Pin & Vee Block Test Machine

Used in Standard Test Methods

- ASTM Standards
  D 2670, D2626, D3233, D5620
- Federal Test Methods
  FTM-791-3807.1, FTM-791-3812.1
- Chrysler Corporation
  461-C-84-01, 461-C-84-02, 461-C-84-03
- Ford Motor Company
  FMC-BJ1-1
- Institute For Petroleum
  IP 241

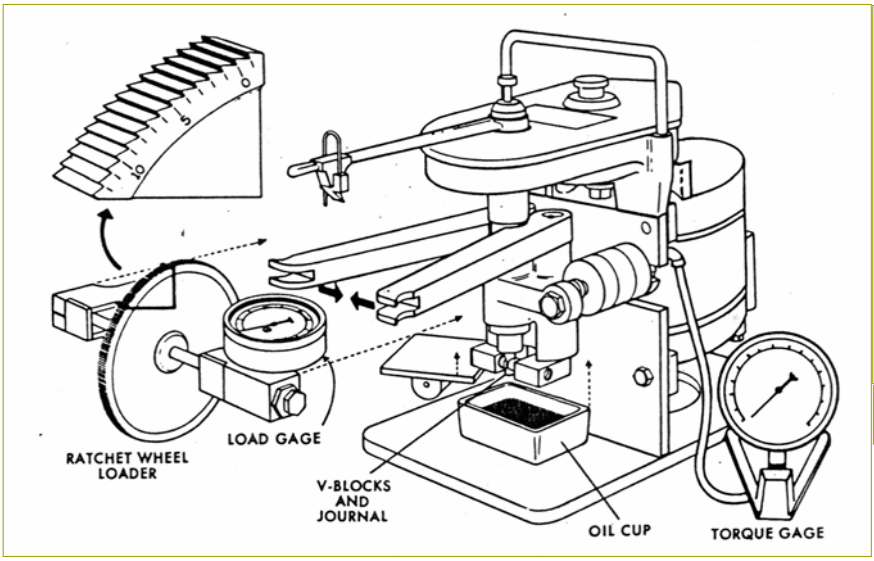
Suitable for Testing

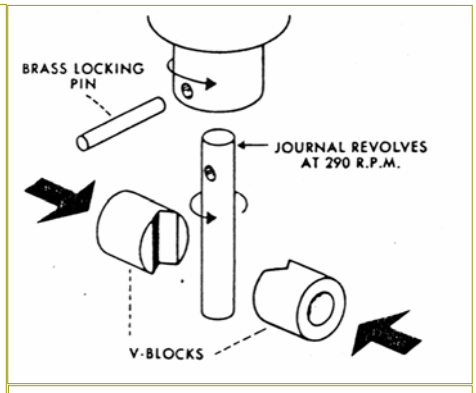
- Fluid and Dry Lubricants
- Additive Packages and Base Stocks
- Dry Film Bonded Coatings
- Materials
- Hardface Coatings
- Metal Working Lubricants
- Refrigerant Lubricants

GENERAL INFORMATION

The **Falex Pin & Vee Block Test Machine** is a laboratory tool for **evaluating wear, friction and extreme pressure properties** of materials and lubricants.

The equipment rotates a 1/4 inch diameter test pin (journal) against two 1/2 inch diameter vee blocks. A four line contact region is established as load is applied through a mechanical gage by a ratchet wheel and an eccentric arm.





Pin & Vee Block Configuration

SPECIFICATIONS AND FEATURES

LOAD:

Load is applied to the vee blocks against a rotating test pin by use of a ratchet wheel mechanism and spring type gage. The Falex Dual Range Load Gage applies from 200 to 3000 lbs direct load (4500 lbs reference load) ±2% full scale accuracy, up to 300 psi average initial Hertzian stress.

Optional low load gage (200 to 800 lbs) is available when improved accuracy at low loads is needed.

Electronic load systems provide digital display of 3000 lbs direct load gage.

SPEED:

Shaft speed: 290 rpm ±10 rpm (18.98 ft/min)

Variable speed: 50 to 5600 rpm (3.27 to 366.5 ft/min) (F-1503 model)

WEAR:

Ratchet wheel system allows rate of wear measurement during test and total wear.

14.4 ratchet teeth = 0.001 inch (0.025 mm)

TORQUE:

0 to 100 in-lb load cell with digital display. Accuracy ± 2% full scale.

