

# Multi Function Tribometer MFT-3000



Wear, Friction, Coefficient of Friction, Adhesion, Scratch Hardness & Resistance, Hardness, Modulus, Fretting, High Temperature, Cryogenic



# A Bench Top Like No Other

- Wear
- Friction
- Coefficient of Friction
- Adhesion
- Scratch Hardness
- Scratch, Mar Resistance
- Hardness
- Modulus

## Multi ASTM DIN, ISO Tests On a Single Platform

Run both standard and non-standard tests on coupons or real components

### Wide Load Range - Nano, Micro, and Macro

Interchangeable load cells allow a wide range of force ranging from mN to 3000 N

## Several Easy Interchangeable Test Modules

Test coatings, materials, and lubricants across broud testing conditions

## **Rigid Design**

Unique "I" bream configuration for highest rigidity

## Two Test Ranges On One Setup

Instantaneous Range Change While Maintaining Highest Resolutions



## **Tribometer Configuration**





### Platform

Rigid construction design to conduct mechanical tests on a bench top configuration.

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### **Dual Force Sensor**

Dual simultaneous mounted patented range force sensors from mN to 3000 N.



### **Environmental Control**

Wide temperature (-50°C to 1000°C), humidity (5 to 95% RH), tribocorrosion, and many more chambers are available. XS

X Stage

High precision 150 mm X stage to move test modules or samples automatically. Each fast exchange lower drives (rotary, reciprocating, block on ring) mounts on top of the X stage.



### Lower Interchangeable Test Modules

Interchangeable fast-exchange test modules: rotary, reciprocating, block on ring, and many more. Data Acquisition, Motion Controller

Advanced high speed, low noise, multiple channel, high data acquisition rate (200 kHz) controllers.

# Wide Range Of Sensors With Patented Technology

- Automatic Recognition
- Various In-line Senors
- Fast Exchange
- Highest Resolution
- Low Floor Noise

Precise mechanical characterization requires the ability to accurately differentiate behaviors between samples. The resolution, repeatability, and the type of data collected are of prime importance for a comprehensive analysis. The MFT-3000 comes with a wide range of sensors to measure several parameters during the test. The choice of sensors depends on the application and test setup.

- Load Cells-Superior accuracy - Negligible drift - Capacitive, strain gauge, and piezo technologies
- Acoustic Sensors -Sensors to detect cracks, and failure.
- Electrical Contact Resistance -Surface properties with micro ohm resolution.

## **Force Sensor Technology**



High resolution capacitive based sensor



Fast Piezo Sensor for linear reciprocating



Standard strain gauge sensor

### **Other Available Sensors**

Torque Sensors / 1D, 2D, 6D Sensors / In-line Dynamic Torque Sensors Patent # 1017938GB2

# **Modular Drives With Fast Exchange**

Modular Design For Maximum Versatility



MFT-3000 runs tests across a wide range of forces and applications using its modular concept. Various interchangeable modules can be added to the same platform based on the intended application. The modular nature of this tester allows it to test coatings, bulk materials, lubricants, real components, etc.



The test modules are quickly swapped. In addition, the testing modules, load cells, and lower test drives come with a fast exchange mechanism that allows the user to change test configurations easily.

The software and hardware automatically recognize the test module and easily run each test.

## **Commonly Used Modules**



Rotary Drive



Reciprocating Drive



1000°C



-50°C

# **Powerful Software, Controller**

Easy and Versatile

The tester comes with powerful operational and post-analysis statistical analysis software. Each test is controlled by an easily user-created test method (recipe). The recipe can be recalled for future tests. In addition, the MFT-3000 comes with a vast library of pre-programmed tests. The data can be exported to many formats, including ASCII format.

The MFT-3000 comes with advanced high speed, low noise, fast feedback, multiple channels, highest data acquisition rate (200 KHz) controllers.



### **Custom Stop or Logical Choice Criteria**

The software allows the user to set up custom stopping conditions or to change the test on the fly using inputs from several in-line sensors. For example, the user can set up a stop test condition as - "when friction increase by 30% or when the acoustic sensor shows a failure signal, then stop the test". This condition allows the user to do a post-analysis of the sample the moment failure happens.

## Wide Applications Research & Quality Control

The versatility of the tester allows the tribometer to play an essential role in several applications. It can be used for thin or thick films, lubricants, materials, soft materials, hydrogels, biomaterials, smooth or rough surfaces, flat or rough surfaces, transparent or opaque surfaces, nano or macro scale, coating or bulk materials, and more.



Automobile



Hard Coating



Semiconductor

**Decorative Coatings** 



Aerospace



Materials



Optical



**Bio-Materials** 

### **Platform Specification**

- Floor standing: Micro, Macro
- Bench top: Nano, Micro

### X Stage

- Range: 150 mm
- Motion resolution: 0.1 µm
- Maximum speed: 50 mm/s
- Twist Compression

### Z Stage

- Max speed: 10 mm/s
- Max resolution: 0.25 µm

### **Computer Console**

- Latest Windows OS
- LCD monitor, printer

### **Facilities Requirement**

Power Requirements: 240 VAC

### **Environmental Chambers**

- -50°C up to 1000°C
- 5 to 95% RH
- Liquid
- Corrison

### **Additional Sensors**

- Potentiostats
- Acoustic emission
- Electrical resistance
- pH probes

### **Various Mechanical Heads**

- Tribometer
- Indentation
- Scratch

### **Rotary Drive**

- Range 360°
- Standard speed up to 5000 RPM

### **Block on Ring Drive**

- Range 360°
- Standard speed up to 2500 RPM

### **Fast Reciprocating Drive**

- Speed up to 80 Hz
- Stroke 0.1 mm to 30 mm



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