

REFRACTORY TESTING, REDEFINED



High-Performance Equipment for *Critical Refractory Testing*

*Not just a
Substitute for Imports
An Export-Grade
Standard*

Engineered in India. Matched Globally.

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THERMAL CONDUCTIVITY

Specification

Measuring Range	0 – 15 W/m·K
Temperature Range	Room Temperature to 1400 °C
Heating Element	Silicon Carbide (SiC) Elements
Hot Wire Material	Platinum, 0.5 mm Diameter
Hot Zone Dimensions	230 mm × 115 mm × 150 mm
Suitable Sample Size	228 mm (length)
Power Supply Unit	Keithley Precision DC Source, 5 A Capacity
Voltage/Current Measurement	Keithley DMM6500 Digital Multimeter

Applications

Suitable for determining the thermal conductivity of non-carbonaceous, dielectric refractories including *refractory bricks, castables, plastics, ramming masses, powders, granules, and refractory fiber materials.*



Software

The Thermal Conductivity Test Bench is powered by custom LabVIEW® software exclusively made by VBCC, offering precision control and robust data acquisition. It is tailored for accurate measurements based on the hot cross wire method, and is equipped with features ideal for both industrial QA/QC labs and research environments.

- Real-time temperature ramping and hot wire resistance monitoring
- Easy creation, storage, and recall of test recipes.
- Simultaneous multi-parameter data acquisition with high temporal resolution
- Direct export of test data to MS Excel® for custom analysis
- Automatic PDF report generation summarizing test results with graph.



PYROMETRIC CONE EQUIVALENT (PCE)

Specification

Max. Temperature	1800°C (Continuous operation at 1700°C)
Heating Element	MoSi ₂ - 1800°C Grade
Programmable Controller	144 Segment TAIE PID Programmer with B-type Thermocouple
Power Control	Phase angle thyristor control using SCR block from SEMIKRON, Italy
Control Accuracy	±1°C
Rotating Sample Base	Ensures uniform heating of test cones
Mechanical Lever System	Precise positioning of sample and reference cones
Quartz View Port	50 mm dia with radiation shield for safe visual monitoring
Integrated IR Camera	Real-time visual capture of cone deformation
Data Logging Software	Image saving, melting behavior recording, reporting

Integrated Thermal Imaging Camera (IR)

The PCE Test Bench includes a **high-performance thermal imaging camera** for non-contact, real-time monitoring of cone deformation and melting behavior. Ideal for precise thermal profiling during high-temperature operations.



Temperature Range: Up to 2000°C

Resolution: 384 × 288 pixels

Detector: Uncooled FPA with 17 µm pixel pitch

Frequency: Up to 30 Hz

Emissivity: 0.01 to 1.0 (adjustable)

Accuracy: ±2°C or ±2% of reading

Spectral Range: 8 – 14 µm



HOT MODULUS OF RUPTURE (HMOR)

Specification

Max. Temperature	1400 °C 1600°C
Heating Element	Silicon Carbide (SiC), Molybdenum disilicide (MoSi ₂)
Hot Zone Dimensions	200 mm × 200 mm × 400 mm
Test Specimen Size	25 mm × 25 mm × 150 mm (L)
Support Span	125 mm (3-point bending)
Max. Load Capacity	380 kg
Loading Mechanism	Motorized, Automated Load Application
Control System	PLC with 5" HMI Touchscreen
Temperature Controller	144 Segment TAIE PID Programmer with R-type Thermocouple
Accuracy	±1°C (Temperature), ±1% (Load Measurement)
Output	Digital Display of Rupture Load at Breakage and Data Logging

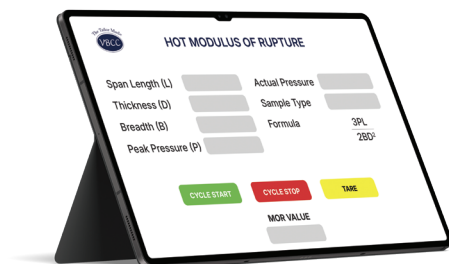
Applications

Applicable to *fired dense refractory bricks and shapes, chemically bonded bricks, castable-formed shapes, plastic or ramming mix shapes*, and any other refractory materials that can be formed to the required specimen dimension.

