



Abrasive-Resistant Thermoplastics

Sand and other abrasives are often a challenge for pump users in the power industry. Clearances on line shaft bearings and bowl wear rings open up, increasing pump vibrations and reducing pump efficiency. Greene Tweed's proprietary AR[®] thermoplastic materials exhibit outstanding wear characteristics in media containing solids.

Applications

- » Circulating water pumps
- » Screen wash pumps
- » Open and closed cooling water pumps
- » Sump pumps
- » River water pumps

Availability

Greene Tweed manufactures AR[®]1 machined components worldwide at our own QRCs (Quick Response Centers), dedicated machine centers, making them readily available in short lead times. Greene Tweed's on-site manufacturing capabilities allow us to produce simple or complex parts to our customers' specifications. Billet sizes range from diameters of 1 in. to 30 in. (2.5 cm to 76 cm) with lengths up to 9 in. (22.85 cm) (depending on diameter and wall thickness).

Abrasion Resistant Composite

Improved System Performance

AR[®]1 offers excellent abrasive resistance as well as chemical resistance approaching that of PTFE. AR[®]1 is rated from ambient to 120°F (50°C), AR[®]1 is easy to machine, and clearance requirements are easily determined. AR[®]1 works well in a variety of pumps in the power industry, including those working with circulating water, open and closed cooling water, and river water as well as screen wash pumps. AR[®] materials have performance characteristics that exceed traditional technologies, such as cutlass rubber, bronze, and carbon materials.

Features and Benefits

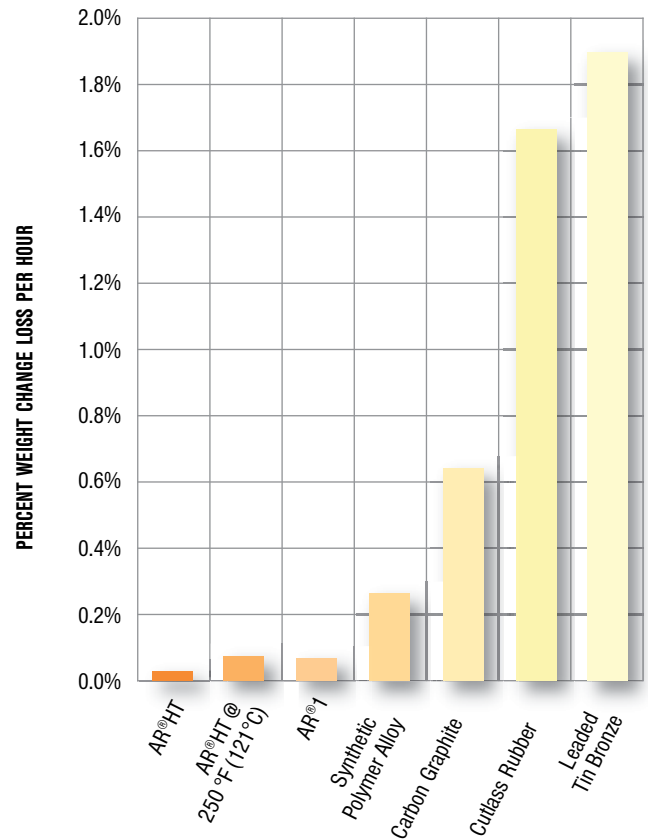
- » Improvement of pump reliability over traditional bearing materials due to lower wear in abrasive media
- » Non-galling and non-seizing properties help avoid unplanned shutdowns due to pump failures caused by excessive vibration or dry-run startup
- » Extends lifetime and operation of mechanical seals and pumps due to excellent vibration dampening characteristics
- » Lower coefficient of friction aids survival in "off design" pump conditions, such as intermittent dry run, better than traditional materials like cutlass rubber
- » Easy to machine and install to exact finished dimensions, reducing pump repair turnaround times and lowering repair costs
- » Low hydrolysis or swell makes designing parts easier and helps maintain their physical properties in water applications
- » Very good physical properties allow the bearings to receive impact from the shaft or shaft sleeve without breaking or cracking during operation

Typical Properties

| Physical Properties (ASTM Standard) | Typical |
|---|---|
| Color | Brown |
| Specific Gravity (D1457) | 2.00 |
| Hardness, Shore D, Points (D2240) | 65 |
| Mechanical (ASTM Standard) | |
| Compressive Modulus, psi (MPa) (D695) | 139,000 (960) |
| Compressive Yield Strength, psi (MPa) (D695) | 2,700 (19) |
| Elongation @ Break, % (D1457) | 300 |
| Flexural Modulus, psi (MPa) (D790) | 157,000 (1,080) |
| Flexural Strength @ 5% Strain, psi (MPa) (D790) | 2,790 (19) |
| Tensile Modulus, psi (MPa) (D638) | 165,000 (1,140) |
| Tensile Strength, psi (MPa) (D4745) | 2,270 (16) |
| Thermal | |
| Coefficient of Thermal Expansion, in./in./°F (mm/mm/°C), (0°F to 105°F/-18°C to 41°C) | 60 x 10 ⁻⁶ (108 x 10 ⁻⁶) |
| Service Temperature Range*, °F (°C) | 60°F to 120°F (15°C to 50°C) |

Greene Tweed AR[®] Series Vs. Traditional Materials

This chart shows percent weight change (loss) per hour of Greene Tweed's AR[®] materials compared to traditional materials.



Note: Bearings made from each of the materials (size: 2 in. x 1.5 in. x 1.5 in./ 5.1 cm x 3.8 cm x 3.8 cm) were tested at 900 rpm under 25 psi (0.17 MPa). The run time of the test was eight hours. The test was conducted on 300 series SS shaft, in 95 percent water and five percent silica sand. All materials were tested at 70°F (20°C). Additionally, AR[®]HT was tested at 250°F (120°C) in ethylene glycol.

Statements and recommendations in this publication are based on our experience and knowledge of typical applications of this product and shall not constitute a guarantee of performance nor modify or alter our standard warranty applicable to such products.

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