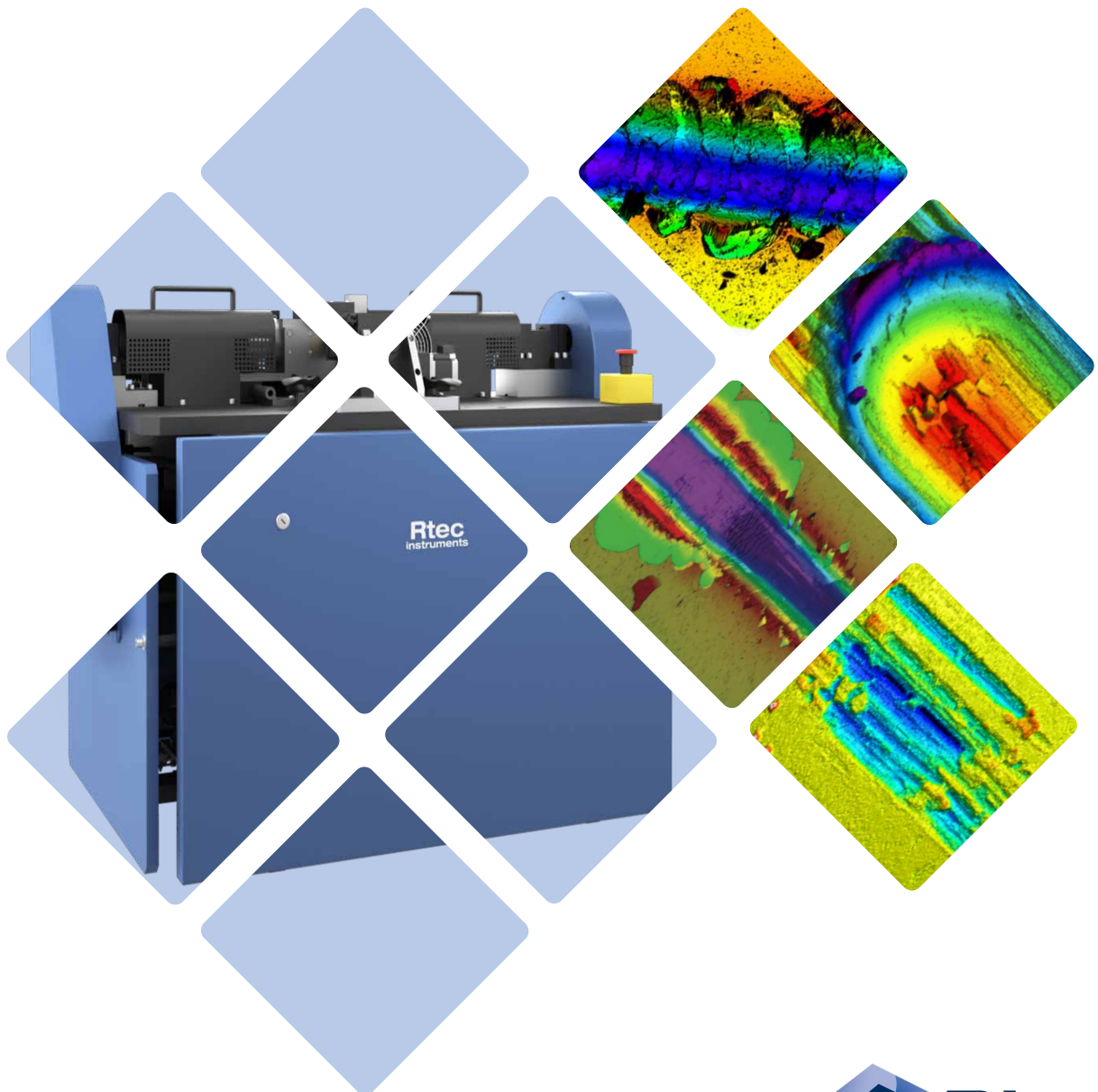


# Twin Roller Tester

TwinRoller-3000

Roller Contact Fatigue

Multiple ASTM, DIN, ISO Standards Compliant



# Research and Quality Control

- Elastohydrodynamic lubrication
- Gear lubricants, materials
- Surface treatments
- Hydraulic fluids
- Pitting
- Rail friction
- Rolling mill
- Sliding-rolling contact
- Traction coefficient
- Traction fluids

### Independent Control of Both Rotations

Servo controlled high torque, precise rotation motors

### Wide Load Range - Micro and Macro

Load cells with forces from 1 N to 8000 N

### In-line 3D Optical Inspection

Generate sub nm 3D images of surface during the test

### Environmental Control

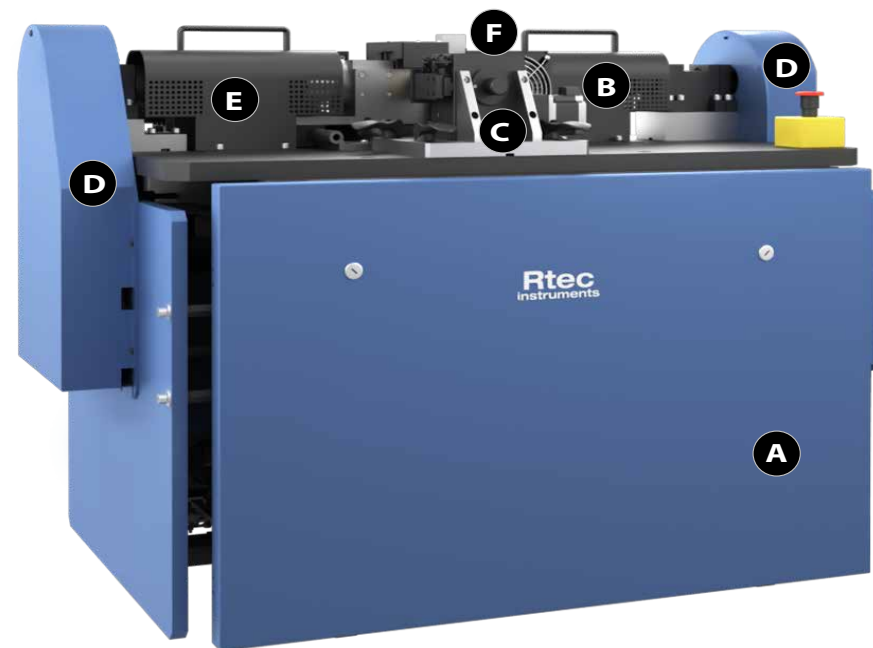
Control temperature with high resolution controllers

