



FRETTING WEAR PROTECTION TESTER TT-4170

Fretting Wear Protection Tester TT-4170 is designed to assess how effectively lubricating greases can safeguard oscillating bearings against fretting wear. This testing method, primarily used for setting specifications, helps differentiate greases by categorizing their performance as low, medium, or high in preventing fretting wear under standardized conditions. Notably, this test is often used to estimate how well greases will protect wheel bearings in passenger cars during extended transportation.

APPLICATIONS

The Torontech TT-4170 is a specialized instrument designed to evaluate the ability of a lubricating grease to protect oscillating bearings from the damaging effects of fretting wear. This test simulates the micro-movements that occur in non-rotating or oscillating bearings, such as those in vehicles during transport. It is a critical tool for qualifying greases that can prevent this specific, insidious wear mechanism, which can lead to premature component failure.

This fretting wear analysis is essential for qualifying lubricants in:

- **Automotive Manufacturing:** As a primary test to qualify greases for new vehicle wheel bearings, ensuring they are protected against fretting damage that can occur during rail or sea transport from the factory to the dealership, which can lead to early-life noise and failure.
- **Aerospace & Defense:** To certify greases for applications involving high-frequency vibration and small-amplitude oscillations, such as in helicopter rotor heads, control surface linkages, and missile guidance systems, where preventing fretting is critical to reliability.
- **Wind Energy:** For validating greases for wind turbine pitch and yaw bearings, which are subjected to constant, small-angle oscillations and high loads, making them highly susceptible to fretting corrosion and wear.
- **Industrial Machinery & Robotics:** To select appropriate lubricants for components like spline shafts, robotic arm joints, and other oscillating or indexing mechanisms where preventing fretting damage is essential for maintaining positional accuracy and long service life.

FEATURES

- This fretting wear measurement device uses two sets of standardized thrust ball bearings with an inner diameter of 16 mm $\pm$ 0.025 mm and an outer diameter of 35.69 mm $\pm$ 0.025 mm.
- The motor is controlled by a frequency converter, enhancing frequency control accuracy, with a digital display for monitoring the operating frequency.
- The oscillating bearing seat is secured with fixing screws for stable operation.
- The instrument includes a set of standardized fixtures to facilitate precise testing.
- A digital time controller displays the test duration and provides an audible alert when the test period is complete.
- High-precision spring guide cylinder with a length of 31.75 mm $\pm$ 0.25 mm, an outer diameter of 23.02 mm $\pm$ 0.05 mm, and an inner diameter of 13.614 mm $\pm$ 0.013 mm.

THEORY & METHOD

The tester operates with two ball thrust bearings, each lubricated with the test grease. The bearings are set to oscillate through an arc of 0.21 radians at a frequency of 30.0 Hz, under a load of 2450 N, for a period of 22 hours at room temperature. Fretting wear is then assessed by measuring the mass loss of the bearing races.

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TECHNICAL SPECIFICATIONS

Applicable standard	ASTM D4170, SH/T0716
Oscillating mode	Motor drive
Oscillating arc	12 degrees
Oscillating frequency	30Hz
Bearing load	2450N
Operating time	22 hours
Frequency controlling	Frequency converter
Voltage	AC220V 50HZ (110V is also available)
Total power	300W



Torontech Inc.

251 Consumers Road, Suite 1200
Toronto, Ontario, M2J 4R3, Canada 

Phone: +1 416 368 2721 | Fax: +1 416 981 7652
Email: info@torontech.com

Torontech, LLC

601 Brickell Key Drive, Suite 700
Miami, FL 33131, USA 

Toll-Free: 1-866-383-7919
Email: sales@torontech.com

Torontech ME FZE

Meydan Grandstand, 6th Floor,
Meydan Road, Nad Al Sheba,
Dubai-261440, UAE 

Phone: +971 488 19252
Email: me@torontech.com

