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BLOCK-ON-RING TRIBOMETER - 3000N (HIGH SPEED)

Block-on-Ring Tribometer - 3000N (High Speed) - ToronTribo™ BOR 3000

High-speed block-on-ring tribometer evaluates lubricant performance and material wear resistance under oil-immersion lubrication at elevated sliding speeds, serving lubricant formulators, metal component manufacturers, and materials testing laboratories. The ToronTribo™ BOR 3000 presses a stationary block against a rotating ring while the contact remains fully immersed in the test oil, reproducing the flooded lubrication conditions found in bearings, gears, and other continuously lubricated sliding contacts.

The tester applies up to 3000 N of normal force with a maximum friction force of 300 N, and drives the ring at spindle speeds from 1 to 2500 rpm as standard, with an optional 2 to 4000 rpm high-speed configuration for accelerated test protocols. Test oil temperature is controllable from room temperature up to 100°C, and the main spindle rotation counter displays up to 9,999,999 revolutions, supporting long-duration wear and lubricant evaluation studies.

Lubricant manufacturers use the ToronTribo™ BOR 3000 to measure extreme-pressure properties under the Timken test method, while metal component producers and materials laboratories use the same platform to rank sliding wear resistance of metals and coatings under flooded lubrication. The shared block-on-ring configuration lets both applications run on a single, well-characterized test platform.

APPLICATIONS

Block-on-Ring Tribometer - 3000N (High Speed) - ToronTribo™ BOR 3000 Applications

The ToronTribo™ BOR 3000 supports lubricant and material wear evaluation under oil-immersion lubrication at standard and high sliding speeds.

- Extreme-Pressure Lubricant Testing: measures the load-carrying capacity of gear oils, greases, and industrial lubricants using the Timken extreme-pressure test method
- Metal Material Sliding Wear Ranking: compares wear resistance of different metal alloys and heat treatments under flooded lubrication conditions
- Bearing and Gear Lubricant Qualification: evaluates how lubricants protect sliding and rolling contact surfaces under sustained oil-immersion conditions
- Coating Wear Resistance Testing: assesses how coatings perform under lubricated sliding contact compared to uncoated base materials
- High-Speed Sliding Contact Research: studies wear and friction behavior at elevated sliding velocities relevant to high-speed industrial machinery
- Lubricant Additive Package Screening: compares different extreme-pressure and anti-wear additive formulations under identical load and speed conditions
- Instrument Calibration and Verification: supports calibration and operational verification of block-on-ring test procedures against reference materials


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TorenTribe™ BOR 3000
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Standards

The ToronTribo™ BOR 3000 supports test procedures aligned with internationally recognized ASTM standards for extreme-pressure lubricant testing and block-on-ring sliding wear evaluation.

- ASTM D2714-94 - Standard Test Method for Calibration and Operation of the Falex Block-on-Ring Friction and Wear Testing Machine
- ASTM D2782-02 - Standard Test Method for Measurement of Extreme-Pressure Properties of Lubricating Fluids (Timken Method)
- ASTM G77-17 - Standard Test Method for Ranking Resistance of Materials to Sliding Wear Using Block-on-Ring Wear Test

FEATURES

Block-on-Ring Tribometer - 3000N (High Speed) - ToronTribo™ BOR 3000 Key Features

The ToronTribo™ BOR 3000 combines high-speed capability with flooded lubrication control for combined lubricant and material wear testing.

- High-Capacity Loading: applies up to 3000 N of normal force with a maximum friction force of 300 N for demanding extreme-pressure and wear test conditions
- Optional High-Speed Configuration: extends spindle speed from the standard 1 to 2500 rpm range up to 2 to 4000 rpm for accelerated test protocols
- Oil-Immersion Lubrication: fully floods the block-ring contact in test oil, reproducing sustained lubricated contact conditions

- Controlled Oil Temperature: adjusts test oil temperature from room temperature up to 100°C to match different lubricant evaluation requirements
- Extended Rotation Counting: displays main spindle rotation up to 9,999,999 revolutions, supporting long-duration test protocols
- Dual-Purpose Testing Platform: supports both extreme-pressure lubricant testing and metal or coating sliding wear ranking on the same instrument

THEORY & METHOD

Theory and Method

Extreme-pressure lubricant testing and sliding wear ranking both rely on the same fundamental block-on-ring contact, but each measures a different outcome. The Timken extreme-pressure test method presses a stationary test block against a rotating ring while the lubricant under evaluation floods the contact, and the load is increased in steps until the lubricant film fails and scoring occurs on the block. The load at which failure occurs indicates how much pressure the lubricant can support before breaking down under boundary lubrication conditions.

The same block-on-ring configuration supports material wear ranking by holding load and speed constant while comparing wear volume across different block and ring material combinations. The ToronTribo™ BOR 3000 applies this principle through a spindle-driven ring immersed in a temperature-controlled oil bath, with load and friction force measured continuously throughout the test. Because the contact remains fully immersed in oil rather than run dry, the resulting wear and friction data reflect flooded lubrication behavior rather than the boundary or mixed lubrication conditions seen in dry sliding tests.

Running tests at elevated spindle speeds, up to 4000 rpm in the optional high-speed configuration, shifts the contact toward hydrodynamic lubrication conditions where a thicker oil film can more fully separate the block and ring surfaces. Comparing results across the standard and high-speed configurations lets engineers see how sliding velocity affects both lubricant film formation and the resulting wear or extreme-pressure performance, information relevant to both lubricant formulation and

component design for high-speed machinery.

TECHNICAL SPECIFICATIONS

Block-on-Ring Tribometer - 3000N (High Speed) - ToronTribo™ BOR 3000 Technical Specifications

Parameter	Specification
Maximum Normal Force	3000 N
Maximum Friction Force	300 N
Spindle Speed Control Range	1 to 2500 rpm (standard); 2 to 4000 rpm (optional, high-speed)
Main Spindle Rotation Display Range	0 to 9,999,999
Test Oil Temperature	Room temperature to 100°C

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