



CIP Composites™

Hydraulic Wear Rings



Columbia Industrial Products

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www.cipcomposites.com

CIP Composites

CIP Composites are laminated composite bearing materials made by impregnating fabrics with thermosetting resins. The physical properties of CIP Composites make them an excellent choice for various bearing and wear applications.

CIP Composites offer an attractive, performance driven alternative to the more traditional phenolic materials commonly used for wear rings. CIP Composites are easily machined and perform excellently in heavy duty applications where high loads, shock and edge loading may be anticipated. CIP materials are non-metallic and do not contain fiberglass or any abrasive fillers (such as calcium carbonate).

CIP Wear Rings are designed to allow ideal movement between parts and prevent metal to metal contact in hydraulic cylinders. Reduce overall maintenance and increase wear life with CIP Wear Rings. These are ideal where high performance, large diameters and/or high temperatures are required.

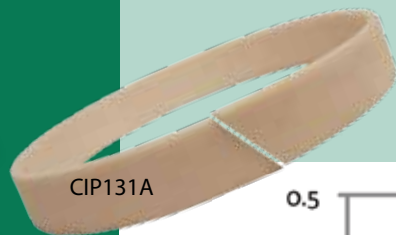


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CIP is dedicated to providing the highest quality material performance with exceptional customer service.

Offering customers:

- 24 Hour Emergency Support
- Technical/Engineering Support
- Short Lead Times

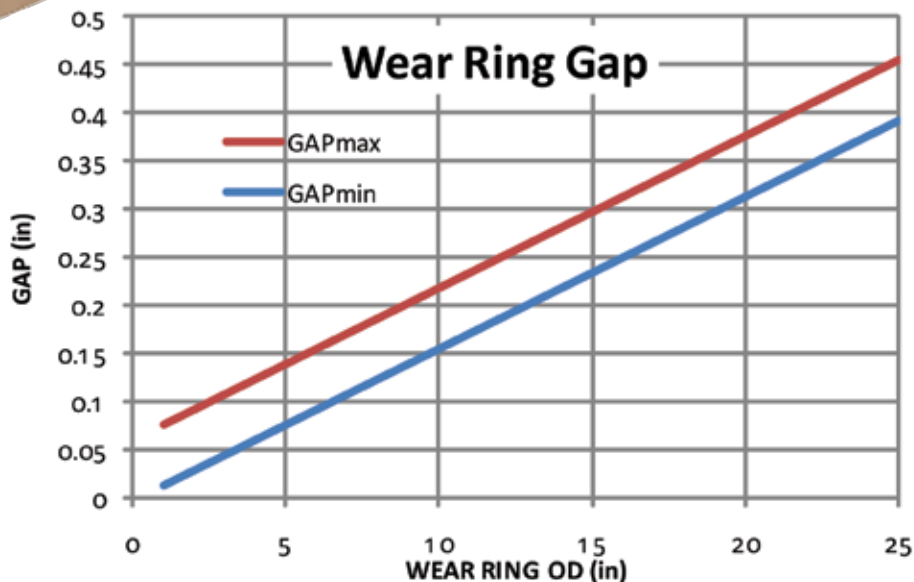
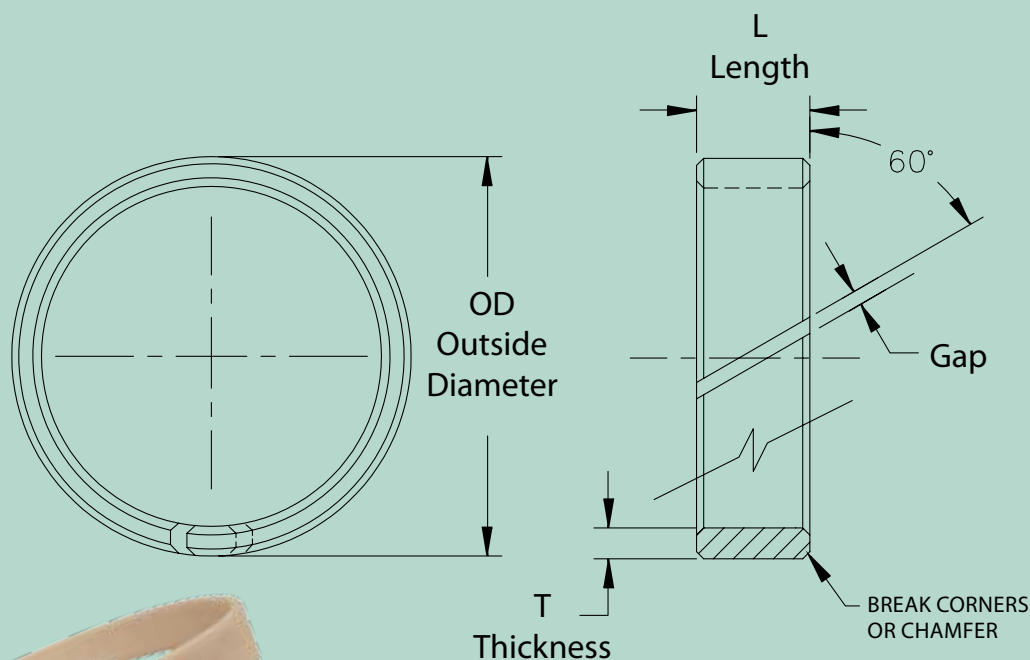


Custom Components

CIP custom manufactures all wear rings according to the customer's specifications. Based on outside diameter (OD), thickness (T), and length (L) wear rings are available in inch or metric dimensions. The angle cut allows for maximum bearing exposure.

