

Advanced HiMod® Composite Bearings



Strong and light thermoplastic composite bearings for demanding environments.

At Trelleborg Sealing Solutions, we're experts in innovating and producing high-performance composite parts. Our solutions bring additive manufacturing technology to advanced composites, creating customized parts for critical applications in demanding environments around the world.

Our patented Automated Fiber Placement (AFP) technology is a robotic fabrication method for thermoset and thermoplastic composites. It creates high-quality, consistent and repeatable parts using a heating system to bond composite layers to one another. AFP is used to manufacture HiMod® Thermoplastic Composite Bearings that are often used as plain bearings, wear rings and bushings in a wide range of industries. Unlike other non-metal bearings, these do not crack or swell in extreme conditions making them a reliable choice for a wide range of applications. These unique bearings can operate from an extremely low temperature of -156 °C to +274 °C / -250 °F to +525 °F and are capable of continuous service even when wet, with nearly zero water absorption.

Available As:

- HiMod® Advanced Composite Bearing – continuous carbon fiber PEEK composite
- HiMod® Advanced Composite Bearing Plus – enhanced dual-layer bearing with a low friction modified PEEK liner, bonded to continuous carbon fiber PEEK composite backing
- Sizes up to 5ft (1.52m) outer diameter and 40ft (12.2m) lengths

- Made-to-order finished machined structures, stock cylinders and flanged plain bearings

Applications

- Petrochemical pump wear rings
- Oil & Gas swivel joint back-up rings
- Aerospace landing gear high-load bearings
- Aerospace hydraulic actuator housings
- Industrial heavy truck high-load bearings

Material Benefits

- Will not seize or gall
- Allows tight tolerances when mating components
- Can withstand short-term dry running wear
- Lightweight with high specific strength
- Nearly zero CTE with traditional layup
- Higher CTE available
- High chemical resistance: Continuous Carbon Fiber/PEEK
- Nearly zero moisture absorption
- Up to 50% less friction with HiMod® Advanced Composite Bearing Plus

HiMod® Advanced Composite Bearing Properties

Bearing Properties*	HiMod® Advanced Composite Bearing Carbon/PEEK	HiMod® Advanced Composite Bearing Carbon/PEEK Backing + Solid lubricant-filled PEEK Liner	Test Method
Max. Compression Strength , ksi (MPa) Through-thickness direction	194 (1,338)	130 (896.3)	ISO 604
Modulus , msi (MPa) Through-thickness direction	1.5 (10,342)	1.26 (8,687)	ISO 604
Operating Temperature Range , °F (°C) Varies with loading and constraints	-250 °F to +525 °F (-156 °C to +274 °C)	-250 °F to +525 °F (-156 °C to +274 °C)	-
Coefficient of Friction Dynamic, dry, chrome plate steel	0.15	0.07	In-house friction/wear test
Max. PV Value , psi-ft/min (MPa-m/min) Dry, Max. tested 900fpm (4.57 m/s), 4,500psi (31 MPa), 1018 Steel, 16 ± 2 µin Ra	250,000 (525) ¹	- ²	¹ ASTM D3702 ² In-house PV test Reached test machine limit before failure
Wear Factor , 10 ⁻¹⁰ in ³ min/ft. lb. hr. (10 ⁻⁸ mm ³ /N-m)	4.38 (8.82)	-	In-house friction/wear test
Type of Maintenance	Maintenance Free	Maintenance Free	-
Coefficient Linear Thermal Expansion , 10 ⁻⁶ /°F (10 ⁻⁶ /°C) Varies with layup	0.15 to 17.0 (0.27 to 30.6)	0.15 to 17.0 (0.27 to 30.6)	-

*HiMod® Advanced Composite Bearing raw material is unidirectional, continuous carbon fiber reinforced PEEK, 60% fiber volume. Test conditions are +73 °F (+23 °C), ambient. Friction and wear properties vary with test method, counter surface material, roughness, ambient conditions, and PV combination.

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9900099ENG0722