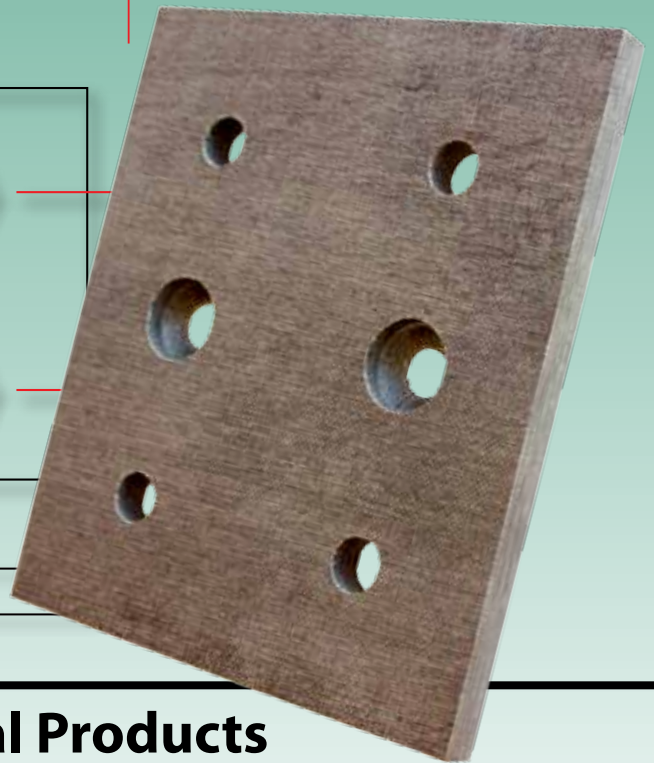
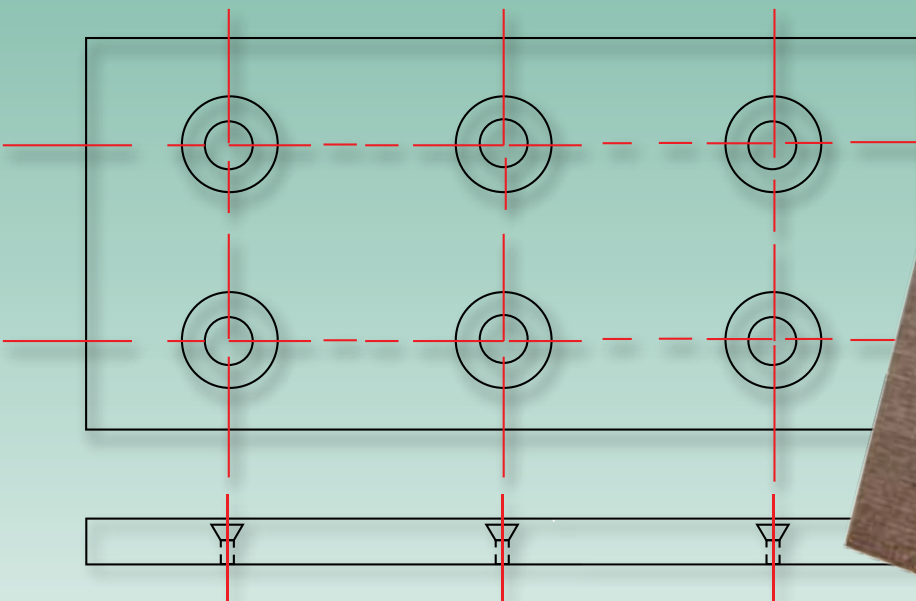
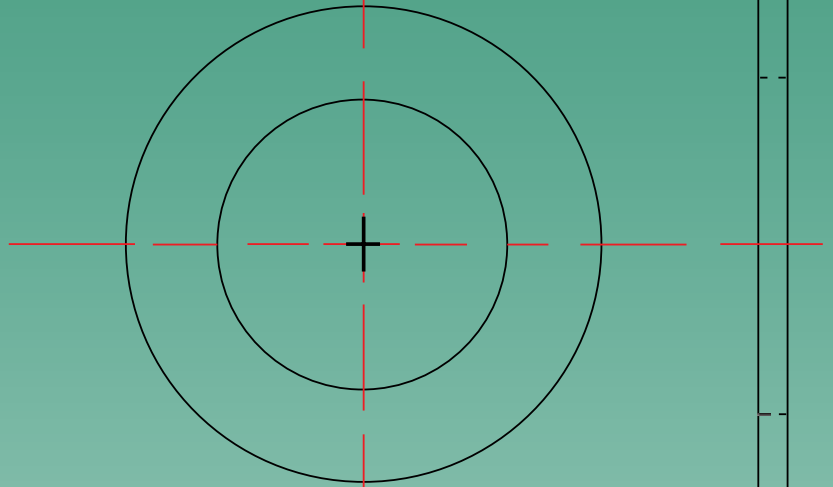




