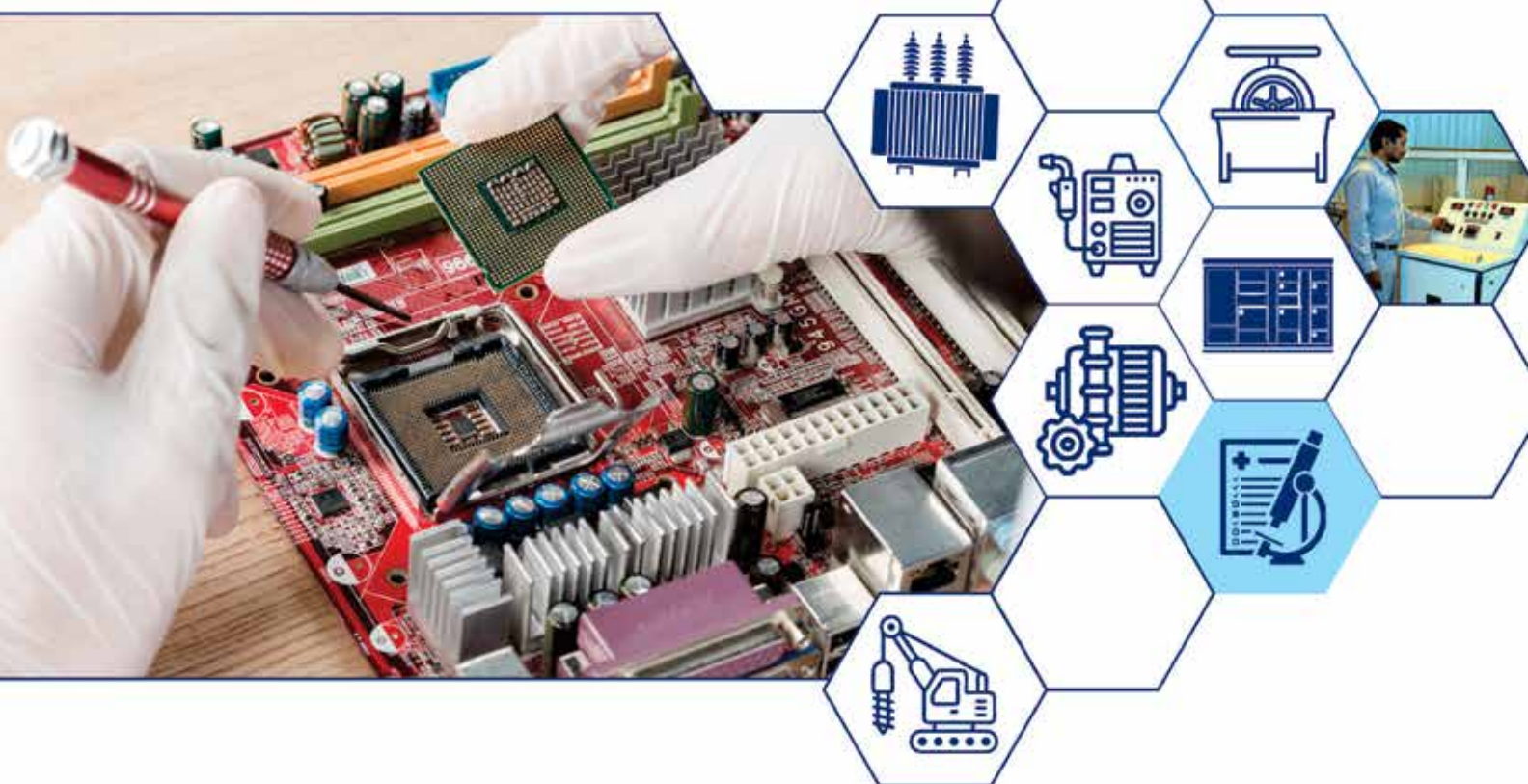




# BHEL Testing & Calibration Services

A Promise of 100% Quality

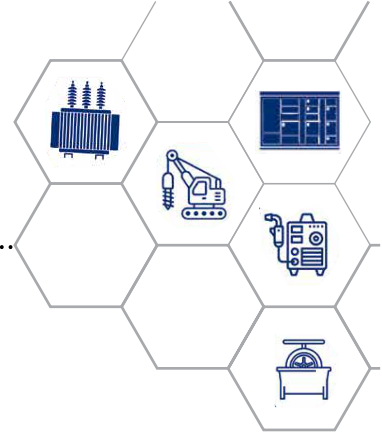


Testing & Calibration Services Catalogue  
**2021-2022**

## BHEL Testing & Calibration Services .....





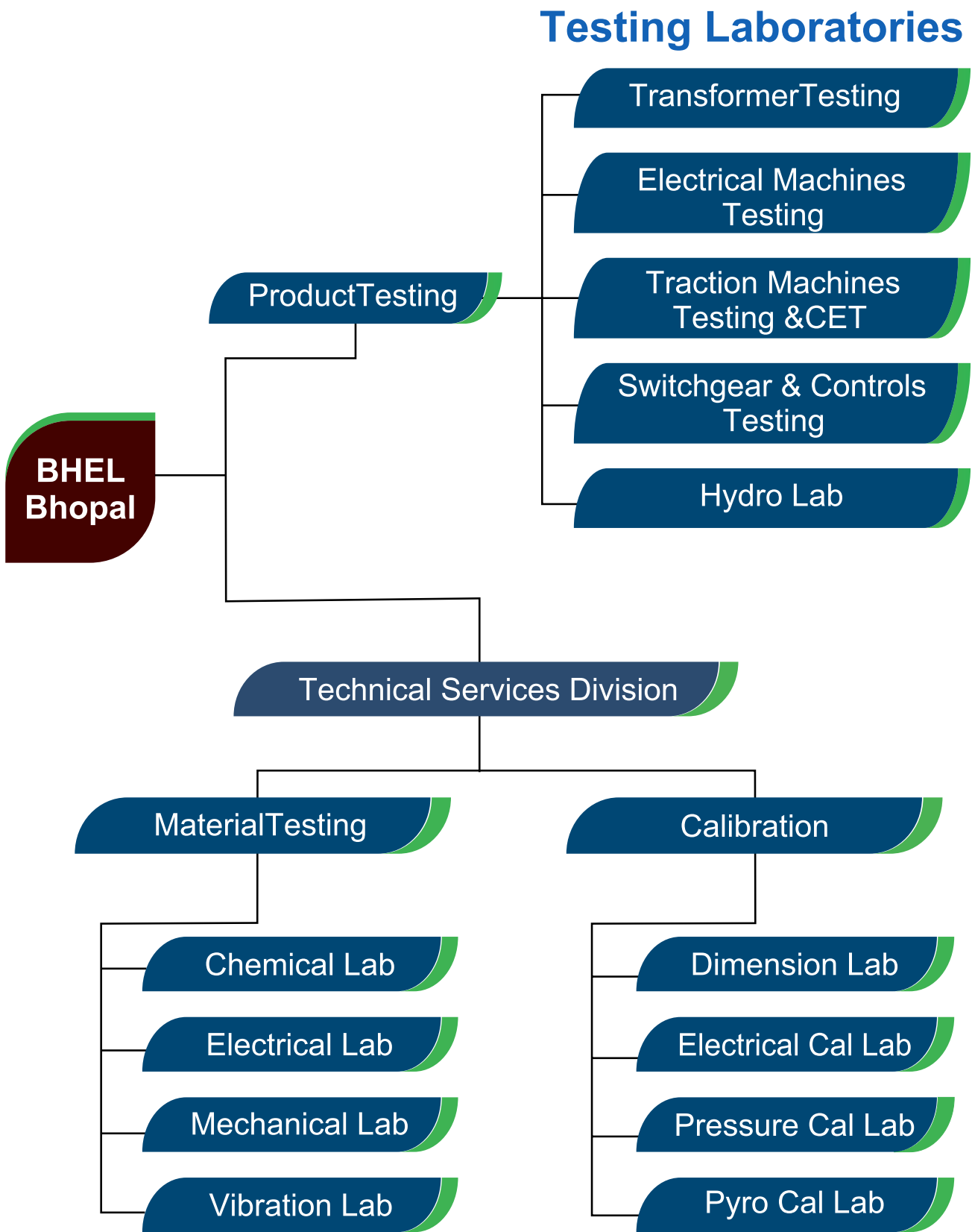


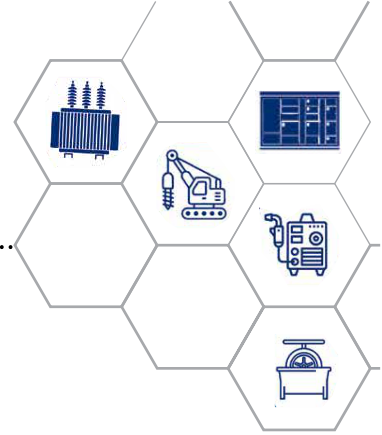
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# BHEL Bhopal Testing & Calibration Laboratories





## Introduction Page



**4** million Men hour  
testing experience

World Class  
Infrastructure  
and facility  
with  
compliance to  
**ISO17025**



Testing Beds  
catering to  
all sizes



One of the  
largest electro-  
magnetically  
screened  
laboratories in  
the world

Accredited  
by  
NABL

BHELintro :  
Serving the  
Nation since  
1955



Leader & forerunner in  
testing of transformers,  
motors, hydro machines.

Diversified Geographical  
Footprints and Versatile  
Testing Facility

# One Stop

Solution for  
all your testing  
needs

Pioneers in  
Engineering  
Materials and  
Electrical  
Equipments  
Testing





# Testing & Calibration facilities

## Achieve compliance, cost savings and quality

Testing determines quality of product or material. With calibrated equipment and expert manpower we provide services of testing for variety of materials like metals, transformer oil, paints, insulating tapes, cables etc. We also offer our expertise and testing services for products like transformers, motors, traction motors, hydro machines models, switchgear and controls to ensure compliance. Achieve and maintain compliance through consistent procedures and adhere to local and global regulations and standards, such as:

