



Triple disc machine for researching rolling contact fatigue (RCF) failure mechanisms in the form of micro and macro pitting under lubricated and unlubricated conditions.

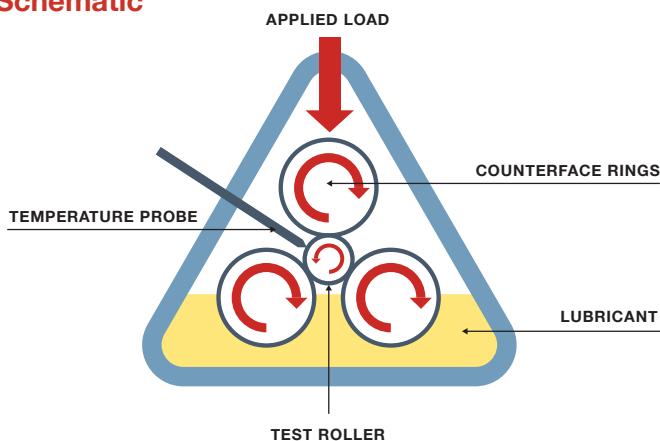
speed

The MPR is an innovative, compact test instrument designed to investigate rolling contact fatigue at realistic contact pressures. It is used extensively by tribologists, to study a range of failure mechanisms observed in real world applications and as a screener test for current lubricant formulations, to ensure they are fit for purpose.

MPR test data plays an integral role in the development of new formulations, coatings and materials to enhance the tribological properties of systems.

The simple test set up and intuitive software allows real life conditions to be easily replicated. The unique specimen geometry enables the MPR to complete an unrivaled number of contact cycles whilst keeping surface speeds low. This allows in depth research into RCF phenomena, and ensures test time is significantly shorter than is possible with any other instrument on the market.

Test Specimen Schematic



Failure Mechanisms being studied on the MPR:

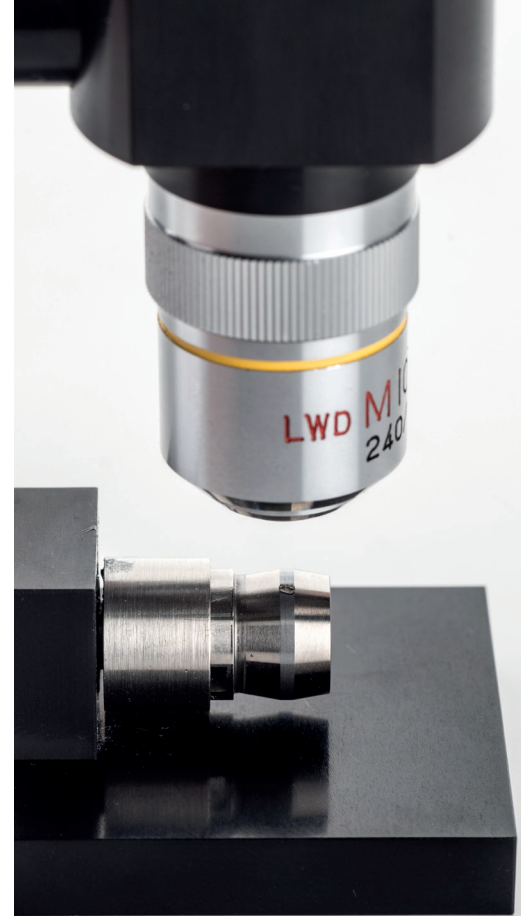
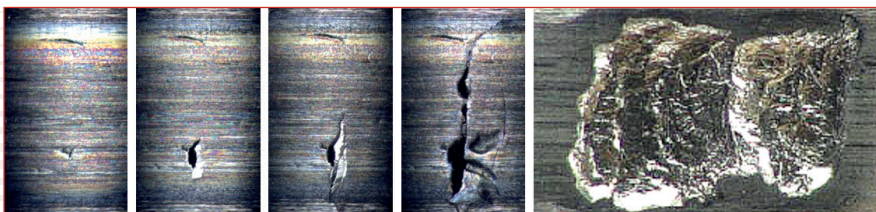
Micro Pitting

Macro Pitting (spalling)

White Etching Cracks (WECs)

Scuffing Resistance

▼ Pit progression during macro pitting test



Features & Benefits:

Up to 1 million contact cycles per hour, significantly increasing test throughput

Fully automated, easy to calibrate and intuitive software, improves repeatability, and ease of use

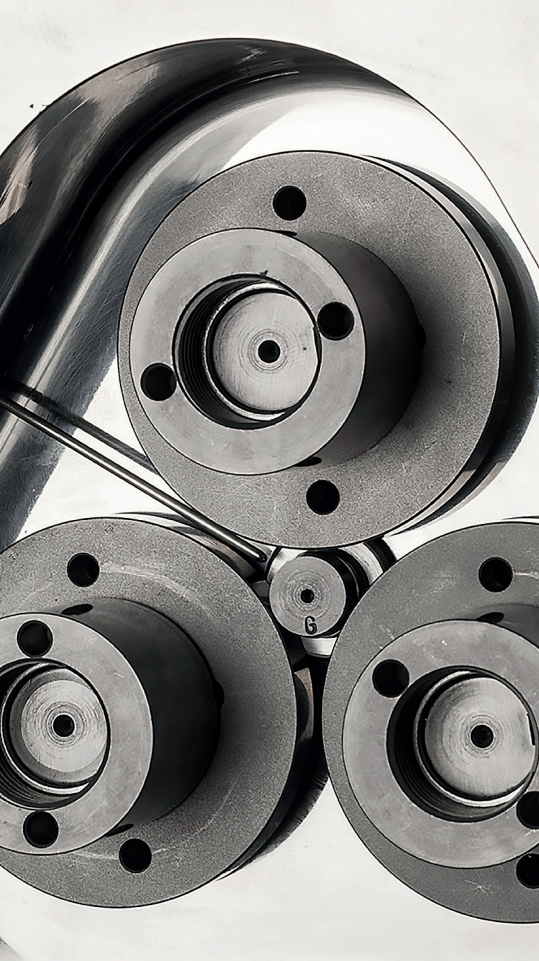
Two independently driven motors, allows any slide-to-roll ratio and a wide range of speeds to be set, expanding the instrument testing capabilities