CIP Composites™

Wear Pads & Thrust Washers



Columbia Industrial Products

29538 Airport Road - Unit A - Eugene, OR 97402

Phone: 541-607-3655 - Fax: 541-607-3657

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 wear pad and thrust washer applications.

CIP Composites™ offer engineers an attractive, environmentally friendly, cost effective alternative to more traditional materials used commonly for wear pads, thrust washers and guide strips when compared to PTFE, UHMW, Cast Nylon and other traditional Phenolics. CIP Composites™ are easily machined and can be retained by countersunk screws and located by keeper plates where high lateral or shearing loads are anticipated. CIP materials can also be bonded using two-part epoxy resin adhesives. CIP materials have great dimensional stability, high load capabilities, and they do not contain abrasive fillers (such as calcium carbonate).

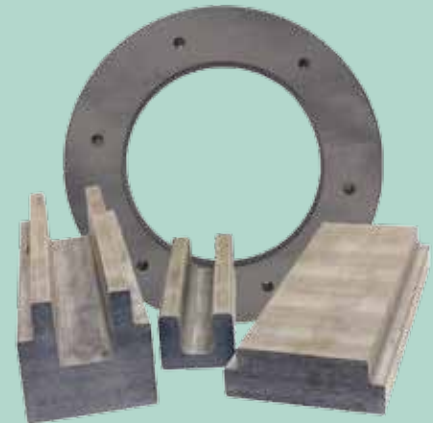


Columbia Industrial Products

CIP is dedicated to providing the highest quality material performance with exceptional customer service to build long term relationships.

Experience built it.

Innovation drives it.



Standard Material Increments

Tubes

Minimum Bore..... 3/8" (9.5mm)
Maximum Bore..... 60" (1524mm)
Standard Lengths..... 16" - 24" - 32" (406-609-812mm)

Sheets

Minimum Thickness..... 1/16" (1.6mm)
Maximum Thickness..... 6" (152.4mm)
Standard Widths..... 16" - 24" - 32" (406-609-812mm)
Standard Lengths..... 24" - 36" - 48" - 60" (609-914-1219-1524mm)

Custom Components

Special components can be manufactured to CIP or customer's drawings. Parts requiring hex, square or irregular ID shapes can be produced.



CIP Services World Wide

- Superior Customer Service
- 24 Hour Emergency Support
- Engineering & Technical Support
- Custom Sizes
- Short Lead Times

Benefits

- Self Lubricating
- No Abrasive Fillers (calcium carbonate)
- Environmentally Friendly
- Wet or Dry Running
- Exceptional Material Performance
- Stable in water, corrosive fluids and chemical solutions
- Low Coefficient of Friction
- Edge Load Tolerant
- Eliminate Stick Slip
- Excellent Wear Life
- High Shock Loading
- Low Moisture Absorption
- Custom Sizes
- Retained with countersunk screw/keeper plates
- Easy to Machine
- Machinable in Place
- Non-Conducting Materials Available