**ISO 17025**

**NABL Accredited**

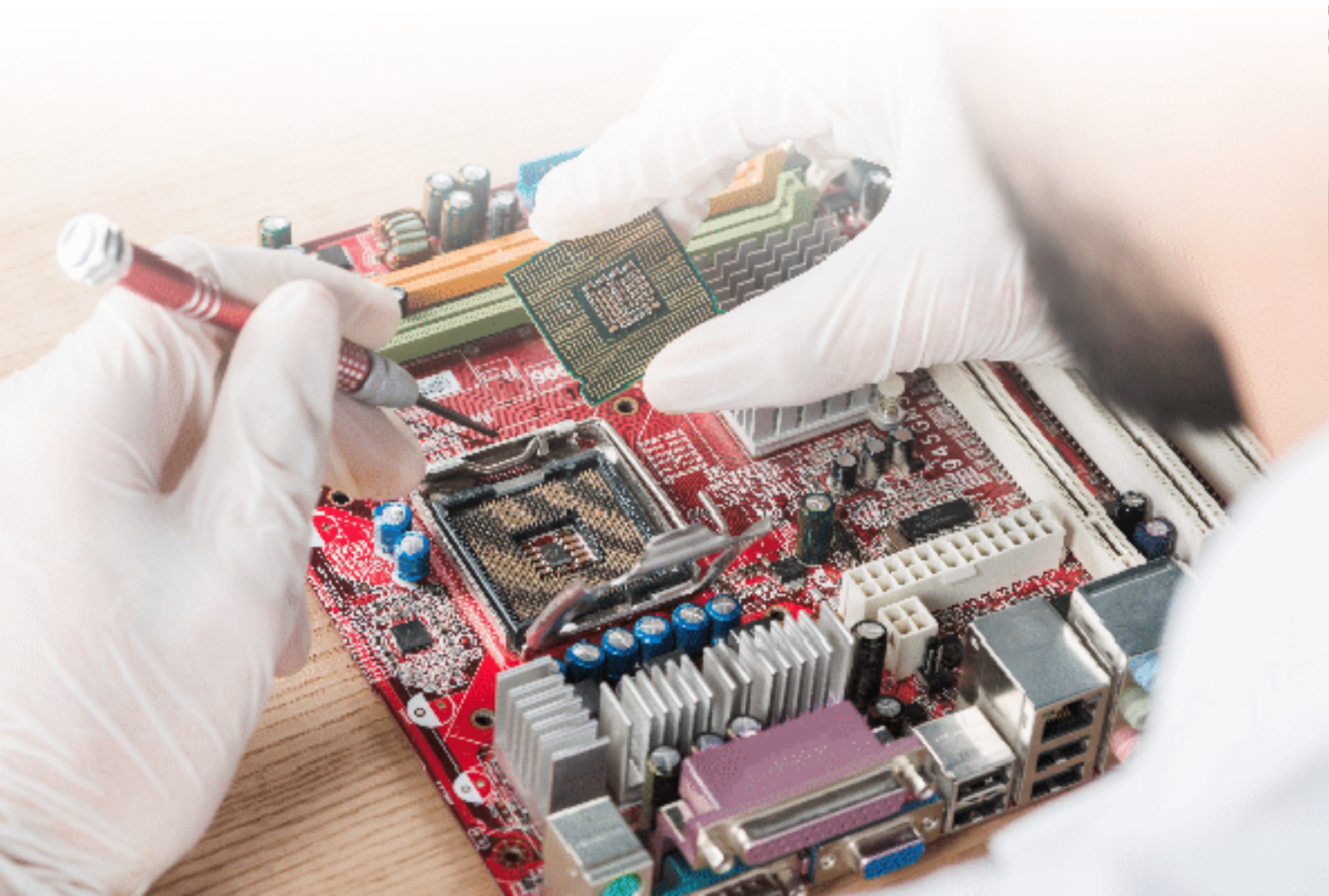
## Testing is the key to quality

Gain confidence in your product quality with testing and certificate services that only BHEL can provide. Our market-leading technology and expertise will bring you peace of mind and keep you compliant, with:

- Industry leading metrology expertise
- State-of-the-art testing equipment
- Professional, easy-to-read certificates
- Audit-proof documentation

## Testing certificate management

BHEL ensures consistency through step-bystep testing procedures. Our lab generates comprehensive and audit-proof certificates retrievable on demand from our secure database.





# Transformer Testing



Transformers Testing in BHEL Bhopal is look after by ULTRA HIGH VOLTAGE LABORATORY (UHV). It is the premier lab of its kind in India, offers most modern and sophisticated testing facilities for a wide range of transmission equipment and products. This unique lab was set up in 1980. The laboratory is accredited by NABL with compliance to ISO 17025. UHV Lab made a significant contribution in successfully establishing the BHEL as a major leader & forerunner in setting up the 400 kV. A.C. power system in India.

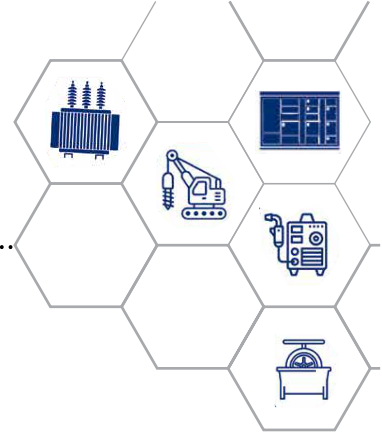
UHV laboratory is one of the largest electromagnetically screened laboratories in the world. It offers very low background level during Partial Discharge(PD) measurements. The major test equipment are mobile on air-cushion transport system, which provides flexibility of placement of test objects and test equipment in the hall with no space constraint upto the highest test voltages.

