Ultracomp Series

Ultracomp Bearing Grade Composites meet the rigorous needs of high load, low speed plane bearing applications. Ultracomp is self-lubricating, easy to machine, has exceptional resistance to vibration and impact, and an ultimate compressive strength of up to 54,400 psi. Ultracomp is produced using synthetic resins and reinforcing fibers with a series of internal lubricants. Therefore, it is an excellent choice for wet or dry, dirty or clean applications, and where loads exceed all other non-metallic bearing materials. Ultracomp excels in linear, oscillating, and rotary applications that require high load and low speed conditions. It is available in tube, sheet stock, or can be fabricated into custom bearings to your specifications.

UC-200 - Bearing Grade Polyester/Graphite Composite Designed for high load, high impact, slow speed, and vibratory applications. UC200 has excellent abrasion resistance, does not require lubrication, and has extremely low moisture absorption. Runs best on shafts with RC30 or higher.

UC-300 - Bearing Grade Polyester/Graphite Composite Similar in construction to UC-200, PTFE lubricant added to resin matrix for rotary or linear applications to reduce its coefficient of friction. Runs well against stainless and aluminum.

U-400 - Bearing Grade Polyester/MOS2 Composite Similar in construction to UC-200 with moly lubricant for slow rotary, salt water, and dry oscillation applications.

UC-500 - Bearing Grade Polyester/Graphite Composite Unique interwoven laminate using PTFE, polyester fibers, and graphite lubricant. Excellent material for full rotary applications where self-lubricated low friction and long wear is required.

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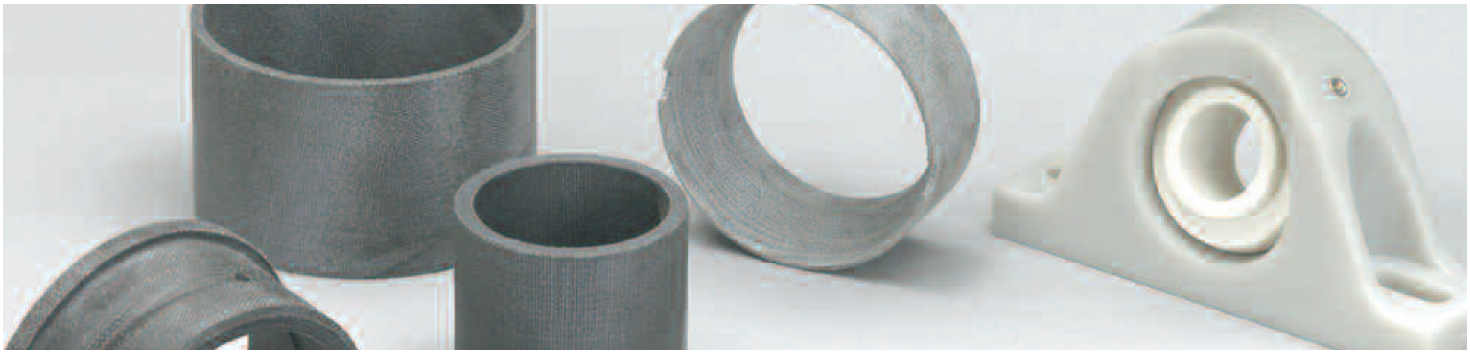
Technical Specifications

Recommended Operating Limits and Engineering Information

Properties	Units	UC200	UC300	UC400	UC500
Specific Gravity	g/cc	1.35	1.35	1.32	1.35
Tensile Strength	psi	17,500	17,500	9,500	17,500
Elongation	%	26	26	26	26
Compressive Strength Perpendicular to Laminate					
Yield	psi	18,500	14,000	16,000	18,000
Ultimate	psi	54,400	45,000	52,000	50,000
Modulus	psi	750,000	650,000	730,000	750,000
Impact Strength, Notched	ft.lbs./in. of notch	>20	>20	>20	>20
Flexural Strength	psi	13,500	14,000	13,000	13,500
Operating Temperature					
Minimum	-	Cryogenic	Cryogenic	Cryogenic	Cryogenic
Maximum - Continuous	°F Max.	266	266	266	266
Maximum - Short Term	°F Max.	360	360	360	360
Coefficient of Friction - Dry	-	0.15	0.08	0.12	0.15
Water Absorption, 24 Hours Saturation	%	<0.1	<0.1	<0.1	<0.1



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Ultracomp Series

Stock Shapes

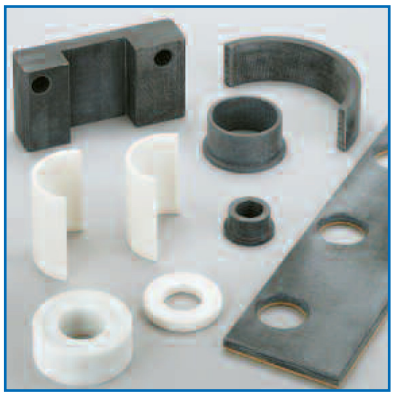
Benefits
54,400 PSI Compressive Strength
Sheet & Tubing
Near Zero Moisture Absorption
Economical

