High Frequency Fretting Rig

HFRR

Fretting, Wear, Linear Friction
Lubricity of Oils, Grease, and Additives

Certified ISO 9001:2015

Next Generation HFRR

ASTM, ISO, DIN Compliant

- Lubricity
- Wear
- Linear Friction
- Fretting

Closed-loop Downforce Control

Real-time measurement and control of downforce. Programmable constant, linear, or step force profiles.

Closed-loop Environmental Control

Humidity, temperature & inert gas for real-life simulation.

High Reliability - Flexure Design

Voice coil-based flexural suspension design without any bearings.

The Smallest Controllable Stroke - 10 µm to 2.8 mm, up to 200 Hz

Real-time stroke, frequency monitoring, and correction using LVDT.

- A **Enclosure**
- B **Downforce Control**
- C **Position Control**
- D **Environmental Control**
- E **Voice Coil**
- F **Friction Measurement**
- G **Addition In-line Sensors**
- H **Liquid Containers, Sample Holder**

Introduction

Rtec-Instruments' benchtop high-frequency reciprocating tester tests the lubricity of diesel fuels and screens the lubrication performance of engine oils, additives, and more.

This next-generation HFRR testing machine uses programmable force control (no dead weights). Its unique flexure-based design, rigid platform, in-line friction monitoring at high frequencies, and fully automated test programs provide high repeatability and precision measurements.

Down Force

The applied force is measured and controlled in real-time using a servo-controlled motor. The real-time force control (no dead weights) allows it to perform tests in constant, linear, or step force profiles. Hence it can run both standard and non-standard tests with ease

Precise Waveform Control

Without the friction of rolling or bearings, the flexure-based design with a voice coil actuator provides the control required for the most sensitive of tests. In addition, the tester uses the most accurate and precise displacement control in the market with a 1 nm resolution and micron level of accuracy.

Accurate Determination of Failure Events

The tester has advanced dual piezo sensors to measure real-time friction at high frequencies. Coupled with in-line acoustic emission and an electrical contact resistance sensor, it accurately determines failure events during the test.

Standard Compliance

The tester comes with certified standard oil samples, balls, and disks.

Software

The tester comes with a Windows-based computer with an operation and data analysis software package. The operation software is a recipe-based software that allows it to run standard or previously created standard programs with a click of a button. The software provides change force, temperature, frequency, stroke, time, cycles, and humidity during each step. It also allows you to define endpoints based on several in-line data that are monitored. The software can be used for simple standard tests or advanced complex test methods.

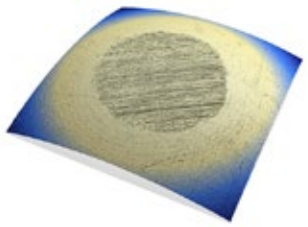
The analysis package comes with visualization and statistical data analysis. Multiple files and reports can be opened for easy comparison. Data can be stored in binary or ASCII format.

Environmental Control

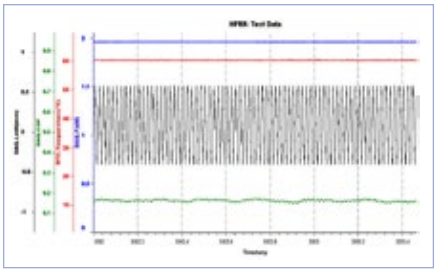
The tester comes with several environmental control options, including a closed-loop humidity control that uses a humidifier to reach 5 to 95% RH. Several temperature ranges for both heating and cooling are available on the tester.

Applications

Broad testing conditions allow the HFRR Tester to be used across several applications, such as automotive, aerospace, lubricant, railways, coatings, turbines, EV vehicles, motors, turbines, and much more.



3D Wear Scar Mark



High Frequency Data

Front View of the FFT-M

Software Interface

Platform Specification

Platform
- Benchtop FFT-M HFRR
- Up to 20 N force (more options available)
- Enclosure

Standards Conforms To
- D6079
- ASTMD7688
- CEC F-06-A-96
- ISO 12156-1
- IP450
- BS-EC590
- Many More

*Standard reference oils (high and low viscosity) and disk provided for calibration.

Actuators
- Displacement 10 µm - 2.8 mm
- Resolution: 0.1 µm
- Oscillation frequency: up to 200 Hz

Sensors
- Piezo Friction Sensor

Environmental
- Up to -35°C, 180°C, 400°C
- Humidity controller 5 to 95% RH

Standard Samples
- 6 mm balls
- 10 mm diameter disks
- More options available

Computer console
- Control Software and Data Analysis Software
- Windows 10 Operating System
- Monitor, keyboard, mouse

▲ **Rtec-Instruments Office**

● **Agent / distributor**

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HFRR-FFT-M-2022-A-01A-EN