This laboratory is designed for comprehensive testing of for Power Transformers, HVDC Transformers & Shunt Reactors upto 765 kV class.

## Transformer: Routine & Type Test Facility in BHEL Bhopal

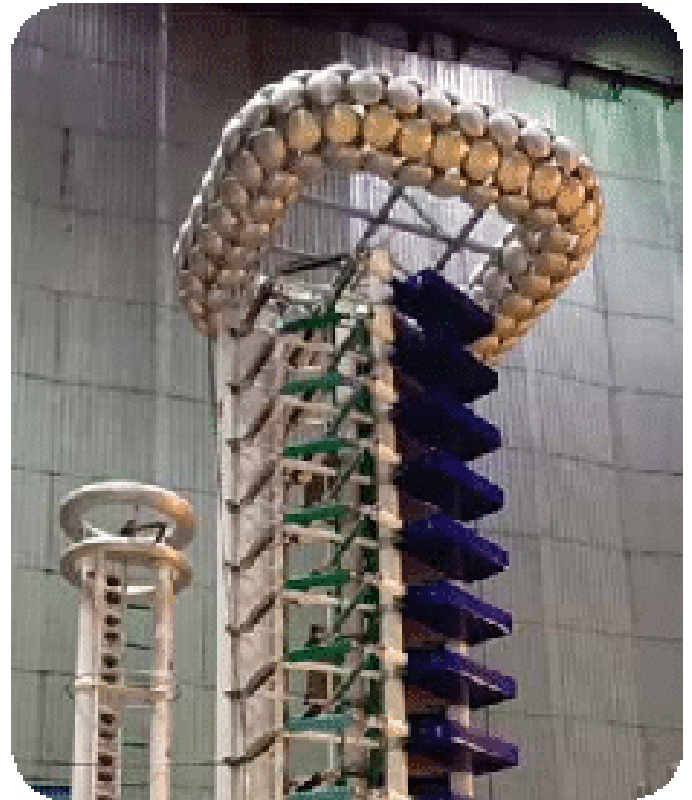
S No	Product Testing Facility	Transformer: Type Test
1	Tests on Oil - before and after type/routine test	Measurement of harmonics
2	DGA - Before and after test, During/Before and after HR, Before and after Dielectric	Measurement of Acoustic sound level - Ambient/ Hot condition, 1.0/1.1 pu, Before/after Dielectric
3	Isolation test -3.5kV DC/ 2KV AC/ 10kV AC	LTAC/ACSD test
4	IR of Isoation point	Measurement of VI
5	Applied voltage withstand test (separate source)	Temperature rise test - 1 & 3 rating
6	Chopped wave lightning impulse voltage withstand test on HV terminals	Measurement of power taken by cooling circuit
7	Applied AC test	Measurement of Zero Sequence Impedance
8	IVPD/ACLD test	
9	LI on Neutral terminal	
10	DC applied voltage test	
11	DC Polarity Reversal test	
12	Measurement of capacitance and tan delta of winding, bushing - before/after Dielectric	
13	Induced and applied Switching Impulse test	
14	Measurement of load loss & impedance - High Frequency	
15	Measurement of load loss & impedance - Rated Frequency	
16	Measurement of voltage ratio	
17	SFRA test - With / Without oil	
18	Repeat no load loss measurement at 100 % excitation	
19	Verification of polarity	
20	Measurement of magnetizing current from LV side	
21	Measurement of IR & PI before and after Dielectric	
22	Measurement of no load loss & current at 90%,100%,110% excitation	
23	Measurement of winding resistance	





# Transformer Testing Facilities

Facility	Test
Impulse Test Systems 4000 kVp, 400kJ & 3000 kVp, 450kJ	Lightning Impulse, Switching Impulse
1200 kV HVDC Test System	DC Test
1000 kV AC Measuring System (AC divider)	Applied Voltage Test Induce Over Voltage Test
Loss Measuring System (CT, PT & Measuring System - 2500A & 4000A)	Load Loss No Load Loss
1200 kV Series Resonant Test System	Applied Voltage Test
Standard Capacitor 50.9pf, 600 kV	Reactor Loss Measurement
Ratio meters	Voltage Ratio
Capacitance & Tan delta Bridge	Capacitance & Tan delta of Winding & Bushing
Micro ohmmeter	Winding Resistance
Digital multi meters	Magnetizing Current
Partial discharge measurement system	Partial discharge measurement /ACSD test/ACLD test/ IVPD/LTAC



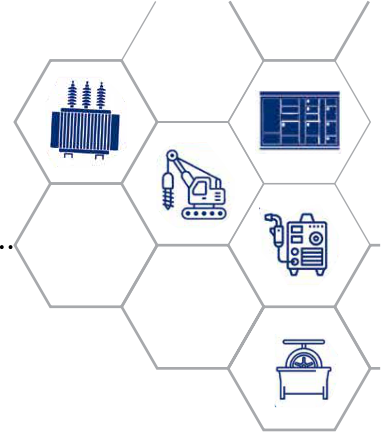
**BHEL Testing & Calibration Services .....**