Applications
Railroad Components
Off-Road Vehicles & Equipment
Mining & Mineral Processing
Timber, Pulp & Paper Handling
Ship Rudder Bearings

Spherical Bearings

Benefits
High Load/Vibration
Wash Down Resistant
Self-Lubricating
Maintenance Free

Applications
Spherical, Sleeve, and Flanged Bearings
Conveyor Bearings
Aircraft & Ground Support Equipment
Waste Water & Slurry Bearings
Amusement Parks



Fabricated Parts

Benefits
Easily Machined
Light Weight
Multi-Surface Bearing Material
Impact & Shock Resistant

Applications
Machined Components
Slide Plates/Guide Rails
Chemical Plant/Outdoor Applications
Hydraulic Wear Rings
Marine Cranes

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Design Considerations

Load
All Ultracomp products have very high compressive strength and can carry a sustained static load of over 50,000 psi. However, it is important to remember that dynamic loads must consider compressive yield factors to determine the maximum operating potential. Please contact Daemar for design assistance.

Lubrication
While Ultracomp is classified as a self lubricating material the use of lubrication will, in most cases, enhance the long term performance of the bearings. Friction is reduced and thus heat buildup so wear life is extended. In high load, oscillating applications the lubricating additives in the Ultracomp are drawn to the surface and maintain a continuous source of low friction lubrication film. The use of heavy greases can cause debris to become trapped and result in a lapping effect on the bearing. Daemar recommends a light weight oil or grease if your application requires any lubrication.

Friction
Coefficient of friction is directly affected by load and speed of the application. As a rule, the coefficient of friction values of Ultracomp are between 0.08 and 0.15. The higher the working load, the lower the friction values will be. Stick slip is virtually eliminated after break in of the bearing and ongoing static and dynamic friction will be consistent from that point on. For more specific frictional values contact Daemar.

Mating Surfaces
For optimum wear and friction performance, Daemar recommends a 12-16rms surface finish on the dynamic mating surface. The static surface of the hardware should be 32 rms for improved bearing retention. Minimum hardness of the dynamic mating component should be 45RC or harder. We recommend against chrome plate as it can increase wear of the bearing. ENP, Plasma and other hard coat processes are desirable. Stainless steel can be used with Ultracomp products in certain conditions but we recommend you call Daemar to review the particulars of your application.

Installation of Ultracomp Bearings
There are several factors to take into consideration for the proper fit of Ultracomp bearing materials is dependent upon close adherence to these design factors. Please refer to Charts 1 thru 3 on page 6 for Press Fit, Close In and Running Clearance data. Ultracomp bearings can be freeze fitted or adhesively bonded in certain applications. Contact Daemar for any questions regarding fit and finish.

Speed
In most cases, the maximum sustained speed for Ultracomp is 15 sfpm. Since Ultracomp is a insulative material, frictional heat generation does not allow for high rotational speeds. In lubrication, speeds can be dramatically higher. Due to the heat transfer properties of the fluid. Water is an excellent lubricating media for Ultracomp as are all greases and oils. Daemar has other options available for higher speed applications so please consult our Technical Team for further assistance.