(F-1503 and F-1500C models offer automatic torque shutoff)

Test Area

SYSTEM DESCRIPTION

The Pin & Vee Block Test Machine is offered in three models:

000-001-001 Standard Falex Pin & Vee Block Test Machine

Includes the following:

- Dual Range Load Gage
- Load Gage Stand
- Electronic Digital Indicating Torque Gage
- Fluid Sample Cup
- Manual Heater Control
- Shear Pin Knock-out Tool
- Shear Pin Clip and Puller

F-1500C Pin & Vee Block Test Machine with Data Acquisition System

Includes Standard Pin and Vee Block test machine adapted for use with computer data acquisition system. By adding Electronic Monitoring Systems and computer technology to the test equipment, this complete system makes it possible to electronically acquire and store test data. During testing the load, torque, wear (optional) and fluid temperature can be viewed. The data is then stored in a format compatible with commercially available spreadsheet software packages (such as Excel) and may be viewed in alphanumeric or graphic format. With the use of spreadsheet software this data can be examined further, manipulated and compared to other runs. Real time and historical trending can be displayed.

Includes the following:

- Electronic Load Measurement
- Load Gage Stand
- Ratchet Wheel Loading Assembly
- Fluid Sample Cup
- Computer Controlled Heater Control
- Shear Pin Knock-out Tool
- Thermocouple and Retaining Clip
- Shear Pin Clip & Puller

Data Acquisition System includes:

- PC (with Windows® operating system)
- Falex SoftWEAR™ Data Acquisition Program
- Digital Recording of:
  - Load (Direct and Reference Scales)

F-1503 High performance Pin & Vee Block Test Machine with Data Acquisition

The High Performance Pin & Vee Block Test Machine is a versatile alternative to the Standard Pin & Vee Block Machine. The High Performance Pin & Vee Block offers expanded capabilities to meet the requirements of testing programs outside the scope of the Standard Test Methods. Test Pin Rotational Speed and the Rate of Specimen Load Application is user controlled.

Includes the following:

- 1 HP Variable Speed Drive Motor
- Fluid Sample Cup
- Variable Rate loading System
- Chamber Temperature Control and Display
- Specimen Temperature Display and Cutoff
- Automatic Temperature Start-up
- Test Cycle Counter & Cutoff
- RPM Display
- Torque Display and Cutoff
- Wear Display and Cutoff
- Load Display
- Shear Pin Retaining Clip
- Shear Pin Clip & Puller

PIN & VEE BLOCK OPTIONS & ACCESSORIES

F-1500AL Automatic Loading Option:

Provides controlled maintenance of test load. User programmable test load and differential load point for the automatic maintenance of test loads. User defined and Standard Test Load Programs for evaluating wear and extreme pressure properties of fluid lubricants and bonded solid lubricants. Load is applied in positive direction only. Option available with systems using the Falex SoftWEAR™ Data Acquisition Program.

F-1500CU Falex SoftWEAR™ Data Acquisition System Upgrade:

For use with the standard Falex Pin and Vee Block Test machines. Provides users of current machines to acquire and store friction, load, and temperature signals at user-selected predetermined time intervals. Data is presented in real time graphic and alpha numeric (spreadsheet) format compatible with Excel® and other commercial spreadsheet programs. Load displayed in Direct Load (150 to 3000 Lb) or Reference Load (200 to 4500 Lb) scales. Coefficient of friction and optional wear data are calculated and displayed simultaneously. Complete system with PC,Falex SoftWEAR™ program, and electronic interface. F-1500AL Automatic Loading capability can be added for programmable control of loading.

F-1500-11 Dual Range Load Gage:

Combines 3000 lb Direct Reading and 4500 lb Reference Reading Load Scales on a Single Gage

F-1500-12 Low Range Load Gage:

800 lbs Direct Reading Load Gage. Used when performing tests under light load conditions. Provides improved accuracy and readability. (for use with F-1500 model)

F-1500-13 Electronic Load system:

Electronic Direct Load Sensing Gage and Meter (100 to 3000 lb) accurate to ± 2% full scale. Replaces Dual Range Load Gage. (included with F-1500C and F-1503 models)

F-1500-32 Temperature Measurement System:

Electronic Temperature Measurement and Display Meter (0 to 999°C). Supplied with thermocouple. Readable to 1°C. Dual scale (°F or °C). For near specimen and liquid temperature measurements.

F-1500-24 Wear Measurement Display:

For use with the F-1500C Pin & Vee Block Test Machine with Data Acquisition System to display wear as indicated in number of ratchet teeth or inches.

F-1500-25 Programmable Oil Recirculating System:

F-1500-26 High Pressure Test Chamber:

Sealed chamber surrounding test area and fluid reservoir for performing evaluations of test oil saturated with refrigerant or other gases. Prevents gases from escaping continuously into atmosphere. Capable of initial temperatures from ambient room temperature to 150°C (302°F) and pressures from atmospheric to 225 psig. Pressure source not included.

PLEASE NOTE: This must be installed on a new Pin & Vee Block Test Machine by factory trained personnel; it cannot be field installed.

PIN & VEE BLOCK OPTIONS & ACCESSORIES (continued)

F-1500-28A Low Rate Loading Ratchet Assembly

Optional Ratchet Wheel Shaft for lower test load loading rate. For use with Standard Pin and Vee Block Test Machine.

