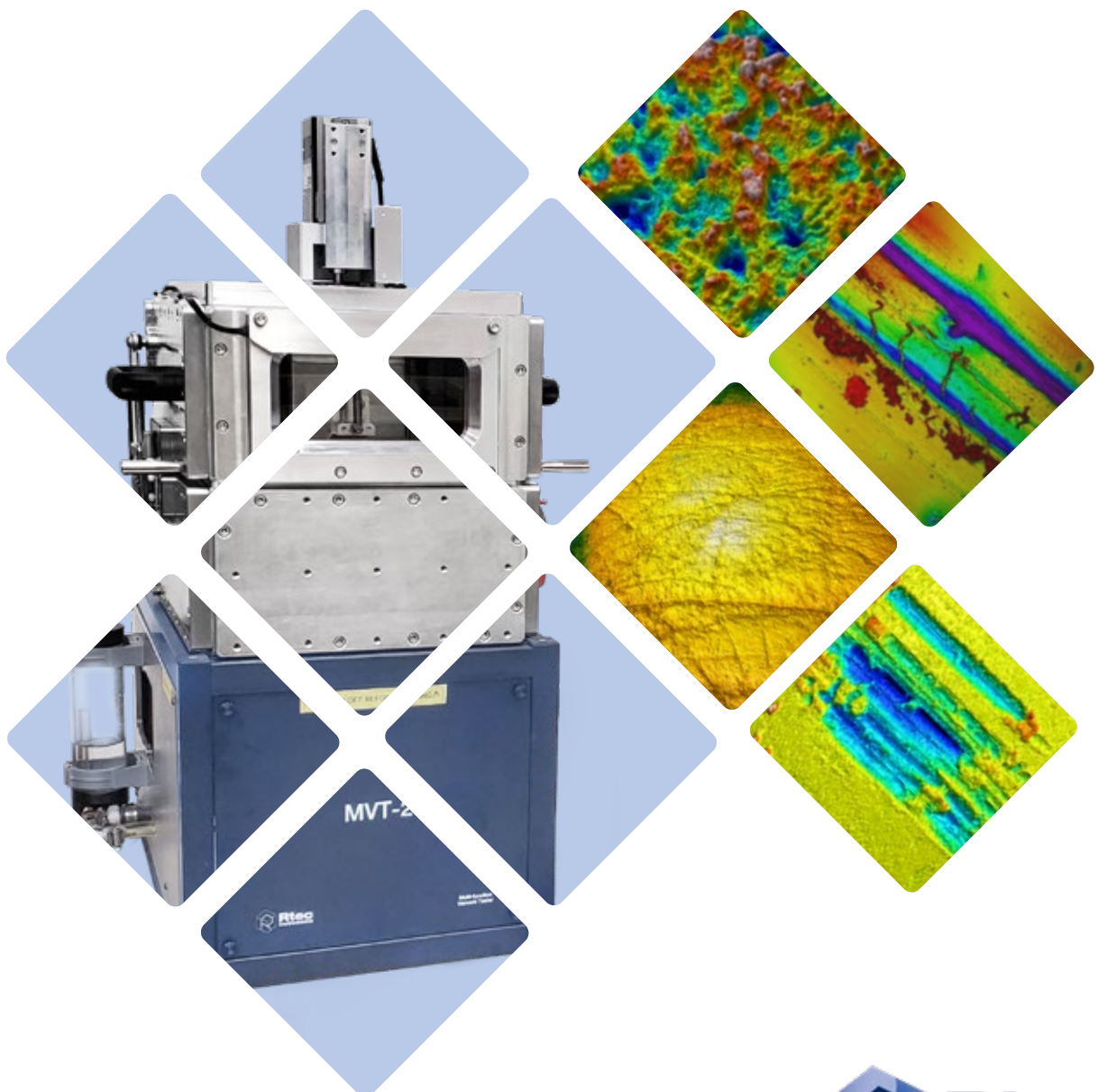


Multi Function Vacuum Tribometer

MVT-2

Tribology and Mechanical Tester With
Vacuum and Environmental Control

Cryogenic To High Temperature



Versatile Vacuum Testing

- Wear
- Friction
- Coefficient of Friction
- Adhesion
- Scratch Hardness
- Scratch, Mar Resistance
- Hardness
- Young's Modulus
- Fracture Toughness

Environmental Control

Study properties under vacuum and wide temperature range of -150 to 1000 °C

Closed-Loop Down Force Control - Nano, Micro, Macro Range

Patented Capacitive Sensors With Test range from mN to 200 N

Interchangeable Test Modules

Indentation, Scratch and Tribology heads easily exchangeable.

