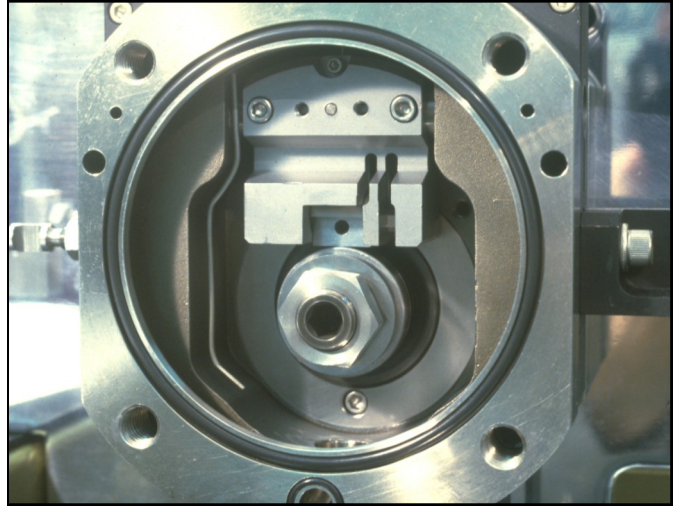




Block-on-Ring Test Machine

The Falex Block-on-Ring Test Machine combines test versatility with operational simplicity. Capable of simulating a variety of field conditions, the Falex Block-on-Ring Test Machine evaluates the friction and wear characteristics of materials and lubricants in research, quality control, and technical service applications.



Suitable for Testing

- Fluid Lubricants
- Greases
- Additive Packages and Base Stocks
- Dry Film Bonded Coatings
- Materials
- Hardface Coatings
- Refrigerant Lubricants
- Sliding Wear

Used in Standard Test Methods

ASTM D2714 - Calibration and Operation of the Falex Block-on-Ring Friction and Wear Testing Machine

ASTM D2981 - Wear Life of Solid Film Lubricants in Oscillation Motion

ASTM D3704 - Wear Preventive Properties of Lubricating Greases Using the Falex Block-on-Ring Test Machine in Oscillating Motion

ASTM D2509 - Extreme Pressure Properties of Lubricating Greases

ASTM D2782 - Extreme Pressure Properties of Lubricating Fluids

ASTM G77 - Ranking Resistance of Materials to Sliding Wear Using Block-on-Ring Wear Test

Proposed STM - Ranking Resistance of Polymeric Materials to Sliding Wear Using Block-on-Ring Wear Test

Proposed STM - Measuring Wear Properties of Dry Film Solid Lubricants Using a Block-on-Ring Machine in Unidirectional Motion

SPECIFICATIONS AND FEATURES

SPEED AND VELOCITY:

Speed and Velocity control is managed by the operator selection of test shaft RPM and test specimen configuration. The Computer Control System enables programmable control of RPM set points, ramp rates, test parameter cycles, and test start sequences.

LOAD:

Load control is managed by the operator selection of test load and test specimen configuration. Computer Controlled Systems enable programmable control of Load set points, ramp rates, test parameter cycles, and test start sequences using a Dual Range, Low 10 to 100 lbs. and High: 50 to 1300 lbs., Pneumatic Load System.

TEMPERATURE CONTROL:

Temperature control is managed through the operator selection of chamber and heater configuration, regulating environment or test specimen temperature. Computer Controlled Systems enable programmable control of Temperature set points, ramp rates, test parameter cycles, and test start sequences. Ambient to 250°C. External cooling options allow for sub-ambient testing environment temperatures.

ENVIRONMENTS:

The Falex Block-on-Ring Test Machine is available with a Standard Enclosed Test Chamber, suitable for testing fluid lubricants, greases, coatings, or dry environment testing. An optional chamber seal kit allows for containment of atmospheres, purged or light vacuum environments, and pressurization to 150 psig max. Optional fluid lubricant recirculating systems and a grease feeder system are available.

TEST DURATION:

Test Duration is controlled by elapsed time, number of test cycles, or through high-limit cutoff, set by Operator programmable control.

FRICION FORCE:

Friction Force is measured using an electronic load cell. The standard measuring system range is 0 to 250 lbs. An optional 0 to 25 lb. measuring system is available for lower range friction forces.

WEAR:

Continuous display of test specimen dimensional change indicating the rate of wear and/or total wear.

SPECIFICATIONS AND FEATURES

TEST GEOMETRIES:

Contact Geometry	Test Adapter
Line	Block-on-Ring, Falex Block-on-Ring, Timken Canted Cylinder Chip on Ring
Area	Conforming Block-on-Ring, Falex Conforming Block-on-Ring, Timken
Point	Ball-on-Ring

MOTION:

The Falex Block-on-Ring is supplied with a standard unidirectional drive system. Computer Controlled Systems enable programmable control of an optional reversible drive system. Operator selection of oscillation range (5° to 720°) and test cycle patterns provide complete control of test motions.