Facility	Test
VI measurement kit	Measurement of VI
Oil test kit	Temperature rise test thermography
FRA kit	SFRA test
Isolation test kit (DC KIT)	Isolation test
Insulation Resistance Meter (10 kV)	Insulation Resistance test
Automatic High Precision C, L & Tan Delta bridge for Reactor Loss measurement	Load Load test
Non-contact type continuous Thermal scanning and Recording system	Temperature rise test Thermography
Power Clamp Meter	Cooler Loss Measurement
Temperature Recorder and data logger	Temperature rise test







# Electrical Machine Testing Large & Medium Motors

BHEL Bhopal, motor manufacturing and repair facility, built in 1963. It is recognized for being the first manufacturing facility in India and also ranks as one of the BHEL's longest continuous operating plants in India. The plant is capable of Testing the complete line of

1. Medium Motors (up to 2 MW),
2. Large Motors (up to 22 MW) and
3. Hydro Generator (up to 200 MW).



The Bhopal facility is also known for Testing motors that exceed the stringent standards established by the IEC, IEEE, IS, petroleum industry, customized quality plan of customers, etc. The facility is dedicated to testing these large electric motors as well as providing services to diagnosis fault in older motors for taking up further customized repair process.

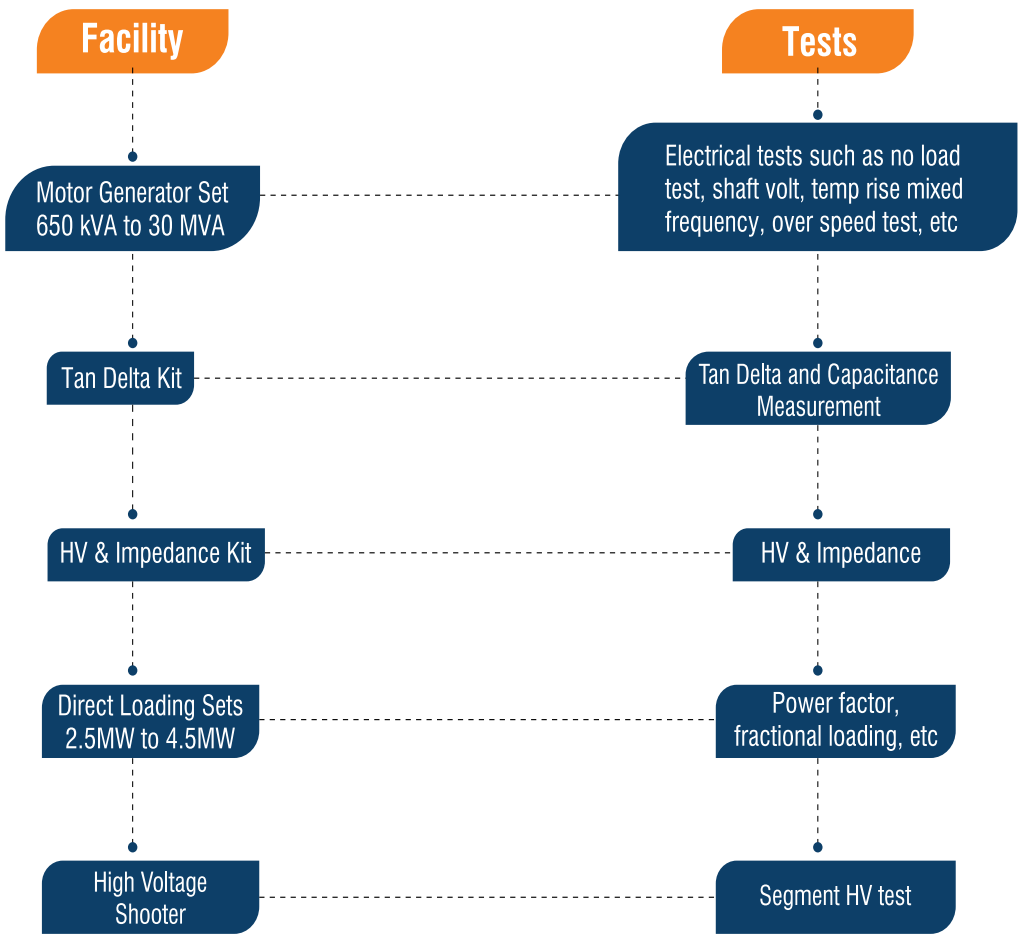
## Motor Testing Services: -

- \* Best-in-class motor testing capabilities in India.
- \* Available for BHEL and non-BHEL motors.
- \* 57 + years of manufacturing expertise with installed capacity of 2000 motors per year.
- \* Testing conducted in accordance with NEMA MG 1, IEC 60034-02/-29, and IEEE 112, IS 4029
- \* Full load testing up to 2.5 MW motors
- \* Customer confidence & integrity in service.

