



SATHI Foundation IIT Kharagpur

Fostering research-based innovation for Atmanirbhar Bharat
Scientific and Engineering Services in Advanced Materials

Vaccum and Inert Gas Universal Testing Machine

The installed high temperature testing system is capable of performing various tests such as tensile, compression, flexural etc. It is capable of performing tests at very high temperature of 1500 °C in vacuum as well as inert atmosphere. With a maximum load capacity of 50kN, It is suitable for a wide range of materials, including metals and ceramics. The system integrates advanced measurement techniques such as optical and laser extensometer to ensure precise strain measurement.



High temperature testing system (Kappa 50 SS-CF) installed at the SATHI Foundation IIT Kharagpur Facility



Main Features

- Operates from room temperature up to 1500 °C
- Supports testing in vacuum, inert gas atmosphere, and high temperature conditions
- Performs tensile, compression, and flexural tests etc. up to a max. load of 50kN.
- Equipped with optical and laser extensometer for accurate strain measurement.
- Ensures accurate force and displacement measurement for reliable results.



Potential Industries

- Aerospace and Defence
- Additive Manufacturing
- Ceramic and Refractories
- Metallurgical Research



Advantages

- High temperature testing makes it ideal for evaluating materials under harsh thermal conditions.
- Its suitability for both ceramic and metallic materials makes it versatile across multiple industries.
- Load capacity of 50 kN, ensures robust materials testing.

Some of the tests which can be performed on the Kappa 50 SS-CF

✓ Tensile and Creep Tensile test:
Max load of 1kN at 1150°C

✓ Creep-Fatigue: ASTM E606
Room Temp. to 1150°C

✓ Creep 3-point bending test:
600°C - 1400°C → Vacuum or inert gas mode
1400°C – 1500°C → Only Inert gas mode

✓ Creep Compression and common
Compression test:

600°C - 1400°C → Vacuum or inert gas
1400°C – 1500°C → Only Inert gas

✓ Creep tensile with CT-Specimen
According to ASTM E1457
Room Temp. to 1150°C



Application areas

Tensile, compression and flexure testing of materials under high-temperature conditions.

Creep and stress rupture testing by analysing long-term material behaviour under sustained load at high Temperatures.

Thermomechanical fatigue testing by simulating real world cyclic loading conditioned at high temperatures.

Environmental testing for assessing material behaviour under controlled atmosphere such as vacuum or inert gas conditions.

About SATHI Foundation IIT Kharagpur

Department of Science & Technology (DST), Government of India (GoI) has set up a Sophisticated Analytical and Technical Help Institute (SATHI) center at IIT Kharagpur (IIT Kgp) to offer services such as Characterization, Testing, Fabrication, Scientific analysis / interpretation, generation of data & knowledge dissemination etc. to various external users including startups, MSMEs, large scale industry and academia.

SATHI IIT KGP centre will be housing facilities for rapid prototyping, and smart fabrication, in addition to analysis and testing. It will also provide an opportunity for consultancy, training and various levels of collaboration with the stakeholders in the process.

The key theme of SATHI center at IIT Kharagpur, which will be managed by SATHI Foundation at IIT Kharagpur, (a section 8 company) is Advanced Materials. More details of about the center are available on the website <http://www.sathi.iitkgp.ac.in>

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