

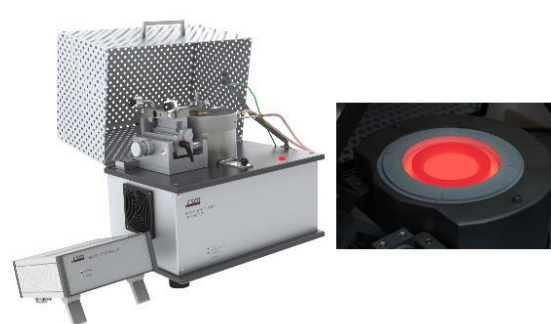
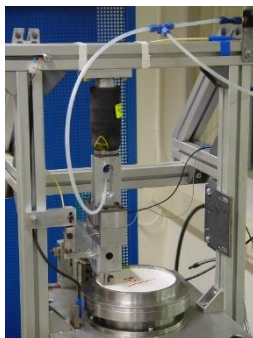
Wazou: The tribometer is used to measure the friction and wear behaviour of materials under sliding conditions. It can be operated without lubrication with solid objects and with fluid lubricants with boundary or mixed friction. This tribometer allows for a very large range of geometries, normal loads and sliding velocities to be applied. During the standard testing procedure a stationary specimen (pin or ball) is pressed against the front surface of a rotating disc with a defined normal force. Both specimen are arranged vertically. The top specimen is the rotating disc and the stationary specimen (disc, pin or ball) is loaded from below.

Pin-On-Disc 1: A stationary pin is pushed with a given normal load against a rotating disc, continuously measuring the friction force on the pin and the depth of the wear track (vertical displacement of the pin) on the disc. The pin consists of steel or hard metal and the disc material is a composite plate. Additional to post-mortem analyses, wear mechanisms are on-line monitored by a high-speed camera, AE (acoustic emission), 3D accelerometry, strain gauges and infrared thermometry. This equipment is used to detect wear mechanisms as e.g. matrix/fiber cracking and gives information about the current state of the composite material.

High Temperature Tribometer (THT): The CSM tribometer with the configuration Pin/Ball on Disk allows the determination and study of friction and wear behaviour of almost every solid state material combination or hard coating with varying time, contact pressure, velocity, temperature, humidity and lubricants.

- A flat or a sphere shaped indenter is loaded onto the test sample with a precisely known weight
- The pin or ball is mounted on a stiff lever, designed as a frictionless force transducer
- As the disk rotates, the resulting frictional forces acting between the pin and the disk are measured by very small deflections of the lever using a LVDT sensor
- Wear coefficients for both the pin and the sample are calculated from the volume of material lost during a specific friction run

CSEM Tribometer: The CSEM tribometer allows to press a ball or a pin against a rotating disc. These small standardised specimens allow a quick and cheap investigation of the coefficient of friction and the wear behaviour of different material combinations. A flat or a sphere shaped specimen is loaded onto the rotating disc with a precisely known weight. The stationary specimen is mounted on a stiff lever, designed as a frictionless force transducer. As the disk rotates, the resulting frictional forces acting between the pin and the disk are measured by very small deflections of the lever using a LVDT sensor. Wear coefficients for both the pin and the sample are calculated from the volume of material lost during a specific friction run.



TEST RIG CHARACTERISTICS

Property	Wazou TRM1000	Pin-On-Disk	High Temperature CSM	CSEM
Geometry				
Pin-on-disc	✓	✓	✓	✓
Ball-on-disc	✓	✗	✓	✓
Disc-on-disc	✓	✗	✗	✓
Motion				
Rotational	✓			
Continuous	✓			
Oscillation	✓			
Wear surface				
Disk size	Ø 20 – Ø 100 mm	Ø 160 mm x 3 mm	Ø 55 mm x 3 mm	20 – 100 mm
Plate size	Max. 70 mm x 70 mm	160 x 160 x 20 mm ³	Max. 35 mm x 35 mm	Max. 70 mm x 70 mm
Wear track diameter	10 mm to 90 mm	100 mm to 150 mm	5 mm to 50 mm	10 mm to 90 mm
Holder				
Ball	Ø 5 mm – 10 mm		Ø 3.6 mm and 10 mm	Ø 5 mm – 10 mm
Pin	Ø 5 mm – 10 mm		Ø 3.6 mm and 10 mm	Ø 5 mm – 10 mm
Normal load	1 N to 1000 N	50 N to 1000 N	Up to 60 N	Up to 60 N
Friction force			Up to 20 N	
Test temperature	Max. 400°C		Max 1000°C	Max 400°C
Oscillation angle, frequency	8 – 350 Deg, 3 Hz			
Rotational speed		10 mm/s to 100 mm/s	Max 1500 rpm	Max. 1500 rpm