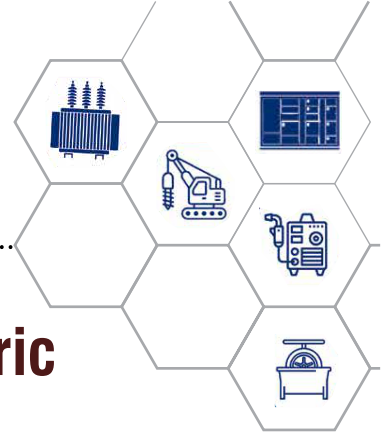
## Motors

S.no	Routine Test	Type Test
1	Magnetic center check	All routine tests
2	stator/rotor winding resistance test	Heat Run
3	Insulation Resistance ,Polarization Index , High Voltage test	Momentary Over load
4	Lock Rotor test	Noise Level Test
5	Mechanical run at rated voltage and measurement of no load loss	Retardation Test
6	Accessories Healthiness Check	Water Ingress Test
7	Charteristic curves	Tan Delta
8	Vibration & Shaft voltage measurement	Over speed Tests
9		Harmonic Test
10		Sudden Short Circuit Test

# Electrical Machines Testing facilities







# Traction Machine Testing & Center for Electric Transportation

**Traction Machine Routine Testing Facility** has routine testing facility for following machines:

1. Traction Motors DC 44 KW TO 630 KW
2. Traction Motors AC 260 KW TO 1190 KW
3. Traction Alternators 230 KW TO 2860 KW
4. Auxiliary Generators 12 KW to 20 KW

**Centre for Electric Transportation (CET)** has been established at Bhopal with the assistance from United Nations Development Programme (UNDP). The centre is envisaged to act as a focal point for systems oriented research in the field of electric transportation. CET has



capability for analysis and testing of rail vehicles for their performance , reliability and energy efficiency. CET can also provide assistance in development and introduction of Urban Mass Transit System.

## Traction Machines Testing facilities

Facility	Test
DC MG sets 155V, 1200A 500V, 3300A 630V, 900A 500V, 950A	Heat run, Speed load & Commutation characteristic, Overspeed, Vibration, Ovality measurement, Dielectric tests
AC Alternator Set 3.3kV, 600A	Impedance, Half hour heat run, No load, Short circuit, Vibration, Shock pulse, Noise (dB), Dielectric tests.
AC Drive Set 415V, 712A	One hour heat run, Open circuit, Short circuit, Overspeed, Vibration, Noise (dB), Dielectric tests.



## Centre for Electric Transportation (Type Testing facility for AC traction motors)

### Type Test

Insulation resistance measurement

One hour Heat run test with converter supply

Heat run test at rated point with converter supply

One hour Heat run test with converter supply and 25% chocking

Heat run test at rated point with converter supply and 25% chocking

Short time ( 3 min) overload test

Very Short time ( 10 sec) overload test with 25% chocking

Torque Characteristics Motoring mode

Torque Characteristics Braking mode

No load test

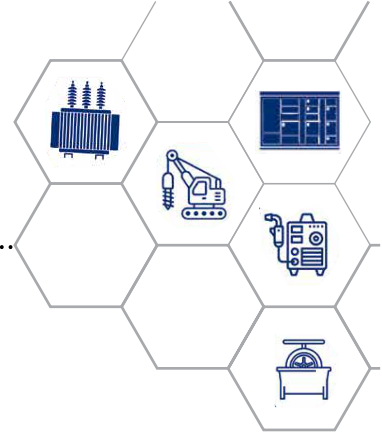
Blocked rotor test

Overspeed test

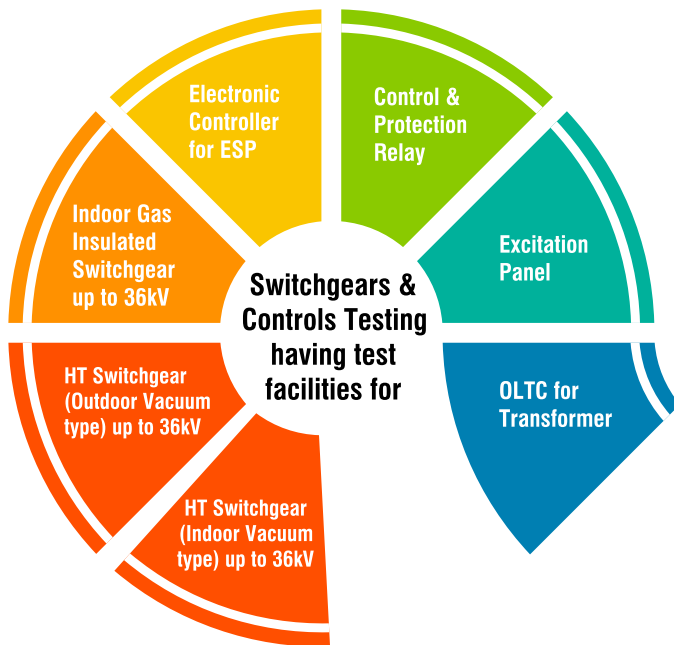
Overspeed test







## Switchgears & Controls Testing



## Switchgear & Controls Testing facilities



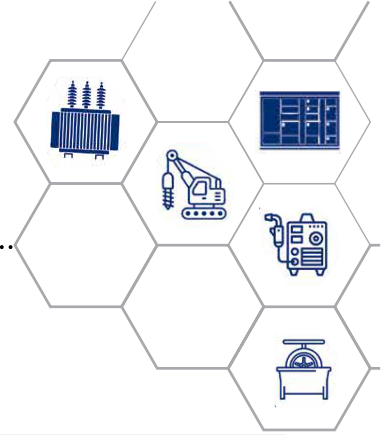
Facility	Test
AC HV Sets 5 kV to 150 kV	HV Test on Power & Control Circuits, Power Frequency Voltage withstand
Digital Micro Ohmmeter/ DLROs	Contact Resistance
Breaker Analyzer	Breaker timing check with speed/time curve
Test Station (D-2)	Breaker opening at 110% and 70% of auxiliary Voltage
IR Meter	IR Test before & after HV Test
Current Signature Equipment	Motor current behaviour & magnitude
Low Resistance Measuring Unit	Low Range Resistance

