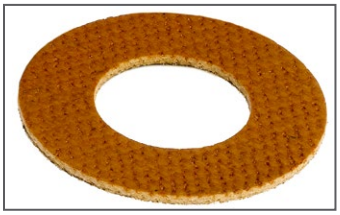
CW / CWW Thrust Bearings

TriStar

Engineered Plastic Solutions™



CW and CWW composite washers combine the low friction of a NOMEX/TEFLON wear surface with the strength of a resin-impregnated cotton board. The result is a high load, corrosion-resistant. self-lubricating alternative to plastic or metal thrust bearings.

Construction

Made with one or two wear surfaces, the resin-impregnated cotton board is laminated to NOMEX/TEFLON fabric under heat and pressure. The CW composite bearing is designed for the non-Teflon side to hold the bearing in place. while the mating surface slips against the NOMEX/TEFLON face. With the CWW washer, slip will occur against the face with the lowest interface friction. If friction changes during operation, the slip can change from one face to the other, constantly minimizing the torque requirement in any given design. Any appropriate mating surface will slip against the NOMEX/TEFLON surfaces of the CW and CWW washers, while allowing for up to .015 inch wear.

Mechanical Properties

When CW and CWW laminate is utilized on a smooth flat surface, it is capable of supporting dynamic loads to 15,000 psi maximum and static loads to 25,000 psi maximum at room temperature.

An elevation in temperature will decrease the bearing's load capacity slightly (the converse is also true for decreases in temperature). Typical load deflection curves at 75° F are shown in Fig. 15.

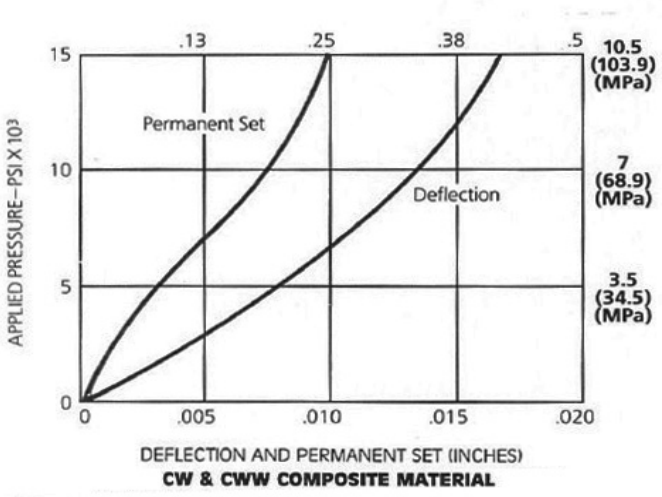


FIG. 15

Dynamic Properties

Mating surface roughness of 8-16 RMS, and a hardness of RC 50 or greater produces optimum wear life. If the mating surface is less than RC 50, more mating surface wear will occur. If the mating surface is hard and flat, the composite will glaze and continually lap itself to the flatness of the mating surface. resulting in low wear and long life. The coefficient of friction against a hardened RC 50 steel plate, with an 8-16 RMS, will vary from .02 to .25 depending on the load. the relative sliding velocity, and the bearing surface temperature. Generally, friction decreases with increasing temperature. The smoother the mating surfaces the lower the friction. It is also important that the mating surfaces have no sharp edges.

Operating without lubrication, CW and CWW washers perform best at speeds less than 150 SFM under light or heavy loads. With lubrication. speeds may be increased appreciably and the coefficient of friction may decrease by 90 percent.

The presence of clean lubricants in and around the CW and CWW composite generally will reduce the wear rate and increase the service life. Circulating fluid lubricants can remove heat. At high speeds, grease is an ineffective coolant. Dirt is naturally undesirable and will reduce bearing life.

PV for Thrust Bearings

Calculations of PV:

P [Unit Pressure] in lbs./sq. in. = $\frac{\text{Load [lb.]}}{\text{Bearing Area [in}^2\text{]}}$

V = [Surface Velocity in Feet/Minute]

[a] Rotational Motion [Against Circular Washer]

where: r^2 = radius of the thrust washer O.D. [in.]

r^1 = radius of the thrust washer I.D. [in.]

RPM = Revolutions Per Minute

$V = .52\ [RPM]\ [/6r^2 \mid 4r^1]$

[b] Oscillating Motion

where: N = Number of degrees per cycle as total travel

One cycle equals two reversals, i.e., for ± 25° oscillation, N = 100.