Temperature controlled test chamber further expands testing capabilities

Compact and mobile, the MPR can be relocated with ease to accommodate lab requirements

Small sample volume saves on cleaning time, reduces sample wastage and cuts running costs

Wide range of specimen materials and geometries available



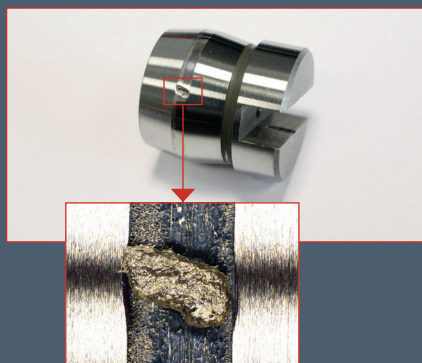
Specimens:

- Single use specimens ensure highly accurate and repeatable results are achieved every test
- The simple, low cost specimens and high contact cycle rate enables multiple samples to be analysed in a short time
- The roller accumulates most of the wear, eliminating the need for post analysis testing of the rings

Available materials:

- 52100 (through hardened)
- 16MnCr5 (case carburised)
- M50 (tool steel)

Other materials available on request



Principle

Three counterface rings are equally spaced around a small, central roller. The speed, slide-to-roll ratio, temperature and load are set by the user using a standalone profile editor application. The test then runs automatically using the chosen profile.

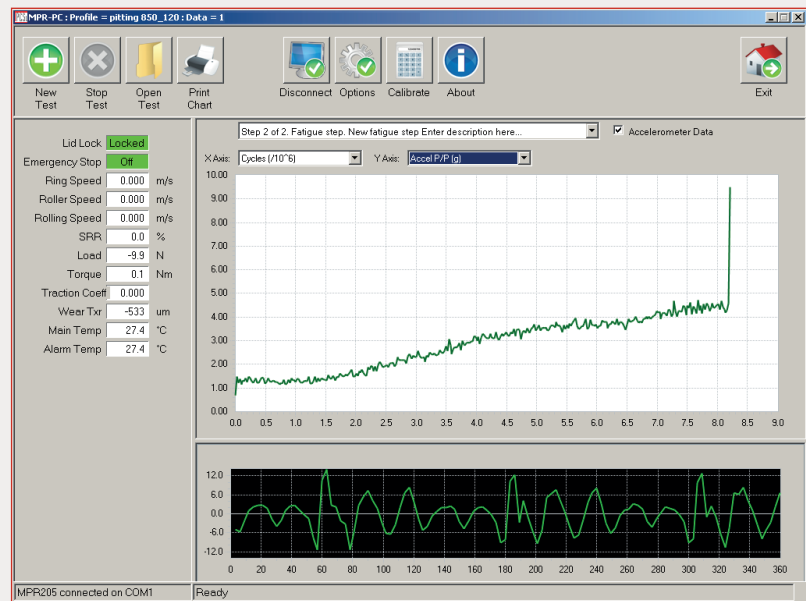
The test load is applied using a linear actuator and throughout the test the friction between the roller and rings is measured using an inline torque transducer.

A piezo-electric accelerometer constantly maintains the vibration level between the roller and rings, and when running a macro pitting test, a failure is detected when the signal exceeds a preset level.

When running a micro pitting test, the roller can be removed at regular intervals and examined for weight loss or change of appearance.

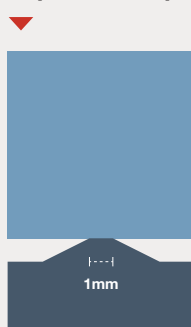
Results:

▼ Screenshot of accelerometer trace over a complete macro pitting test



Geometries:

1 (standard)



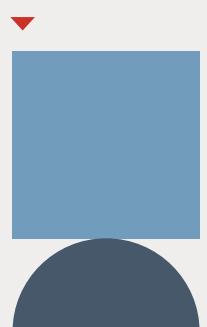
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4



▼ MPR pressures using various specimen geometries

CONFIGURATION	GEOMETRY		CONTACT PRESSURE (GPA)	
	Roller	Ring	Min	Max
1	Chamfered	Cylindrical	0.86	3.04
2	Cylindrical	Crowned (80mm)	1.02	2.36
3	Cylindrical	Crowned (12mm)	1.65	3.84
4	Ball	Cylindrical	3.49	4.74

Technical Specification

The MPR system comprises an integrated mechanical and electronic unit and a PC with data logging software.

TEST PARAMETERS

Load	100 to 1250 N
Contact Pressure	0.86 - 4.7 GPa
Speeds	Up to 4 m/s
Temperature Range	Ambient to 135 °C (below ambient with optional cooler)
Test Sample Volume	150 ml

CONTROL SYSTEM

PC	Custom software running on Windows 10
Safety Checks	Dual Platinum RTDs for temperature measurement, emergency stop button, safety switch on cover
Power Supply	200 - 240 V, 50/60 Hz, 3.0 kW max (15A)

DIMENSIONS & WEIGHT

Weight (Main Unit)	295 kg - 650 lb
Size (h x w x d)	1400mm/55in x 660mm/26in x 1120mm/44in

Industries



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