AR®HT

ABRASIVE-RESISTANT THERMOPLASTICS

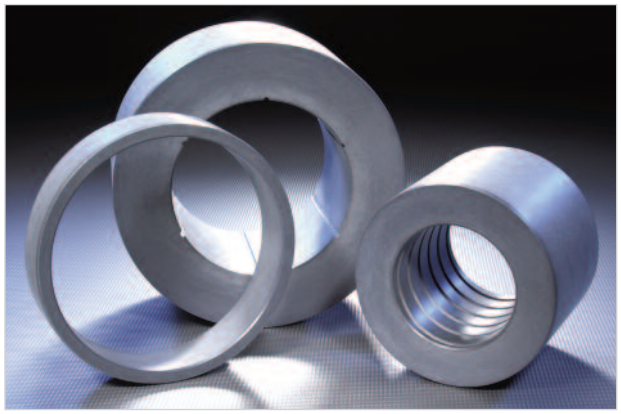
AR®HT is a proprietary thermoplastic material specifically developed for use as bushings, bearings and wear rings in pumps handling abrasive media up to 250°F (120°C). **ARHT** provides outstanding chemical, thermal shock and impact resistance, making it a better wear material than traditional rubber, ceramic or bronze materials.

Greene, Tweed's proprietary **AR** thermoplastic materials exhibit outstanding wear characteristics in media containing solids. **AR** combines excellent abrasive resistance, good dry run capability and superior vibration dampening characteristics with no hydrolysis or swell.

ARHT works well in a variety of abrasive pump applications including those working with circulating water, open and closed cooling water, river water, screen wash and crude oil pumps. When using **ARHT** pump users can operate their equipment with much tighter clearances, boosting efficiency and improving process reliability. **ARHT** is API 610 approved for stationary wear applications.

FEATURES & BENEFITS

- Increased high-temperature range makes it ideal for hot water, crude oil and abrasive hydrocarbon applications
- Improvement of pump reliability over traditional bearing materials due to lower wear in abrasive media
- Nongalling and nonseizing 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



APPLICATIONS

- Circulating water pumps
- Crude oil multistage pumps
- Open and closed cooling water pumps
- River water pumps
- Screen wash pumps
- Sump pumps

AVAILABILITY

Greene, Tweed manufactures **ARHT** 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 58 in. (2.5 cm to 147 cm) with lengths up to 8 in. (20 cm) (depending on diameter and wall thickness).

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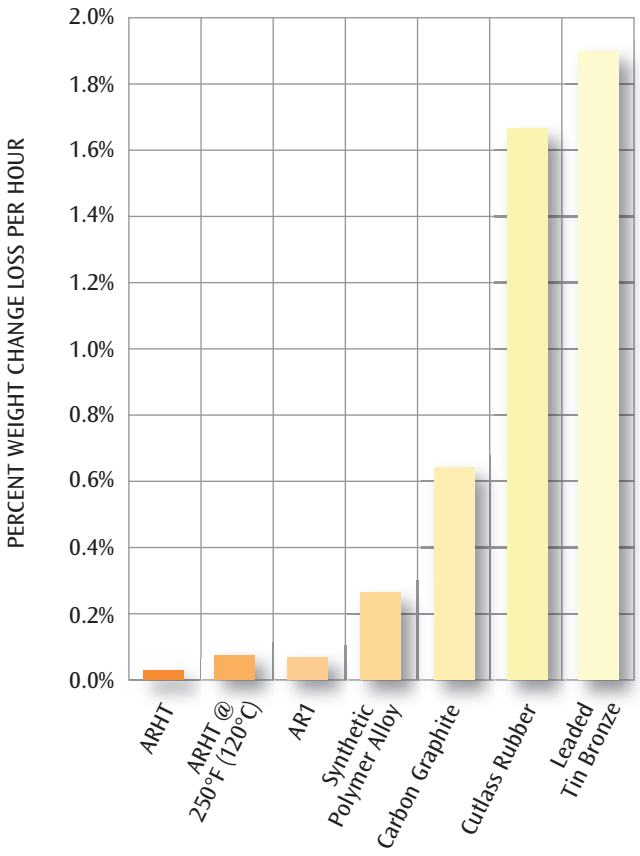
TYPICAL PROPERTIES*		
Physical Properties	**ASTM Method**	**Typical Value**
Color		Gray
Specific Gravity	D792	1.63
Hardness, Shore D	D2240	80
Mechanical		
Compressive Strength, psi (MPa)	D695	9,800 (70)
Elongation, %	D638	2.2
Flexural Modulus 0.5% Secant, psi (MPa)	D790	495,000 (3,400)
Flexural Strain @ Break, %	D790	2.9
Flexural Strength @ Break, psi (MPa)	D790	8,700 (60)
Tensile Modulus 0.5% Secant, psi (MPa)	D638	461,000 (3,200)
Tensile Strength, psi (MPa)	D638	5,100 (35)
Young's Flexural Modulus, psi (MPa)	D790	527,000 (3,600)
Young's Tensile Modulus, psi (MPa)	D638	562,000 (3,900)
Thermal		
Coefficient of Thermal Expansion, in/in/°F (mm/mm/°C), (-100°F to 250°F/-73°C to 121°C)	—	16 x 10^{-6} (28.8 x 10^{-6})
Service Temperature Range, °F (°C)		-100°F to 250°F (-75°C to 120°C)

** When using ARHT in subambient applications interference fit adjustments and mechanical retention methods must be considered. Please contact GT engineering for guidance and design recommendations.*

GREENE, TWEED AR® SERIES VS. TRADITIONAL MATERIALS

The 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./ 5.10 cm x 3.80 cm x 3.80 cm) were tested at 900 rpm under 25 psi (0.172 MPa). The run time of the test was eight hours. The test was conducted on 300 series SS shaft, in 95 percent water and 5 percent silica sand. All materials were tested at 70°F (20°C). Additionally, ARHT was tested at 250°F (120°C) in ethylene glycol.

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