc plating or non-metallic finish should be applied over the steel. (See "Finishes" section).

STAINLESS STEEL -

- **PH 15-7 Mo** is an extra strength corrosion-resistant steel, capable of preventing atmospheric oxidation at temperatures up to 900° F. It also offers the following advantages:

1. Minimal distortion due to unique heat-treating process.
2. A minimum of 225,000 psi for high ultimate tensile strength.
3. High creep strength.

Note: We reserve the right to substitute PH 17-7 stainless steel material for PH 15-7 Mo on larger rings.

- **TYPE 420** - A less expensive alternative to PH 15-7. Since general corrosion resistance for this material is less than PH-15-7, use of this material depends upon the application. Contact Technical Sales for assistance.

- **DIN 1.4122** - A grade of stainless steel for retaining rings ordered in / for European countries.

BERYLLIUM COPPER ALLOY#25 - Applications that require conductivity are best served by this material. It is also characterized by excellent corrosion resistance and is particularly effective in sea air and seawater atmospheres.

PHOSPHOR BRONZE ALLOY#5218 - The least expensive copper material offered. This type exhibits higher strength compared to standard phosphor bronze materials with the same tin percentages. It is also characterized by very good stress relaxation characteristics. (Note: We can also supply phosphor bronze material to DIN standard 17 662, Material Number 2.1020.)

Material	Rotor Clip Code
Carbon Spring Steel SAE 1060-1090 (UNS G10600-G10900)	ST
Stainless Steel PH 15-7 Mo (Grade 632 - UNS S15700) 17-7 PH (Grade 631 - UNS S17700) 420 (UNS S42000) DIN 1.4122	SS SS* SC SG
Beryllium Copper UNS C17200	BC
Phosphor Bronze UNS C52180	PB

*Note: Large stainless steel rings may be supplied from 17-7 due to material availability. Contact factory for details.

Finishes

PHOSPHATE COATING (PA) - This standard finish is recommended over unfinished plain steel since it offers an extended shelf-life protection against rusting. RoHS compliant. **THERE IS NO ADDITIONAL CHARGE FOR THIS FINISH.**

PHOSPHATE AND OIL (PD) - This finish provides 8-hour salt spray protection. RoHS compliant.

PHOSPHATE WITH SEALER (PAL) - A coating is added to the finish to control loose phosphate crystals on the surface of the part. RoHS compliant.

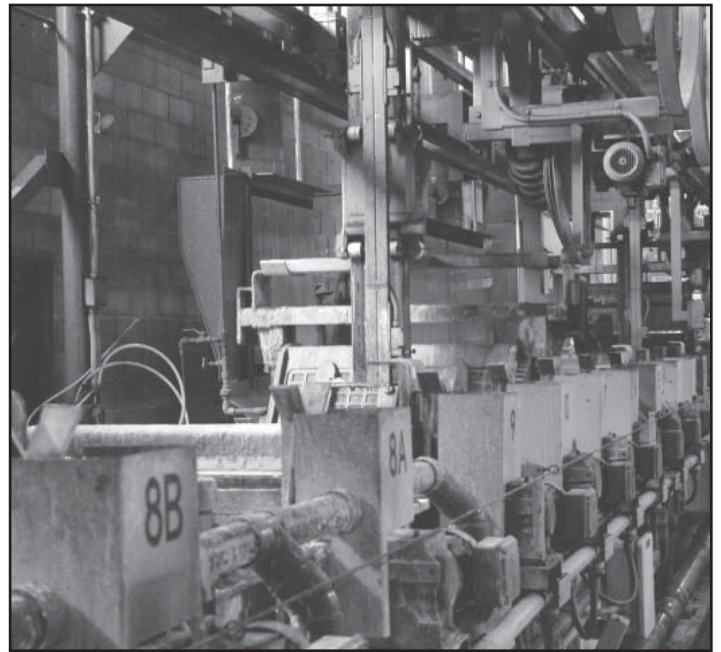
HEAVY PHOSPHATE AND OIL (HPD) - This finish provides 72 salt spray hours and can be used in place of costly stainless steel material in some applications. RoHS compliant.

ZINC PLATING (ZD) - This coating features a yellow dichromate post plating finish. It affords the metal excellent salt spray protection (96 hours) and is particularly effective for applications exposed to seawater. SAE 1060-1090 steel retaining rings are zinc plated using a mechanical plating process, which effectively eliminates hydrogen embrittlement.

ZINC BRIGHT (ZF) - Most of the dichromate is leached out of this process, leaving a “bright” silver finish on the parts. ZF offers some corrosion protection (48 hours), but is widely used when the aesthetics of the part are a factor.

ZINC DICHROMATE w/SEALER (ZDL) - This improved finish offers corrosion protection of up to 240 hours of salt spray protection. (**Heavy Zinc Dichromate with Sealer - HZDL** - offers 480 hours of salt spray protection.) It is a low cost substitution for costly non-corrosive materials such as stainless steel in some applications. Call for additional information.

TRIVALENT CHROMATE over ZINC (Z3X) - This coating meets global requirements for hexavalent-free coatings. **Z3X**, trivalent with a sealer, affords 240 salt spray hours of protection. RoHS & ELV compliant.



NOTE: Electroplating can not be successfully done with steel retaining rings due to the problems encountered with hydrogen embrittlement.

Finish	Code	Description	Salt Spray Hours	Color
Phosphate	PA	Shelf-Life	-	Black
	PD	Phosphate and Oil	8 (Red Rust)	Black
	PAL	Phosphate with Sealer	-	Black
	HPD	Heavy Phosphate and Oil	72 (Red Rust)	Black
Hexavalent Chrome	ZF	Zinc Bright	48 (Red Rust)	Silver
	ZD	Zinc Dichromate	96 (Red Rust)	Yellow
	ZDL	Zinc Dichromate Sealer	240 (Red Rust)	Yellow
	HZDL	Heavy Zinc Dichromate Sealer	480 (Red Rust)	Yellow
Trivalent	Z3X	Trivalent Chromate Zinc plus Sealer	96/240*	N/A
Optional Color Coding Finishes	ZFF	Zinc Flash	None	Silver
	CF	Copper Flash	None	Copper

* White Corrosion/Red Corrosion