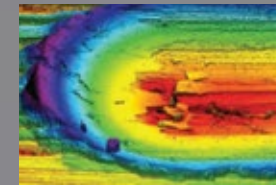
Rotary and Linear Motions

Test can be performed using both rotary and linear modes

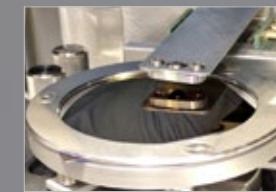
System Design

Unique open face system architecture that allows for easy access and customization. Also allows to add custom ports.

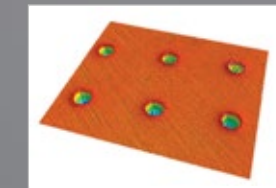
Vacuum Tribology For R&D to QC



Scratch



Tribology



Mechanical Tests

Industry Standard Platform

Why Vacuum Tribology? – Advancement in space, semiconductor, thin films, and 2D materials have resulted in several studies focused on material and coating properties under vacuum. Friction, wear, and adhesion of surfaces under vacuum are very different compared to ambient conditions.

The MVT-2 comes with a wide force, speed, and test temperature ranges for analysis of materials properties under vacuum conditions. Unique design with patented force sensors, with easy wide front access, capable of generating data with high accuracy and repeatability. Run several common friction, scratch, adhesion, hardness, lubrication and wear tests on the same platform.

Vacuum

+

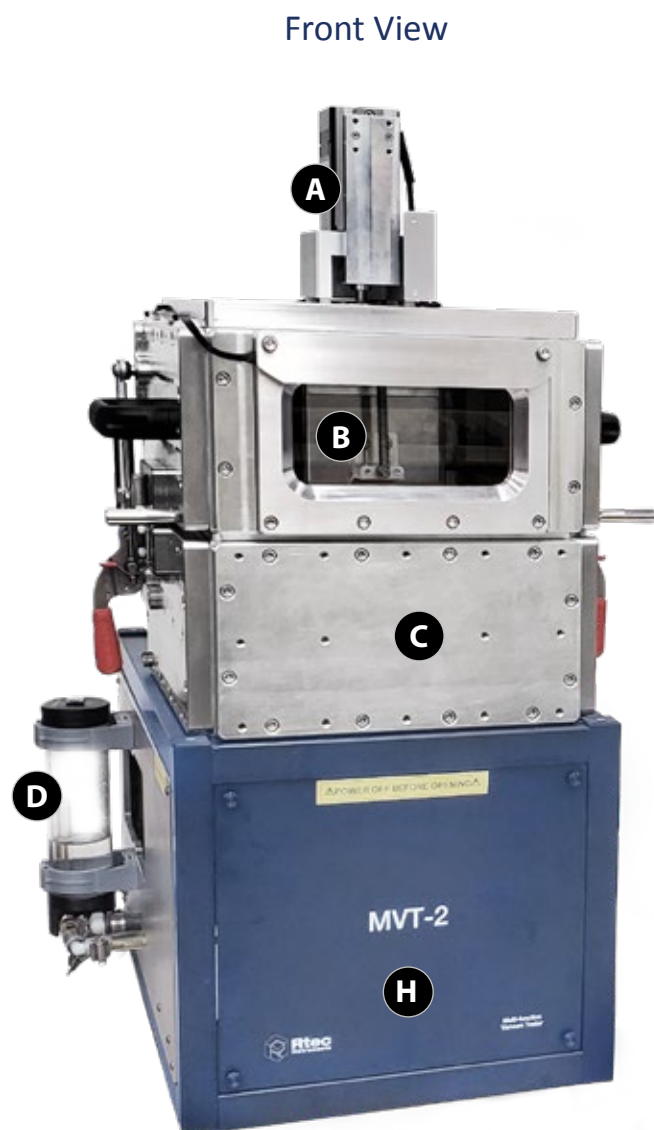
Temperature

Material Properties

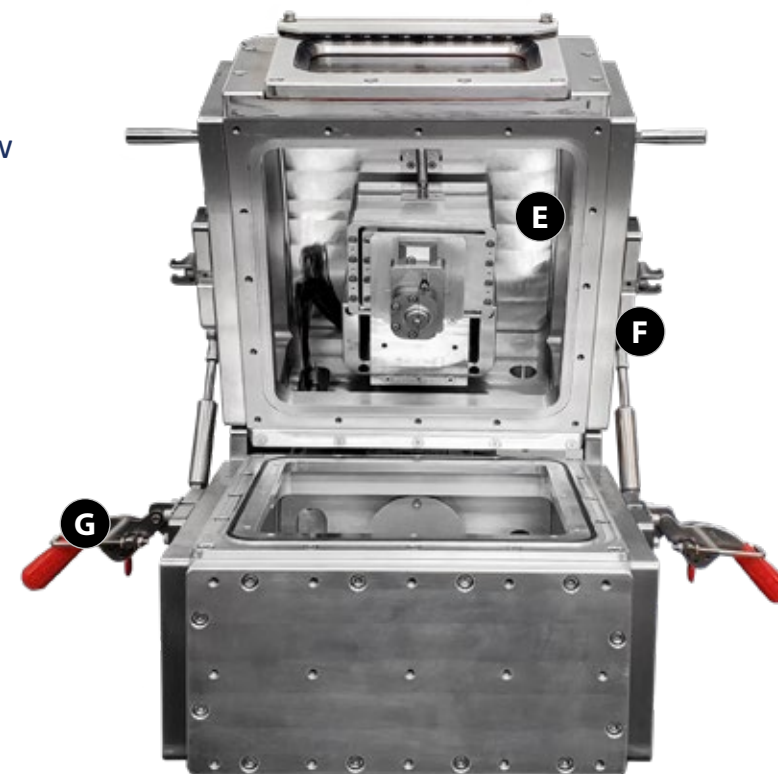
The new method of combined vacuum and temperature control provides tribology testing like no other.