HMI with PLC

Our Hot MOR system integrates a user-friendly Human Machine Interface (HMI) with an advanced Programmable Logic Controller (PLC) for precise test control and automation.

The 5" TFT touchscreen offers intuitive navigation and real-time display of test parameters, breaking load, and temperature profiles.



MODULUS OF RUPTURE (COLD)

Specification

Size of the machine	≈ 750 x 750 x 750 mm
Sample size	As per customer requirement
Capacity of the equipment	1000 kg (load cell)
Capacity of the top punch	1000 kg
Stroke	50 mm (maximum)
Rate of loading	Adjustable (as per customer requirement)
Operation	Vertical down
Daylight	100 mm
Span length	3-point with 40 mm OD rollers, adjustable
Press frame	4-pillar type
Pressure units	Special motorized system (no oil, no motor-gears required)
MOR Measurement	Automatic digital indication of MOR and LOAD via HMI + PLC with freezing
Construction	High-quality MS body & MS angle frame with stiffeners and epoxy-coated finish

Highlights

- ↗ **Fully Automated System with HMI + PLC** – user-friendly interface with digital test readout.
- ↗ **Versatile Sample Handling** – configurable span length and punch pressure for fired & unfired samples.
- ↗ **High Accuracy Load Cell** – ensures precise and repeatable results every time.
- ↗ **Zero Oil Leakage Design** – motorized pressure system eliminates hydraulic mess and reduces maintenance.
- ↗ **PC Connectivity (Optional)** – via RS232 port for digital data logging and report generation.
- ↗ **Customization Options** – Tailored sample sizes, adjustable span rollers, and load range as per your requirements.



CREEP IN COMPRESSION

Specification

Sample Size	50 × 50 × 50 mm (±2 mm)
Maximum Temperature	1800°C (Continuous operation at 1700°C)
Heating Elements	MoSi ₂ - 1800°C Grade
Temperature Control	144 Segment TAIE PID Programmer with B-type Thermocouple
Power Control	Phase angle thyristor control using SCR block from SEMIKRON, Italy
Control Accuracy	±1°C
Load Range	1 N to 1000 N (Max: 0.5 N/mm ² on standard sample)
Measuring Method	LVDT-based system with 1 micron resolution (NABL certified)
Measuring Range	0 to 2000 microns
Furnace Chamber	200 × 200 × 400 mm (usable volume), with preheating zone
Software & Interface	LabVIEW-based control software with digital & PC output

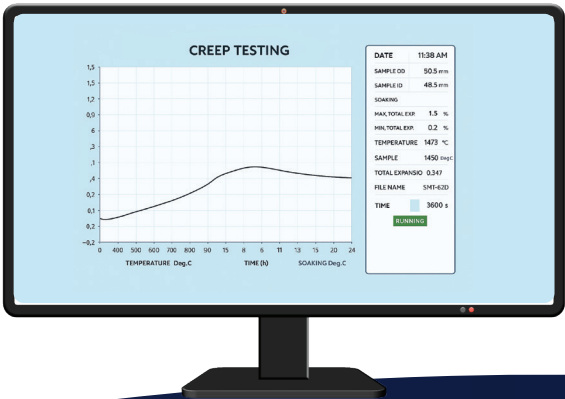
Applications

Evaluates the high-temperature deformation resistance of refractories under sustained compressive load.

Used in material selection for load-bearing components in furnaces, kilns, and reactors.

Predicts long-term performance of ceramics in extreme thermal and mechanical environments.

Ensures quality control by verifying batch consistency and creep resistance during production.