CPM = Cycles Per Minute

$V = .0014\ N\ [CPM]\ [.6r^2 + .4r^1]$

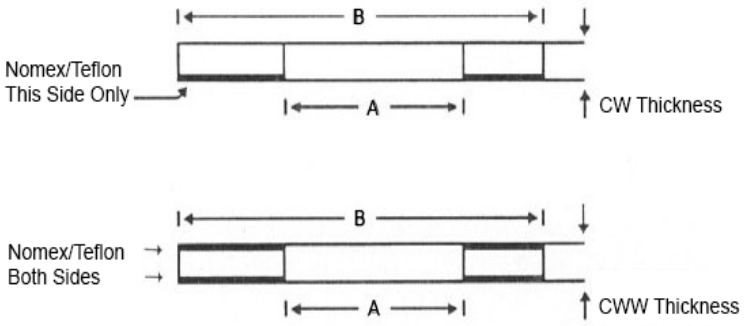
Corrosion Resistance

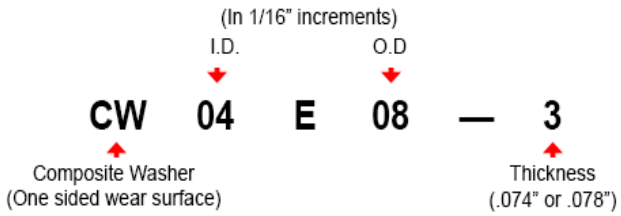
The CW and CWW laminate is unaffected by most corrosive environments, however, some acids are a problem. The bearing laminate eliminates fretting corrosion that normally occurs in metal bearings. Although the laminate has corrosion resistance, the mating surface may not. Therefore, it is recommended, for dry operation, that stainless steel or corrosion resistant materials be used. Carbon steels should be chrome plated for maximum protection and minimum wear. Lubricants or preservatives can be used to prevent rusting of the metals. Since the CW and CWW parts are non-metallic, they cannot rust.

Thermal Properties

The operating range for CW and CWW composite is -65°F to +250°F [-55°C to 120°C]. The material has been heat-stabilized at temperatures above +300°F [+150°Cl and minimal dimensional changes will occur in the bearing during operation.

Standard Sizes for CW and CW Series Thrust Bearings





Nominal I.D. and O.D.	ID [A]	O.D. [B] +000/-.020	CW Part Number .074" Thick*	CWW Part Number .78" Thick*
¼ x ½	.264 .254	.500	CW04E08-3	CWW04E08-3
⅜ x ¾	.389 .379	.750	CW06E12-3	CWW06E12-3
½ x 1	.513 .503	1.000	CW08E16-3	CWW08E16-3
⅝ x 1 ¼	.638 .628	1.250	CW10E20-3	CWW10E20-3
¾ x 1 ½	.764 .754	1.500	CW12E24-3	CWW12E24-3
⅞ x 1 ¾	.888 .878	1.750	CW14E28-3	CWW14E28-3
1 x 2	1.014 1.004	2.000	CW16E32-3	CWW16E32-3
1 ⅛ x 2 ⅛	1.150 1.130	2.125	CW18E34-3	CWW18E34-3
1 ¼ x 2 ¼	1.273 1.253	2.250	CW20E36-3	CWW20E36-3
1 ⅜ x 2 ½	1.399 1.379	2.500	CW22E40-3	CWW22E40-3
1 ½ x 2 ⅝	1.524 1.504	2.625	CW24E42-3	CWW24E42-3
1 ⅝ x 2 ¾	1.649 1.629	2.750	CW26E44-3	CWW26E44-3
1 ¾ x 2 ⅞	1.774 1.754	2.875	CW28E46-3	CWW28E46-3
2 x 3 ¼	2.024 2.004	3.250	CW32E52-3	CWW32E52-3
2 ¼ x 3 ⅜	2.273 2.253	3.375	CW36E54-3	CWW36E54-3
2 ½ x 3 ¾	2.524 2.504	3.750	CW40E60-3	CWW40E60-3
2 ¾ x 4 ⅛	2.774 2.754	4,125	CW44E66-3	CWW44E66-3
3 x 4 ½	3.024 3.004	4.500	CW48E72-3	CWW48E72-3

* Thickness tolerance +/1 .002

Sizes not listed above may be quoted upon request.

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CJ Composite

- Self-Lubricating
- Low weight | High Strength
- Chemical Resistance
- Direct replacement for Bronze

Ultracomp®

- Self-Lubricating
- High Load | Low Speed
- 54,400 PSI Compressive Strength
- Exceptional Resistance to Vibration and Impact

TriSteel™

- Self-Lubricating
- High Load | High Speed
- Metal Backed Bearing System
- 100% Lead Free

Rulon®

- Self-Lubricating
- Low weight | High Strength
- Low Coefficient of Friction
- Chemically Resistant

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