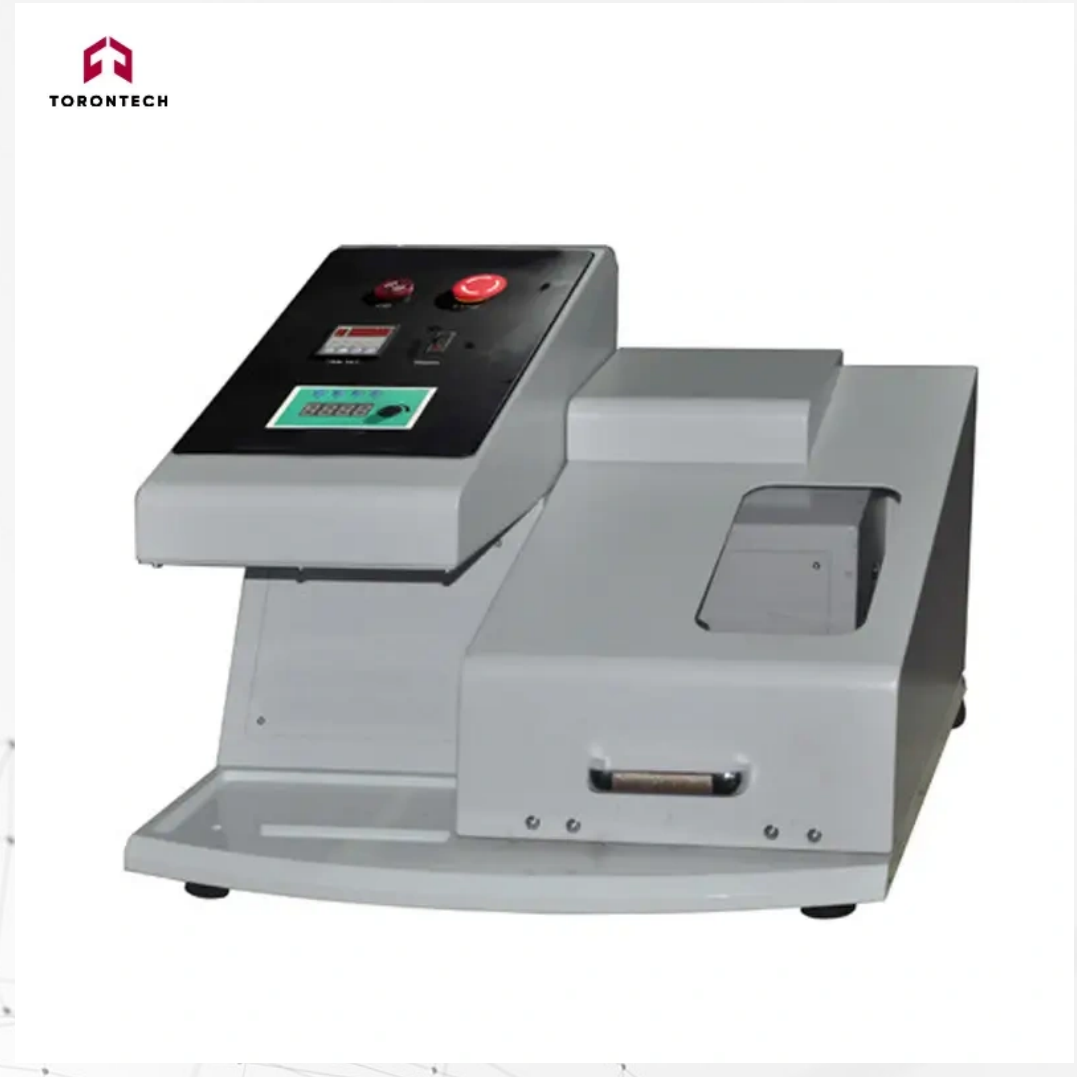
TORONTECH



FRETTING & OSCILLATION WEAR TESTING EQUIPMENT

Fretting & Oscillation Wear Testing Equipment

Fretting wear is a specialized and often misunderstood tribological damage mechanism that occurs when two contacting surfaces undergo small-amplitude oscillatory relative motion. Unlike conventional sliding wear, fretting generates a unique combination of adhesive wear, oxidative wear, and fatigue cracking at contact interfaces — a critical concern for bearings, couplings, electrical connectors, orthopedic implants, and aerospace structural joints that experience vibration or microslip in service.

Standard friction and wear testing machines are not designed to replicate the very small displacement amplitudes and high-frequency oscillatory conditions characteristic of fretting. Torontech's dedicated fretting wear protection tester TT-4170 is purpose-built for this specialized tribological regime, enabling accurate evaluation of lubricant fretting protection performance, surface coating effectiveness, and material fretting fatigue resistance under controlled oscillating conditions.

APPLICATIONS

Application

Fretting and oscillation wear testing addresses a range of specialized industrial and research applications:

- Bearing grease fretting evaluation: Anti-fretting properties of greases used in rolling element bearings subject to vibration during transport or standstill conditions, per ASTM D4170 (fretting wear protection test).
- Automotive component vibration wear: Fretting damage evaluation of wheel hub bearings, driveshaft splines, and press-fit connections exposed to road-induced vibration.
- Aerospace structural joints: Small-amplitude oscillating wear at fastener holes, lap joints, and attachment fittings in aircraft structures under aerodynamic vibration loading.
- Electrical connector reliability: Fretting wear at gold and tin-plated electrical contact surfaces exposed to vibration, a leading cause of contact resistance increase and intermittent failures.

- Power generation equipment: Fretting evaluation of turbine blade root attachments, bolted flanges, and generator components subject to vibration and thermal cycling.
- Medical device tribology: Fretting wear assessment of orthopedic implant taper junctions and spinal implant interfaces under physiological micro-motion conditions.
- Lubricant and coating development: Systematic evaluation of anti-fretting additives, solid lubricant coatings, and surface treatments for fretting protection in demanding applications.

FEATURES

Why Choose Torontech's TT-4170 for Your Fretting & Oscillation Wear Testing?

Torontech's fretting wear protection tester TT-4170 is specifically engineered for the demanding requirements of fretting tribology evaluation:

- ASTM D4170 Compliance: The TT-4170 is designed for compliance with ASTM D4170, the standard test method for fretting wear protection by lubricating greases, the primary standard reference for bearing grease fretting evaluation.
- Precise Oscillation Control: Accurate control of oscillation amplitude (displacement), frequency, and contact load is essential for reproducible fretting wear results. The TT-4170 delivers precise small-amplitude oscillatory motion that conventional universal wear testers cannot achieve.
- Dedicated Fretting Geometry: The TT-4170 uses the ball-on-flat contact geometry with controlled micro-displacement amplitudes characteristic of real fretting contacts, simulating the contact conditions that lead to fretting damage in industrial bearings and structural joints.
- Fretting Protection Quantification: The instrument enables direct quantification of fretting wear volume, fretting scar dimensions, and friction energy dissipation under oscillating conditions — providing actionable data for lubricant and material selection decisions.
- Specialized Capability: Very few laboratory instrument suppliers offer dedicated fretting wear testing capability. Torontech's TT-4170 fills a specialized tribological testing need that general-purpose friction and wear testing machines

do not address.

TORONTECH.com

TORONTECH

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

USA | Canada | EU | UAE | GCC | KSA | India | Africa | Latin America | Asia