UTILITY REQUIREMENTS:

220 VAC, Single Phase, 60 Hz. Optional 220 VAC, Single Phase 50 Hz Systems available. 80 psig clean, dry air supply required for operation of pneumatic loading systems.

WEIGHTS AND DIMENSIONS:

Bench top - Complete System

Space (L x W x H): 72 x 24 x 30 in.
[1829 x 610 x 762 mm]

Estimated Weight: 600 lbs
[272 kg]

Shipping

Dimensions (L x W x H): 48 x 48 x 48 in ea
[1220 x 1220 x 1220 mm]

Estimated Weight: 600, 400, 300 lbs
[272, 182, 136 kg]

FALEX BLOCK ON RING TEST MACHINE SOFTWARE™

FALEX softWEAR™ for Test Program Creation, Parameter Control, Data Acquisition and Instrument Calibration

The Sequence Builder interface is divided into several sections:

- Units:** A dropdown menu set to 'English'.
- Common Parameters:** A list of test parameters including:
 - Type of Motion: Undirectional
 - Speed Range: 3000 CPM
 - Specimen Chamber Type: Standard Chamber
 - Friction Sensor Range Type: 10.0 - 250.0 lb
 - Temperature Control: Specimen
 - Load Range: High 50 - 1300 lb
- Alert and Shutdown Limits:** A table for setting limits for Speed, Load, Chamber Temp, Specimen Temp, Friction Force, Cycle, and CoF.
- Step Definitions:** A table for defining test steps with columns for Definition Name, Priority 1, Priority 2, and Priority 3. Parameters include Temperature Setpoint (F), Load Setpoint (lb), Ramp Rate (lb/sec), Step Duration (HH:MM:SS), # of Cycles, Stop on Time, Stop on Cycles, Speed Setpoint (CPM), Acc/Dec (CPM/sec), Max Speed, and Oscillation Angle.

The Test Configuration interface includes the following sections:

- Start Conditions:** Radio buttons for Immediate, After Time Delay, After Temperature, and After Time and Temperature. Start Delay is set to 00:00:15.
- Stop Conditions:** Radio buttons for Time (00:10:00) and Cycles (1600).
- Temperature Control Type:** Radio buttons for Control Chamber, Control Specimen, and None.
- Specimen Speed, RPM:** Set to 400.
- Speed ramp rate, RPM/s:** Set to 10.
- Load, lbs:** Set to 10.
- Mean Test Radius, in:** Set to 0.531.
- Heater Type:** Table with columns for DC Motor, Servo Motor ratio, and Oscillate motor? (F).
- Alarm Levels:** Tables for Torque, Specimen Load, Temp Chamber, Temp Specimen, Wear, and CoF.

The I/Oscreen interface displays real-time data and control options:

- Control Panel:** Buttons for Motor OFF, Heater OFF, and Data Acquisition OFF.
- Specimen Temperature, Torque, CoF:** A graph showing temperature (Temp, C) and torque (Torque, lb-in) over time.
- Chamber Temperature, Load, Wear, Speed:** A graph showing chamber temperature (Temp, C), load (Load, lb), wear (Wear, in), and speed (Speed, RPM) over time.
- Right Panel:** Real-time readouts for Temp Specimen, C; Torque, lb-in; CoF; Time; Temp, C; T, lb-in; CoF; Temp Chamber, C; Load, lb; Wear, in; Speed, RPM.

The CalibrationScreen interface is used for instrument calibration:

- General Info:** Channel Name: Torque; Calibration Enabled: Yes; Calibration Date: 2/10/2006; Expiration Date: 3/1/2006; Operator Name; Description; Scaling type: Table scale.
- Scaling Data Table:**

Reference Values	Uncalibrated Values
0.000000	-2.054157
1.400000	-0.797205
21.400000	18.613578
41.400000	38.142297
61.400000	57.356391
81.400000	76.614341
101.400000	95.675577
107.516129	101.767735
-107.516129	-105.814815
- Graph:** A plot of Uncalibrated Value vs Reference Value showing a linear relationship.
- Buttons:** Edit, Export, and Return.