### Custom Sample Holders

Unique design to allows for wide sample sizes

## Two Independently Controlled High Speed Rollers

Several In-line Sensors to Monitor Real Time Surface Interactions



- A Platform
- B Torque Sensors
- C Rollers
- D Motor
- E Force Sensors
- F Environmental Control

# Automation and Analysis

### Introduction

Rtec-Instruments' TwinRoller-3000 is an ideal twin roller machine to study traction, wear, and rolling contact fatigue under various combinations of rolling and sliding. With an open platform architecture that allows easy access, the tester comprises of two high torque independently controlled servo motors. The force is applied using electro servo drives. The tests are done under controlled environmental conditions, and run both dry and lubricated setups. The lubricant can be contained in a container or actively circulated during the test. Fully automated test programs and advance controllers allows for high repeatability and precision measurements.

### Active Feedback Loop Control

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

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

The applied force is controlled during the test using electro servo drives. The force is measured using high precision force sensors with negligible drift, all while operating at constant or linear changing force profiles.

The tester comes with several environmental control options. The advanced temperature controller allows temperature measurement at multiple points simultaneously.

### Accurate determination of failure events

The tester can accommodate various in-line monitoring sensors to

quantify real time surface dynamics.

Few commonly used sensors are mentioned here.

a) Torque Sensor - Patented high resolution in-line dynamic torque sensor to monitor change in generated frictional forces.

b) Acoustic Emission - 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.

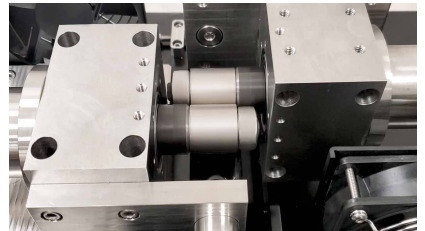
Each test can be controlled by a series of command blocks forming a protocol or "recipe". The data can export into many formats including ASCII format.

The software provides the user with the ability to stop the test using logic based on signals from several in-line sensors. For example, user can put stop test condition as - "when friction increase by 30% or when acoustic sensor shows a failure initiation signal stop the test". This condition allows the user to do post analysis of the sample the moment failure started to happen.

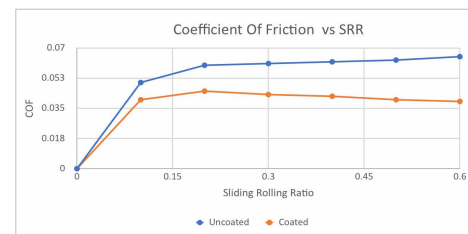
The TwinRoller-3000 comes with advanced high speed, low noise, fast feedback, multiple channel, highest data acquisition rate (200 KHz) controllers.

### Applications

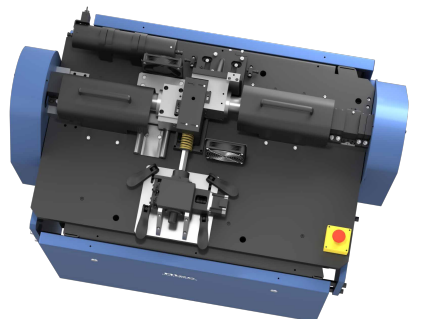
Wide testing conditions allows the TwinRoller-3000 to be used across several applications such as automotive, aerospace, lubricant, railways, coatings, turbines, EV vehicles, motors, turbines, and much more.



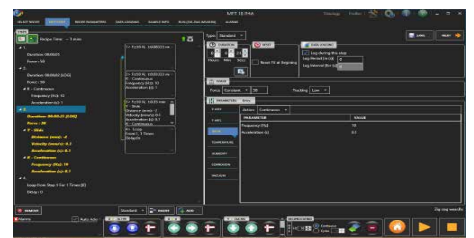
2 Rollers During Test



Data showing friction vs sliding rolling ratio



Top view of the TwinRoller-3000



Software Interface

# Platform Specification

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## Loading stage

- Motion resolution: 0.1  $\mu\text{m}$
- Maximum speed: 1 mm/s

## Load

- Max Load : 5000N/8000N\*

## Computer console

- Latest Windows OS
- LCD monitor

\* Higher ranges available

## Additional Sensors

- Acoustic emission
- Electrical resistance
- Potentiostat

## Rotary Drive

- Pure Rolling
- Pure Sliding
- 0 -200% Sliding/rolling ratio
- Standard Torque 60Nm\*
- Standard speeds up to 3000/6000 RPM\*
- 30 to 60mm diameter\*

## Facilities Requirement

- Power Requirements:  
220/380/480 VAC

## Environmental

- 35°C to 150°C
- Dry or With Liquids

## 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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