## Hydro Machine Testing (HydroLab)

Center of Excellence-Hydro Machines (COE-HM), situated in the premises of Bharat Heavy Electrical limited (BHEL) Bhopal, is one of the pioneer laboratory in India in the field of research development and testing of Hydraulic turbine & storage pumps. Laboratory was commissioned in 1989 with two test rigs and further expansion was done in 2013 with addition of one more test rigs. The Laboratory is accredited as per ISO/IEC 17025:2017 and recognized by DSIR Govt. of India. It has accreditation for “Fluid Flow Measurement” for Hydraulic machines (Turbines/pumps) from NABL. Laboratory completed more than 200 Development model tests including 65 contractual customer witnessed model tests. The model tests are conducted by a team of highly experienced and skilled manpower having experience of 12-30 years.

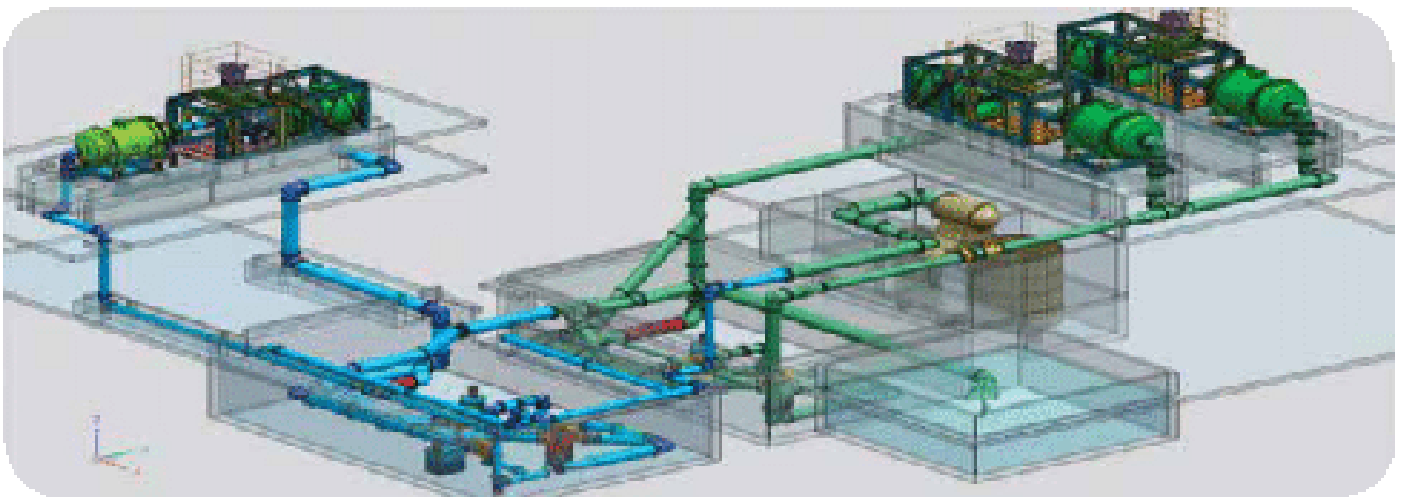
There are three test rigs. Test rig-1 & 2 are run by common pumping system, whereas test rig-3 is independent test rig which was commissioned in 2013. Maximum Test head 100 m and maximum discharge 1.8 m<sup>3</sup>/sec for test rig-1&2, whereas for test rig-3 maximum head is 140 m and maximum discharge is 1.25 m<sup>3</sup>/sec.





## Testing facilities at Hydro Lab, Bhopal

Facility	Products for Testing	Tests
Test rig for model testing of hydro turbines and pumps	Hydro turbines/Pump Models	Model Hydraulic Performance/ Efficiency Test
	Pelton turbines	Cavitation test
	Francis turbines	Pressure pulsation test
	Kaplan / Bulb turbines	Runaway speed test
	Reversible pump-turbines	Hydraulic Axial thrust
	Lift Irrigation Pumps	Guide vane torque





# Material Testing

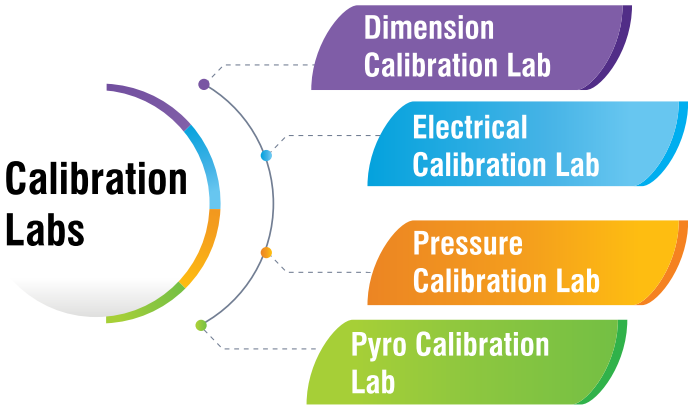
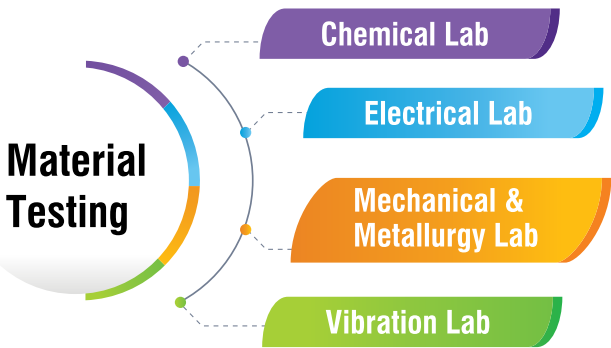
## Achieve Quality, reliability and cost optimization with BHEL