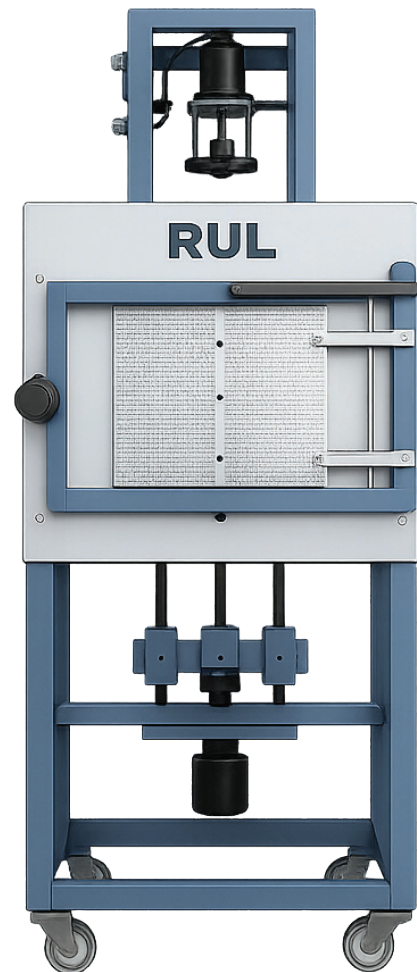
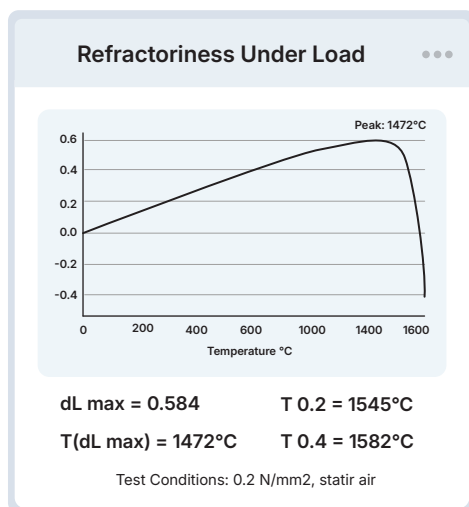
REFRACTORINESS UNDER LOAD (RUL)

Specification

Specimen Dimensions	Cylinder Ø 50 mm × Height 50 mm, coaxial bore Ø 12.5 mm
Applied Load Range	1 N to 1000 N, adjustable in 1 N steps
Max Stress	Up to 0.5 N/mm ² (based on Ø 50 mm surface)
Heating Rate	1–10 °C/min program-controlled
Max Test Temperature	Up to 1700 °C
Temperature Uniformity	≤ 5 °C across the hot zone
Deformation Measurement	LVDT differential via alumina tubes, accuracy ≈ 1 µm
Deformation Range	Up to 20,000 µm (20 mm)
Thermocouples	Two B-type: one inside sample, one in furnace
Software Interface	LabVIEW with PC

Software

The RUL system features a powerful LabVIEW-based software interface designed for precise thermal deformation analysis under load. The intuitive graph plotting module displays real-time temperature vs. deformation curves, allowing users to accurately determine critical parameters such as dLmax, T(dLmax), T_{0.5}, and T_{1.0}.



COLD CRUSHING STRENGTH (CCS)

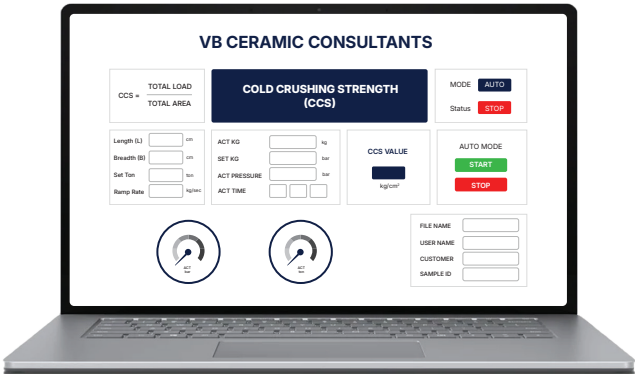
Specification

Max Load Capacity	1000 kN/ 100 Tons – Uniaxial pressing
Touchscreen HMI	5" Delta LCD for load and control
PLC Controlled	Delta PLC for full automation
Load Resolution	0.1 Ton programmable
Hydraulic System	5 HP Siemens motor + axial piston pump
Pressure Sensor	200 Bar rated sensor
VFD Drive	Load controlled through VFD automation
Platen Size	300 mm, 150 mm stroke, 200 mm daylight
Operation Modes	Auto / Manual with safety interlocks
Construction	Heavy MS frame with powder coating

PC & Software

This CCS testing software provides a streamlined, automated interface for evaluating the compressive strength of refractory samples at room temperature. Built with a user-friendly HMI and PLC integration, it enables real-time monitoring of load, pressure, time, and sample dimensions. The software automatically calculates the CCS value (kg/cm²) based on the total load and sample area.