CIP Wear Rings are designed with a specific gap to allow the material to expand without seizing in the cylinder. The recommended gap takes into account the rate of thermal expansion and is best determined according to the OD of the wear ring. (See graph below)

The surface finish of the mating component has a major effect on the performance of the wear ring and should be 0.1-0.8 $\mu\text{m Ra}$. Suitable materials are hardened steels or stainless.





Reliability through superior quality

Material Grades

CIP 111	Polyester Textile Graphite Lubricant Polyester Resin	Traditional Material	-40° to 200° F -40° to 93° C
CIP 131	Polyester Textile PTFE Lubrication Polyester Resin	Non-Conducting Material	-40° to 200° F -40° to 93° C
CIP 131A*	Polyester Textile PTFE Lubrication Polyester Resin Enhancement A**	High Performance, Non-Conducting Material	-40° to 200° F -40° to 93° C
CIP 133A	Polyester Textile PTFE Lubrication Vinyl Ester Resin Enhancement A*	High Temperature Material	-40° to 350° F -40° to 167° C

*CIP 131A is the industry's most common choice.

**Enhancement A is a proprietary lubricant added to the material to increase strength and decreasing friction.

Standard Material Increments

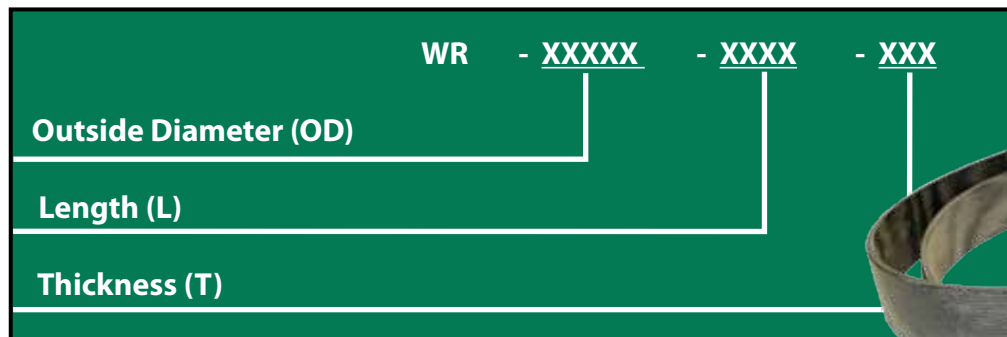
Minimum Outside Diameter..... 0.50" 12.7 mm
 Maximum Outside Diameter..... 54" 1371mm

Angles

30° - 45° - 60° - 90°

Benefits

- Self Lubricating
- High Load Capabilities
- Eliminate Stick-Slip
- Excellent Wear Life
- Edge Load Tolerant
- Shock Load Resistant
- Low Friction
- Low Moisture Absorption
- Easy to Machine
- No Abrasive Fillers (calcium carbonate)
- Non-Metallic
- High Temperature Capabilities
- Non-Conducting Materials Available



Outside Diameter 4.750 in
 Length 2.000 in **WR-04750-2000-125**
 Thickness .125 in



Mechanical & Physical Properties (Tested on CIP 100 Series sheet material)

Compressive Strength		ASTM D695	
Ultimate		50,000 PSI	345 MPa
Yield		15,000 PSI	103 MPa
Parallel		13,500 PSI	93 MPa
Tensile Strength		ASTM D638	
		11,000 PSI	75 MPa
Tensile Modulus of Elasticity		ASTM D638	
		470,000 PSI	3240 MPa
Poisson's Ratio		ASTM D3039-08	
		.231	
Shear Strength		ASTM D2344	
		12,000 PSI	83 MPa
Flexural Modulus of Elasticity		ASTM D790	
		260,000 PSI	1793 MPa
Hardness Rockwell M		ASTM D785	
		100	
Density		ASTM D792	
		0.047 lb/in ³	1.3 g/cm ³
Water Swell		ASTM D570	
		< 0.1%	
Coefficient of Friction			
Oil Immersion		0.02 - 0.04	
Dry		0.15 - 0.2	

Electrical Properties

Dielectric Strength	ASTM D149-97a	200 volts/mil
Volume Resistivity	ASTM D257-07	4.2 x 10 ¹⁵ ohm-cm

(Pertaining to Non-Graphite Material Grades)

Experience built it.
Innovation drives it.



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Chemical Resistance

	20° C 68° F	49° C 120° F
Acetic Acid 15/100%	S/U	L/U
Acetone 15/100%	S/U	L/U
Alcohol Ethyl 15/100%	S/S	S/S
Aluminum Sulfate	S	S
Ammonia Liquid	U	U
Ammonia Aqueous	U	U
Ammonium Carbonate	S	L
Ammonium Nitrate	S	S
Benzene	S	L
Bleach Liquors	S	L
Calcium Chloride	S	S
Calcium Hydroxide	U	U
Carbon Tetrachloride	S	S
Chlorine Water	S	L
Creosote	S	S
Citric Acid	S	S
Ethylene Glycol	S	S
Fatty Acids	S	S
Hydrochloric Acid	S	S
Hydrofluoric Acid	U	U
Maleic Acid	S	S
Naphtha	S	S
Nitric Acid 15/100%	S/U	S/U
Oxalic Acid	S	S
Phosphoric Acid	S	S
Phthalic Anhydride	S	S
Potassium Hydroxide	U	U
Sodium Carbonate 25/100%	S/L	S/U
Sodium Chloride	S	S
Sodium Hydroxide	U	U
Sodium Nitrate	S	S
Sodium Nitrite	S	S
Sulfuric Acid 50/100%	S/U	S/U
Trichlorethylene	U	U

S = Satisfactory
L = Satisfactory for limited service
U = Unsatisfactory
"Satisfactory" means that the material retains 50% or more of its original dry strength after immersion of at least six months.