Vacuum Test Configuration

- A Upper Z Gantry** High precision Z stages for closed-loop down force control.
- B Force Sensor** Patented multi axis capacitive force sensors available across a wide range of forces
- C Lower Test Module** Rotary test modules to achieve speeds up to 5000 RPM
- D Circulator** Water circulator for thermal management.



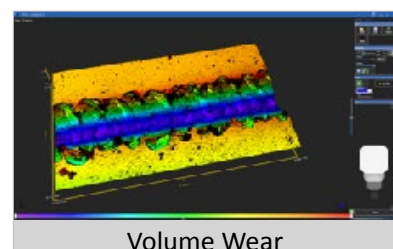
Inside View



- E Linear Stage** In addition to lower rotary drive, the vacuum chamber accommodates reciprocating and linear stages.
- F Vacuum System** Two stages pump including turbo-molecular to help achieve high vacuum in short time. Inert gas circulation also possible.
- G Ease of Use** Open architecture design for easy access and sample exchange. Optical port for visualization.
- H Data Acquisition, Motion Controller** Advanced high speed, low noise, fast feedback, high data acquisition rate controllers



Coated Sample Test View



Volume Wear



Vacuum Grease Test



Force Sensor and holder



In-line 3D Profilometer, Raman



Nitrogen Controller

Patented Capacitive Force Sensor



Technology

- High Frequency Response
- Ultra high stability
- Works across wide environmental range
- Overload protection
- Accommodates customizable upper holders

Highest Resolution and Negligible Thermal Drift

Environmental Control

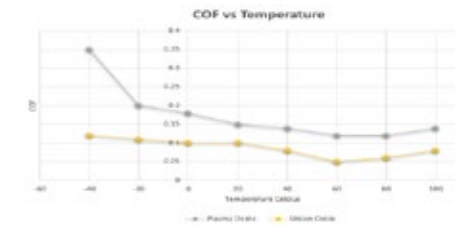
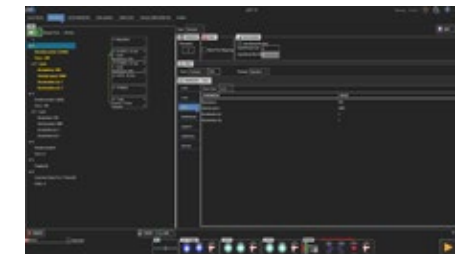
-150°C to 1000°C
Temperature Control

The tester allows for environmental control under vacuum condition. A single setup allows to test across wide temperature range -150°C to room/400°C/ 1000°C. In addition, the design allows to circulate gases during the test.

MVT-2 is equipped with water cooled circulators and anti condensation features for effective thermal management during the test. The advanced control system allows temperature measurement at multiple points simultaneously. The temperature is closed-loop controlled, and the requested conditions are controlled using the software automatically.

Software

The tester comes with a powerful operation, statistical, and image analysis software. All software is Windows based and is very easy to learn and operate. The data can be saved and exported in ASCII format.



Abort Criteria

Each test step can be stopped by user's defined logical criteria.

Recipe Driven

Each test can be controlled by a series of command blocks forming a protocol or "recipe." The recipes are saved and easily drive the instrument.

Easy to Operate

The software is intuitive and easy to operate

Platform Specification

Platform

- Floor standing or bench top

Z Stage

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

Computer Console

- Latest Windows OS
- LCD monitor, printer

Facilities Requirement

- Power Requirements: 240 VAC

Environmental Chambers

- -150°C to 1000°C

Additional Sensors

- Acoustic emission

Various Mechanical Heads

- Tribometer
- Indentation
- Scratch

Rotary Drive

- Range 360°
- Up to 2500/5000 RPM

Linear Drive

- Speed up to 50 mm/s
- Stroke 0.1 mm to 60 mm

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.



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