SYSTEM DESCRIPTIONS

001-001-331 FALEX BLOCK ON RING TEST MACHINE WITH SOFTWARE™

FALEX 330 BLOCK ON RING INCLUDES:

Variable Speed Servo Drive System	Friction Sensor Calibration Fixture
Friction Measurement System (High Range)	Test (Dynamic) Wear Indicator (Dial Gage)
Standard Chamber & Cover	Pneumatic Test Load System (50 to 1300 lbf)
FALEX Style Test Spindle	Test Chamber Drain Pan
Fluid Chamber Temperature Sensor	Test Ring Locknut and Washer
Specimen Temperature Sensor	Test Block Holder

FALEX 330 SOFTWARE INCLUDES:

Test Parameter Program Creation and Storage	Programmable Parameter Loop Sequence
Test RPM Display and Control	Test Data Acquisition and Data Storage
Test Temperature Display and Set Point Control (Chamber or Test Specimen)	Test (Dynamic) Wear Display and Sensor
Test Load Display and Control (Pneumatic Load System)	Real Time Data Graph
Test Duration/Status Display and Control (Time and/or Cycles)	Manual Parameter Override
	Fast Triggered Data Acquisition
	PC Kit

001-200-024 FALEX BLOCK ON RING REVERSIBLE DRIVE OPTION:

Falex SoftWEAR™ Control for Reversible Drive Servo Motor System

001-097-003 FALEX BLOCK ON RING CHAMBER SEAL KIT:

Seal Kit for Test Spindle and Loading Assembly for elevated or reduced atmosphere testing

F-1501-4 TIMKEN SIZE TEST ADAPTER ASSEMBLY OPTION:

Test Block Holder and Test Shaft for operation with Timken Size Test Rings and Blocks

F-1501-6 TIMKEN TEST OIL RECIRCULATION OPTION:

Oil Recirculation System for Testing per ASTM D2782

F-1501-8 LOW RANGE STRAIN GAGE OPTION:

Low Range Strain Gage (0 to 25 lbs) for improved Friction Force Measurement Sensitivity

F-1501-10A FALEX SIZE DUAL SPRAY NOZZLE OPTION:

Dual Spray Nozzle for use with fluid recirculating system. Sprays fluid from opposite sides of the contact area during reversible motion tests.

F-1501-14 FALEX HIGH SPEED PULLEY OPTIONS:

Pulley and Timing Belt Assembly for High Speed Operation (7200 rpm max)

F-1501-16B SEE THROUGH COVER FOR PRESSURE CHAMBER

F-1501-18 CANTED CYLINDER ON RING TEST ADAPTER

BLOCK ON RING ACCESSORIES

STANDARD TEST SPECIMENS and REFERENCE MATERIALS

001-500-025	Test Ring, Falex S-25 SAE 4620, Rc 58-63, 22-28 rms Conforms to ASTM D2981, D3704 and G77
001-500-010	Test Ring, Falex S-10 SAE 4620, Rc 58-63, 6-12 rms Conforms to ASTM D2714, D3704 and G77
001-501-030	Flat (HP) Test Block, Falex H-30 SAE 01 tool steel, Rc 27-33, 4-8 rms Conforms to ASTM D2714, D3704 and G77
001-501-060	Flat (HP) Test Block, Falex H-60 SAE 01 tool steel, Rc 58-63, 4-8 rms Conforms to ASTM D2981, D3704 and G77
F-1501-29	Calibration Fluid per ASTM D2714, 0.5 L



FALEX SCAR MEASUREMENT SYSTEMS

100-200-023

HIGH PRECISION SCAR MEASUREMENT SYSTEM

Includes binocular microscope with X-Y base and digital display of measurement accurate to 0.001 mm. System includes ball cup stand with single ball holder. Allows reading of ball scar without removal from ball cup.

100-200-024

DIGITAL SCAR MEASUREMENT SYSTEM with CCD CAMERA

Includes a CCD camera and digital display of ball scar and measurement resolution to 0.001 mm. System includes ball cup stand with single ball holder and CCD camera with USB port for recording scar diameters to Falex computerized data acquisition system or host computer. Allows for reading ball scar without removal from ball cup. Optional Stands for other specimens available.





For All of Your Lubricant and Materials Testing

Lubricants

- Pin and Vee Block
- Block-on-Ring
- Timken EP
- Tapping Torque
- Panel Coker
- High Temperature/High Speed Bearing
- Four Ball Wear
- Four Ball EP
- High Temperature Wheel Bearing
- Thermal Oxidation Stability (L60-1)
- Fretting Wear
- Hydrolytic Stability
- Grease Corrosion Test
- Isothermal Oxidation
- Hydraulic Fluid Pump Stand (Vickers and Conestoga)

Fuels and Solvents

- Ball on Three Disk Fuel Lubricity
- Thin Film Evaporator
- Fuel Deposit Simulator

Materials

- Journal Bearing
- Multi-Specimen
- Crossed Cylinders
- Low Velocity Friction Apparatus
- Pin on Disk
- Coefficient of Stoption
- Magnetic Media and Paper Wear
- Life Performance Face Clutch System
- Thin Coating Wear (Electrical Contacts)
- Dual Drive Rolling Contact Fatigue
- High Speed Bearing/Mechanical Clutch