Key features include *auto mode operation, precise ramp rate and dwell time control, digital gauge indicators, and secure test data logging*. Ideal for labs and industries focused on refractory quality assurance.



ASTM C372

DILATOMETER

Specification

Max Temperature	1000° 1400° 1600°C
Heating Element	APM Kanthal SiC MoSi ₂
Insulation	Low Thermal Mass Fibre Insulation
Power Control	Phase angle thyristor control using SCR block from SEMIKRON, Italy
Control Accuracy	±1°C
Power Supply	230V, 15 Amps, Single-phase AC
Furnace Movement	Linear bearings on SS rails
Expansion Measurement	LVDT (Massetron, Germany)
Measurement Accuracy	1 Micron
Measurement Range	-2000 to +2000 Microns
Sample Dimensions	10 × 10 × 30 mm ±2 mm

Highlights

NABL Calibrated

Fused Quartz / RCA Tube from Germany

Live Graph Generation

±1µm Accuracy

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Unrivalled Precision for Leading Ceramic Industries including the Ceramic Capital, Morbi. Our Dilatometers, the backbone of thermal expansion analysis, empower the heart of India's Ceramic Capital, ensuring unparalleled accuracy for top-tier quality in tiles and sanitaryware production



DISINTEGRATION TESTING OF REFRACTORIES IN CO ATMOSPHERE

Specification

Furnace Type	Vacuum metal body furnace with external heating
Chamber Size	Approx. Ø460 mm x 915 mm length; accommodates up to 10 test specimens
Specimen Loading	Front-opening insulated door for easy specimen placement/removal
Max Operating Temperature	1200°C (Continuous operation at 1100°C)
Heating Element	Spiral-type APM Kanthal
Power Control	Phase angle thyristor control using SCR block from SEMIKRON, Italy
Temperature Control	144 Segment TAIE PID Programmer with K-type Thermocouple
Control Accuracy	±1°C
Vacuum Level	Ultimate vacuum $\geq 10^{-2}$ mbar (Rotary pump, 500 L/min)
Gas Atmosphere	Controlled CO and N ₂ via dual rotometers; bubbler provided for safety
Insulation	Low thermal mass fibre insulation
Structure & Finish	MS double-wall body with powder-coated finish and proper stiffeners

Applications

Evaluates the resistance of refractory materials to disintegration in high-temperature carbon monoxide (CO) atmospheres.

Used in quality control and material selection for furnaces, gasifiers, and reduction kilns.

Essential for testing fireclay, alumina, and silica-based refractories exposed to reducing environments.

Aids in R&D of CO-resistant refractory compositions.

Helps analyze service failure and predict refractory performance in industrial CO-rich environments.



COLD ABRASION RESISTANCE

Specification

Abrasive Nozzle	Flint-glass, 115 mm length, 4.8 mm ID
Blast Gun	Modified design for uniform media delivery
Air Supply	Clean, dry air with stable pressure control
Media Type	Sharp angular grains for consistent results
Feed Control	Orifice-controlled flow (1000 g in 450 ± 15 sec)
Test Chamber	Sealed with access port; dust collection compatible
Pressure Monitoring	Dual gauges – vacuum & chamber pressure
Nozzle Distance	Fixed 203 mm from specimen surface
Safety Features	Integrated exhaust and dust handling system

Versatile Specimen Compatibility

- Accommodates refractory specimens ranging from 100 × 100 × 25 mm (4 × 4 × 1 in.) to 114 × 114 × 76 mm (4½ x 4½ x 3 in.), suitable for refractory brick, castables, and plastic refractories.
- Allows testing of different surfaces (troweled, mold face) to best reflect real-world application conditions.