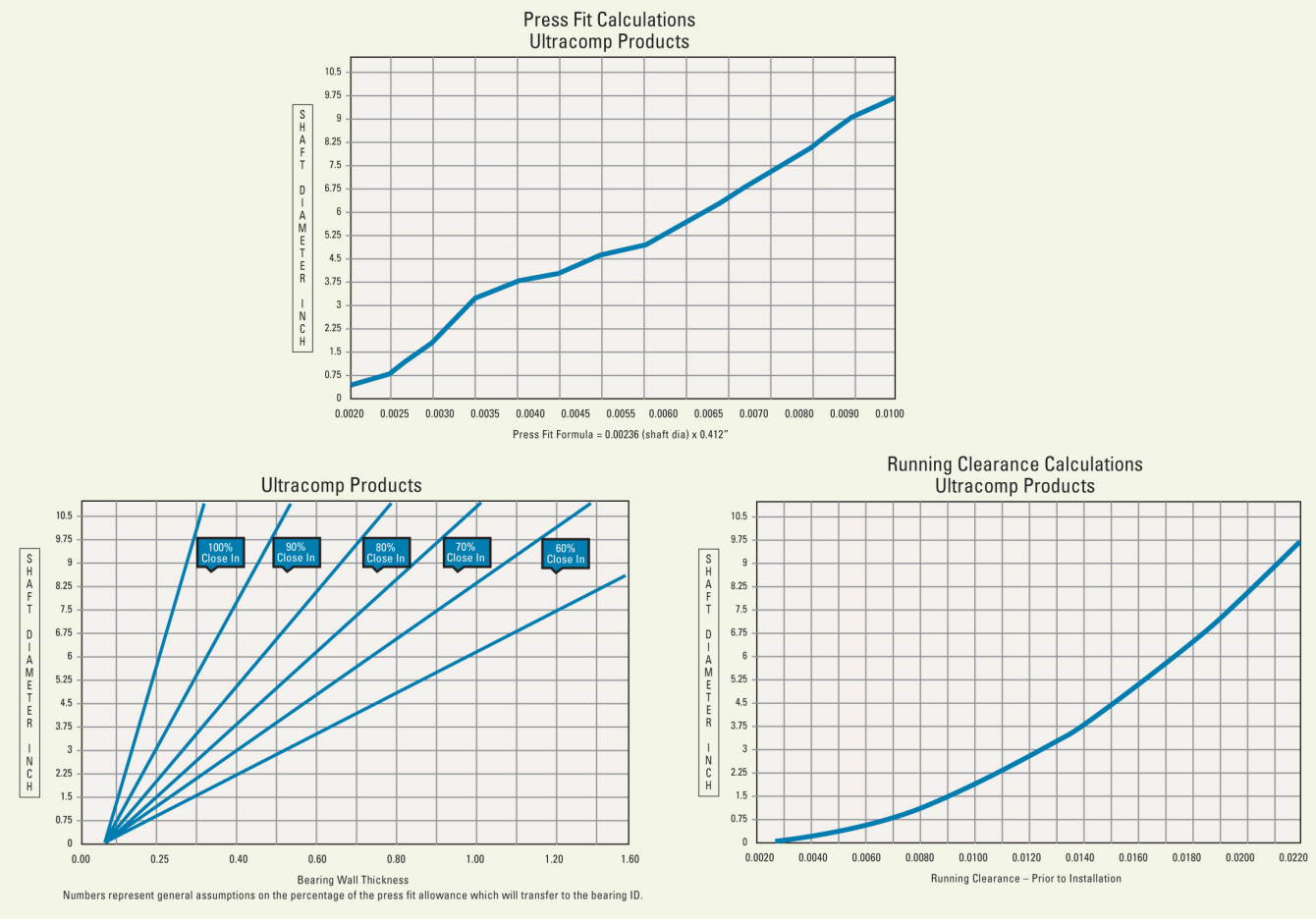
Chemical Resistance
Ultracomp products are resistant to most chemicals including acids and bases. Active solvents, however, can be a problem. Ultracomp is UV stable and is recommended for long term outdoor use.

Electrical and Magnetic
Ultracomp products are excellent dielectric materials and can be used in power switchgears, dielectric standoffs, thrust rings and similar gear. Ultracomp is nonmagnetic and will not sustain a static charge.

Insulation Resistance – 2,000 MegaOhms
Dielectric Strength – 210 V/mil

Thermal Expansion
Since Ultracomp products are insulative by nature, it is very important to consider thermal expansion values during the design process. Press fits and running clearances can be affected dramatically by thermal cycling and, when combined with frictional heat, can be the difference between success or failure of the bearing.

Ultracomp Series



Thermal Properties of Ultracomp Bearings

Coeffificient of Thermal Expansion (in/in/°F x 10E5)	UC200	UC300	UC400	UC500
Perpendicular to Laminate	6.24	6.24	6.24	6.24
Parallel to Laminate	3.3	3.3	3.3	3.3
Maximum Operating Temperature				
Short Term	350	350	350	350
Long Term	266	266	266	266
Minimum Operating Temperature	Cryogenic	Cryogenic	Cryogenic	Cryogenic

Calulating Thermal Expansion of an Ultracomp Bearing

Formula: Bearing Wall Thickness x T x CoTE

Example: 2" ID x .250" Wall BearOperating At 125°F.

Wall = .250 x 2

Ambient Temp = 68°F - Operating Temp. 125°F

- Difference is 57° F

Therefore - 2 x .250 x 57 x .0000624 = 0.0018

Bore Closure Due to Thermal Expa0.0018" (Perpindicular)

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Material Selection Process (MSP)

In all plastic component designs, material selection is critical. During the selection process, one should consider the following factors to ensure the best possible selection.

Temperature

All plastics are affected by ambient heat and have a maximum continuous service temperature. The maximum continuous service temperature is not a melting point, but is the highest temperature at which a material will retain physical integrity. Important: Note that elevated temperatures affect material properties in a negative manner and should be carefully reviewed before use.

Temperature Variation

All plastic materials have coefficients of thermal expansion. Measured in in/in/°F, plastic materials vary greatly not only from each other, but in some cases ten times that of metallic counter parts. As a result, we consider temperature variations. Components should be designed to meet required service temperature. Not doing so may result in premature failure.

Environmental Conditions

Always consider the following environmental conditions under which the material must operate:

- Contact with debris such as sand, grit or dust
- Contact with chemicals such as strong acids, bases and caustics
- Contact with water, constant spray or wash downs
- FDA or USDA compliance
- Thermal Conductivity
- Radiation Exposure
- Microwave Exposure.

Other Considerations

- Size and Shape Availability
- Material Cost/Economy
- Machinability
- Standard or Custom Runs
- Custom Compounds