F-1500-28B Electronic Low Rate Loading Ratchet

Optional Ratchet Wheel Shaft for lower test load loading rate. For use with Pin and Vee Block Test Machine with Data Acquisition System.

F-1500-31A High Precision Scar Measurement System:

Binocular microscope with X-Y base and digital display of measurement accurate to 0.001 mm.

F-1500-31B Digital Scar Measurement System:

Binocular microscope with CCD camera for on screen measurement to 0.01 mm.

F-1500-36 Load Calibration Kit:

Includes one Brinell ball, back-up plug, support block and copper Brinell coupon.

F-1500-36A Copper Brinell Coupon:

Used for checking calibration of load gage. BHN 37-39

F-1500-36B Electronic Calibration Assembly:

System includes digital display meter, load cell and fixturing.

F-1500-36C Calibration Fluid Blend A:

0.5 liter, 0.10% Sulfur Calibration Fluid per ASTM D2670

F-1500-36D Calibration Fluid Blend B:

0.5 liter, 0.20% Sulfur Calibration Fluid per ASTM D2670

F-1500-36E Torque Calibrator:

Unit to verify torque values. (Can be used with models F-1500 and F-1500C)

F-1500-37 Spare Parts Kit:

Includes: (Quantity)

- Copper Brinell Coupon (3)
- Shear Pin Retaining Clip (4)
- Thermocouple Retaining Clip (4)
- Retainer Ring (2)
- Shear Pin Knock-out Assembly (1)
- Knock-out rod Assembly (2)
- Drive Gear Belt (1)
- Shear Pin Clip Puller (2)
- Reamer Tool (1)

F-1500-37A Shear pin Clip and Puller:

Clip holds shear pin secure during test and puller facilitates removal of clip.

F-1500-37B Thermocouples:

Thermocouple used to measure fluid temperature during testing. For use with F-1500-32.

(Included with F-1500C & F-1503 models)

F-1500-37D Shear pin Knock-Out Assembly:

Shear Pin Removal Tool, facilitates safe extraction of brass hear pin from test machine shaft at end of test.

F-1500-37H Reaming Tool:

Used to remove debris from inside test machine shaft at end of test.

PIN & VEE BLOCK UTILITIES & DIMENSIONS

Power requirements:

220 V, 60 Cycle, Single Phase, 8 Amps (50 Cycle optional)

Shipping information:

Model F-1500	150 lbs (68 kg) 31 in x 31 in x 36 in (79 cm x 79 cm x 91 cm)
Model F-1500C	242 lbs (110 kg) 43 in x 36 in x 42 in (109 cm x 91 cm x 190 cm)
Model F-1503	480 lbs (218 kg) 43 in x 36 in x 42 in (109 cm x 91 cm x 107 cm)

Shipping weights & dimensions are typical and may vary depending options ordered.

Space Requirements:

Bench top:	Model F-1500:	30 in x 24 in x 24 in (76 cm x 61 cm x 61 cm)
	Models F-1500C & F-1503:	60 in x 24 in x 24 in (152 cm x 61 cm x 61 cm)

TEST SPECIMENS

These specimens conform to ASTM Standards: D 2670, D 2625, D 3233 and D 5620

000-500-002 Complete Sets with #8 Test Pin:

Two (2) Standard Vee Blocks (AISI 1137 Steel) , One (1) #8 Test Pin (SAE 3135 Steel), and One (1) Brass Shear Pin

000-500-003 Complete Sets with #10 Test Pin:

Two (2) Standard Vee Blocks (AISI 1137 Steel) , One (1) #10 Test Pin (SAE 3135 Steel), and One (1) Brass Shear Pin

000-502-100 Standard Falex Vee Blocks:

AISI 1137 Steel, 96° block angle, Rc 20-24, 10 rms maximum

F-1500-51C Standard Falex C Block (conformal contact):

Vee blocks with curved test surface (conformal) providing reduced contact stress

F-1500-51T Standard Falex Vee Block with Thermocouple Hole

AISI 1137 Steel, 96° block angle, Rc 20-24, 10 rms maximum

000-503-017 Standard Falex #8 Test Pin (journal):

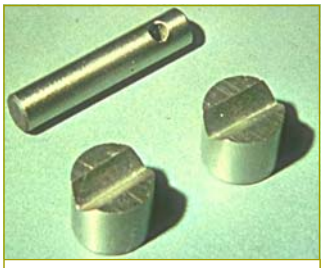
SAE 3135 steel, Rb 87-91, 10 rms maximum

000-503-002 Standard Falex #10 Test Pin (journal):

SAE 3135 steel, Rb 100-104, 10 rms maximum

000-005-004 Standard Falex Shear Pins:

1/2 hard yellow brass (ASTM spec. B-16) bag of 50



New Test Specimens

After ASTM D 2670 Wear Test

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

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