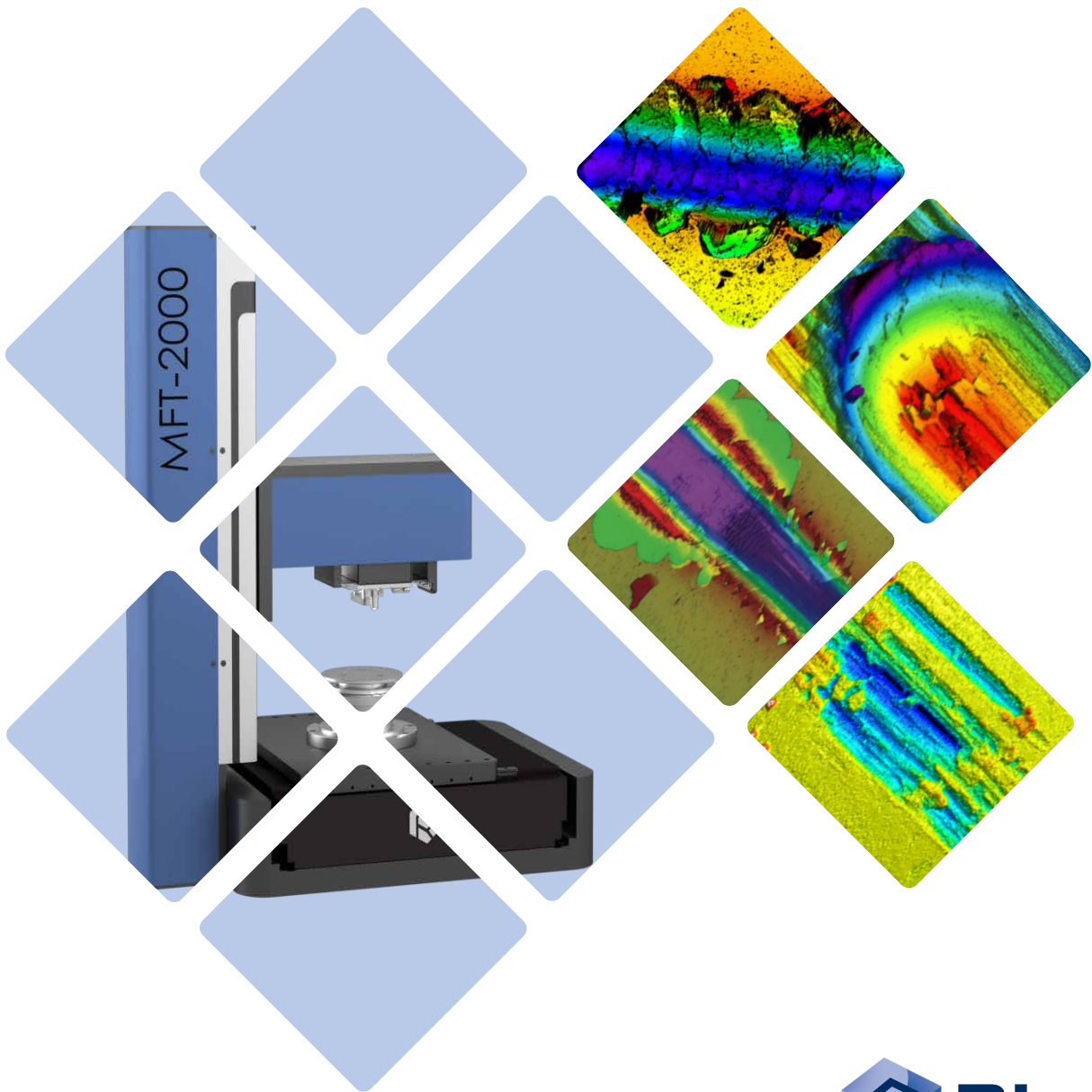


# Multi Function Tribometer

MFT-2000

Friction, Wear, and Mechanical Property Characterization

Nano and Micro Range Tester



# Research and Quality Control

- Rotary Friction
- Linear Friction
- Wear
- Hardness
- Adhesion
- Mar Resistance
- Surface Roughness
- Volume Wear

### Servo control down force control

Real time down force control - linear & constant load

### Wide Load Range - Nano and Micro

Load cells with forces from mN to 100 N

### In-line 3D Optical Inspection

Generate sub nm 3D images of surface during the test

### Environmental Control

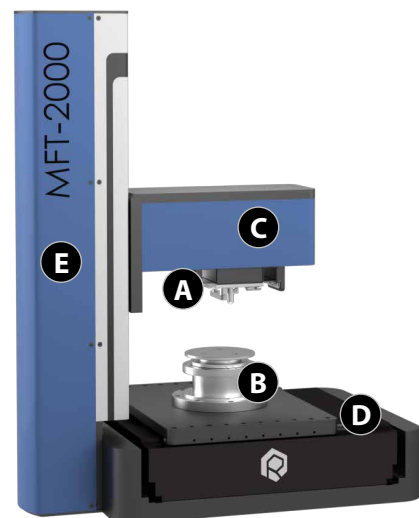
Control temperature with high resolution controllers

### Scratch, Tribology and Materials Tests

XY stage & force control enables wide application use

Designed For Essential Tribology, Wear and Scratch Studies

Several In-line Sensors to Monitor Real Time Surface Interactions



- A** Force Sensor
- B** Lower Drive
- C** Upper Holder
- D** 150 x 150 mm XY Stage
- E** 150 mm Z actuator

# Automation and Analysis

### Introduction

The Multi Function Tribometer MFT-2000 is a versatile and technologically advanced bench top tribometer for essential mechanical, scratch and tribological characterization. An open platform architecture design, fully automated test programs, and advance controllers allows for high repeatability and precision measurements. The servo control load, patented multi dimension force sensors and XY stage allows the MFT-2000 allows to run several tests covering scratch, tribology, wear, mechanical tests and profilometry on same platform.