Physical Properties

Compressive Strength (ASTM D695)

Ultimate.....	50,000 PSI	345 MPa
Yield	15,000 PSI	103 MPa
Parallel.....	13,500 PSI	93 MPa
Modulus.....	500,000 PSI	3,447 MPa
Tensile Strength (ASTM D638)	11,000 PSI	75 MPa
Tensile Modulus of Elasticity (ASTM D638)	470,000 PSI	3,240 MPa
Poisson's Ratio (ASTM D3039-08)	0.231	
Shear Strength (ASTM D2344).....	12,000 PSI	82 MPa
Flexural Modulus of Elasticity (ASTM D790).....	260,000 PSI	1,793 MPa
Hardness Rockwell M (ASTM D785)	100	100
Density (ASTM D792)	0.047 lbs/in ³	1.3g/cm ³
Water Swell (ASTM D570).....	<0.15%	

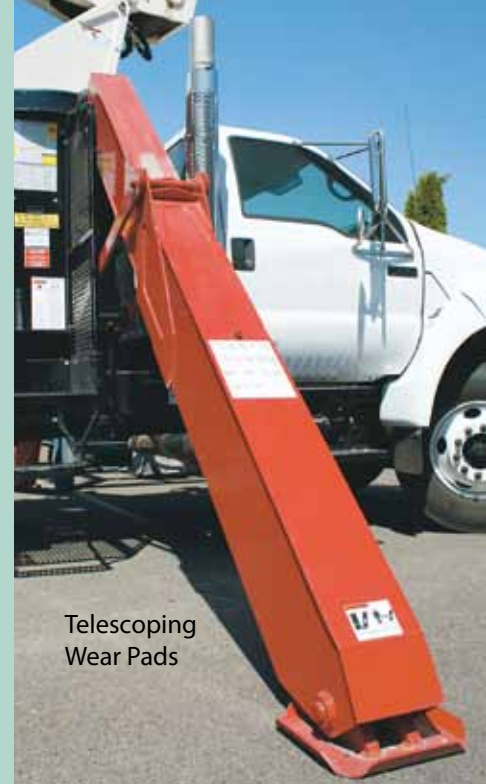
Thermal Properties

CIP 100 & 200 Materials

Operating Temperatures.....	-40° to 200° F	-40° to 93° C
Coefficient of Thermal Expansion.....	68° to 200° F	20° to 93° C
Normal to Laminate.....	3.5x10 ⁻⁵ /Δ° F	6.3x10 ⁻⁵ /Δ° C
Parallel to Laminate.....	1.8x10 ⁻⁵ /Δ° F	3.2x10 ⁻⁵ /Δ° C

CIP 300 Materials

Operating Temperatures.....	-40° to 400° F	-40° to 204° C
Coefficient of Thermal Expansion.....	68° to 400° F	20° to 204° C
Normal to Laminate.....	4.0x10 ⁻⁵ /Δ° F	7.2x10 ⁻⁵ /Δ° C
Parallel to Laminate.....	2.0x10 ⁻⁵ /Δ° F	3.6x10 ⁻⁵ /Δ° C



Telescoping
Wear Pads

Applications

- Wear Pads
- Thrust Washers
- Guide Strips



Reliability through
superior quality

Bonding

CIP Composites can be easily bonded to metals such as bronze, brass, aluminum, stainless steel and many other materials including itself. This can be accomplished by using two-part epoxy resin adhesives. (Manufacturer's recommendations must be strictly followed, particularly with reference to pretreatment of the surfaces.)



Inserts

CIP Composite wear pads can be fastened for desired applications. Wear pads can be retained by metal inserts that are embedded into the composite. Countersunk flat head screw, helicoils and Keenserts® are a few of the more commonly used fasteners.



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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 Sulphate	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
Sulphuric 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.