SPALLING RESISTANCE

Specification

Heating Zone	Customizable
Maximum Temperature	1800°C (Continuous operation at 1700°C)
Heating Elements	MoSi ₂ - 1800°C Grade
Temperature Control	144 Segment TAIE PID Programmer with B-type Thermocouple
Power Control	Phase angle thyristor control using SCR block from SEMIKRON, Italy
Control Accuracy	±1°C
Sample Testing Slots	2 slots (70W x 120H mm each) on front door
Front Door System	Insert type, swing-aside, insulated stainless steel door
Bottom Drop Door	For water quenching – dimension as per sample size
Insulation	Low Thermal Mass Fibre Insulation
Test Standards Supported	IS:1528 (Part-3)-1983 for Spalling Resistance of Refractories
Supported Tests	Small prism test (5 samples) & water quench (3 bricks)



SLAG RESISTANCE

Specification

Model	Bottom-loading box-type furnace with auto raising hearth and tilting tray
Max / Continuous Temp	1800°C (Continuous operation at 1700°C)
Heating Elements	MoSi ₂ - 1800°C Grade
Hot Zone Dimensions	200 × 200 × 200 mm
Insulation	Low thermal mass fibre insulation
Door Mechanism	Bottom door (200 × 200 mm), motorized
Tilting & Raising Mechanism	Automatic
Crucible Type & Capacity	SiC disposable type, 2.0 kg capacity
Temperature Control	144 Segment TAIE PID Programmer with B-type Thermocouple
Power Control	Phase angle thyristor control using SCR block from SEMIKRON, Italy
Control Accuracy	±1°C



PERMANENT LINEAR CHANGE (PLC)

Specification

Maximum Temperature	1800°C (Continuous operation at 1700°C)
Hot Zone	(Customizable)
Heating Elements	APM Kanthal / SiC / MoSi ₂
Thermocouple	K / R / B Type (As per temperature range)
Insulation	Low thermal mass fibre insulation
Temperature Control	144 Segment TAIE PID Programmer with B-type Thermocouple
Power Control	Phase angle thyristor control using SCR block from SEMIKRON, Italy
Control Accuracy	±1°C



POROSITY\DENSITY TESTER

Specification

Weighing Balance 0.01 g accuracy, 200 g max capacity, suspension setup

Immersion Beakers 200 ml quartz glass containers

Vacuum Oven Volume 300 x 300 x 300 mm

Oven Construction SS inner body, MS panel board, powder coated

Insulation Low thermal mass fibre insulation

Max Temperature 150°C

Temperature Control 144 Segment TAIE PID Programmer

Control Accuracy $\pm 1^\circ\text{C}$

Vacuum Capacity Up to 760 mmHg

Vacuum Indication Analog dial vacuum gauge

Vacuum Pump With oil trap

Vacuum Timer Special timer provided

Desiccator Standard laboratory desiccator



HIGH TEMPERATURE FURNACE

RT to 1700°C

Specification

Maximum Temperature	1800°C (Continuous operation at 1700°C)
Hot Zone	(Customizable)
Heating Elements	APM Kanthal / SiC / MoSi ₂
Thermocouple	K / R / B Type (As per temperature range)
Insulation	Low thermal mass fibre insulation
Temperature Control	144 Segment TAIE PID Programmer with B-type Thermocouple
Power Control	Phase angle thyristor control using SCR block from SEMIKRON, Italy
Control Accuracy	±1°C



INDUSTRIAL OVEN

Specification

Maximum Temperature	300 °C
Hot Zone	Customizable
Temperature Uniformity	±5.0 °C @ 250 °C
Insulation	Low thermal mass fibre insulation
Temperature Controller	144 Segment TAIE PID Programmer
Power Control	Phase angle thyristor control using SCR block from SEMIKRON, Italy
Motor	0.25 HP (mounted on top side)
Fan	Heavy-duty fan with Inconel impeller
Inner Chamber	Stainless Steel
Outer Shell	Mild Steel with high-quality powder coating
Tray and Interior Material	Stainless Steel – 304L grade
Number of Trays	Customizable
Heater Configuration	Heating coils on three sides of the inner chamber



WHY CHOOSE US?



VB Ceramic Consultants (VBCC) is a highly trusted manufacturer of high-quality ceramic instruments, equipment, furnaces, and kilns. Our clientele includes esteemed universities, renowned R&D organizations, and leading industries, all of whom rely on our superior offerings. With a dedicated team of experts, we offer a range of comprehensive services to ceramic industries, including product development and problem-solving solutions. Having successfully completed numerous projects, VBCC takes pride in its ability to deliver innovative ceramic products, many of which serve as import substitutes. We offer these products along with the corresponding technical know-how, providing our clients with ready-to-use solutions.

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