### Active Feedback Loop Control

The tester comes with closed-loop active feedback controls over many channels.

The applied force is controlled during the test using electro servo drives. The force is measured using high precision force sensors with negligible drift. The tester can operate at constant or linear changing force profiles.

The rotation speed is controlled using servo controlled feedback, this allows to run test at constant or changing RPM.

The tester comes with several environmental control options. The temperature controller allows to maintain chamber temperature and does measurements at multiple points simultaneously.

### Accurate determination of failure events

The tester can accommodate various in-line monitoring sensors to quantify real time surface dynamics for e.g.

acoustic emission sensor is a wide frequency sensors to detect crack initiation points during the test.

### Ease of use and automation

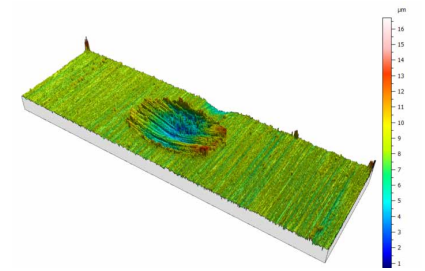
The instrument comes standard with a powerful set of software: from control to post analysis and imaging software. The data can export into many formats including ASCII format. The software provides the user with the ability to stop the test using logic based on signals from several in-line sensors. Each test can be controlled by a series of command blocks forming a protocol or "recipe". The MFT-2000 comes with advanced high speed, low noise, fast feedback, multiple channel data acquisition rate controllers.

### Integrated Imaging

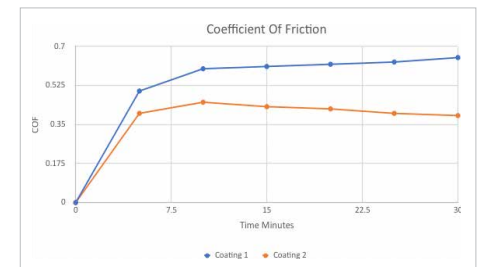
The MFT-2000 comes with a patented in-line 3D profilometer. This sub nm profilometer provides quantification of topography (roughness, volume wear, cracks, step height etc.) with nm resolution. This allows the creation of high resolution maps of surface change vs. time. The XY stage allows to stitch entire wear tracks automatically with ease.

### Applications

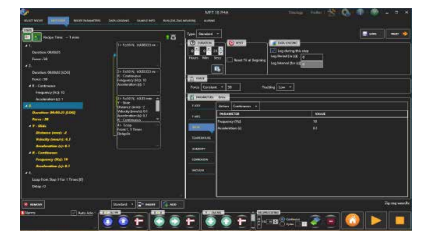
The versatility of tester allows the MFT-2000 to play an important role for several applications. It can be used for thin or thick films, lubricants, materials, soft materials, hydrogels bio materials, smooth or rough surfaces, transparent or opaque surfaces, nano or macro scale, coating or bulk materials, and more.



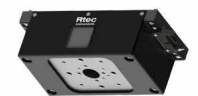
Wear Mark Profile



Friction Comparison



Software Interface



Force Sensor



Rotary Drive



Reciprocating Drive

## Platform Specification

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### XY stage

- Range: 150 mm
- Position repeatability: 1  $\mu\text{m}$
- Maximum speed: 50 mm/s

### Multiple Z stage

- Range: 150 mm
- Resolution: 0.1  $\mu\text{m}$ , 0.02  $\mu\text{m}$
- Max speed: 10 mm/s

### Computer console

- Latest Windows OS
- LCD monitor, printer

### Facilities requirement

- Power: 240 VAC, 50/60 Hz

### Environmental chambers (optional)

- 35°C up to 500°C
- 5 to 95% RH
- Liquid

## About us

Rtec-Instruments develops and manufactures advanced imaging and surface mechanical property measurement solutions for research and industrial applications. Based in Silicon Valley, we are the leading provider of testing instrumentation such as tribometer, optical profilometer, 3D scratch tester and micro/nano hardness tester.

We share a philosophy that embraces collaboration and partnership with customers, leaders in academia and industry, to ensure that our products answer real needs with innovative solutions.



## Surface Inspection

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### Various imaging modules

- 3D microscope
- White light interferometer
- Confocal microscope

### Various other modules

- Tribo-Corrosion
- Acoustic emission
- Electrical resistance

## Test Modules

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### Various mechanical heads

- Tribometer
- Indentation
- Scratch

### Lower drives

Easy to interchange drives. Several combinations of speed and torque available

- Rotary Drive
- Fast Reciprocating Drive
- Linear Stage



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