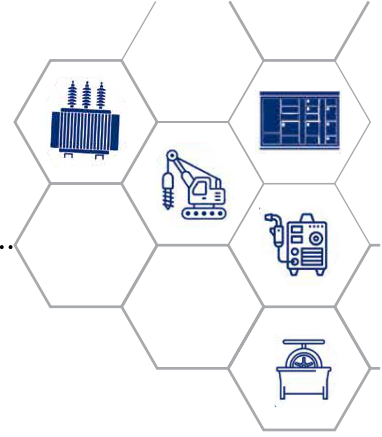
Material Testing & Calibration is look after by TSD in BHEL Bhopal. TSD was established in BHEL Bhopal in year 1958 to cater the material testing need. It comprises of testing & calibration laboratories. All laboratories of TSD are NABL accredited since 1996-97.

It caters the testing of variety of material like ferrous and non-ferrous metals, Insulating Materials, Transformer

Oil, Paints, etc. Highly skilled and qualified manpower look after the testing of materials in TSD. TSD lab is equipped with latest state of art equipment for material testing like Brinell Harndess from Easydur Italy, Vicker Hardness from Struers Denmark, HPLC from Shimadzu Japan, Viscometer from Lauda Germany, Electrical Sheet Tester & Franklin Tester from Brockhaus Germany etc.

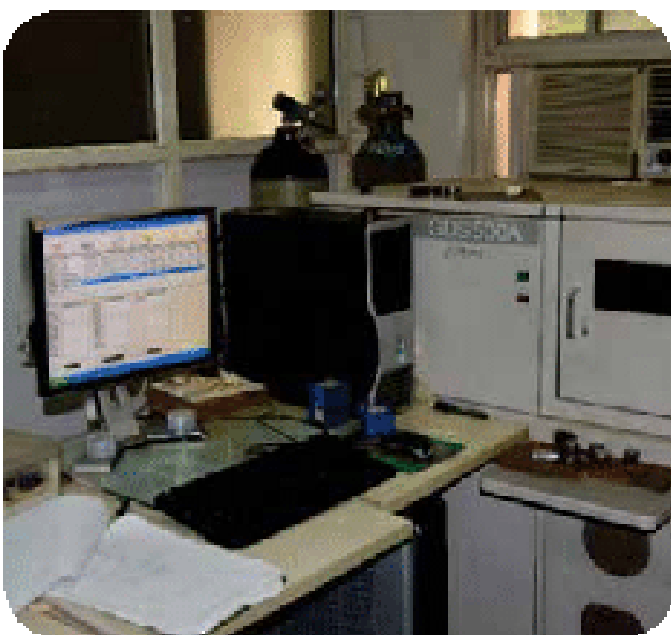
TSD having 4 testing and 4 calibration laboratories as follow:





# Material Testing facilities of Technical Services Division

Material	Testing Facility	Tests
<ul style="list-style-type: none"> <li>Ferrous and Non-Ferrous Metals</li> </ul>	<ul style="list-style-type: none"> <li>UTM 10 kN to 1000 kN</li> <li>Brinell Hardness Tester</li> <li>Vicker Hardness Tester</li> <li>Rockwell Tester</li> <li>Impact Testing Machine</li> <li>Inverted Microscope</li> <li>Etching Facility</li> </ul>	<ul style="list-style-type: none"> <li>Mechanical &amp; Metallurgical Properties such as Tensile Strength, Yield, Elongation, Drift Expansion, Hardness, Micro Structure, Grain Size, Case Depth etc</li> </ul>
<ul style="list-style-type: none"> <li>Low Alloy Steel and Stainless Steel</li> </ul>	<ul style="list-style-type: none"> <li>Glow Discharge Spectrometer</li> </ul>	<ul style="list-style-type: none"> <li>Chemical Composition</li> </ul>
<ul style="list-style-type: none"> <li>Copper and its alloys</li> </ul>	<ul style="list-style-type: none"> <li>Oxygen Content Analyzer</li> <li>Conductivity Meter</li> </ul>	<ul style="list-style-type: none"> <li>Oxygen content</li> <li>Conductivity/ Resistivity</li> </ul>
<ul style="list-style-type: none"> <li>Silver and Silver Alloys</li> </ul>	<ul style="list-style-type: none"> <li>Hardness Tester</li> <li>Wet Analysis</li> </ul>	<ul style="list-style-type: none"> <li>Hardness</li> <li>Silver Content</li> </ul>
<ul style="list-style-type: none"> <li>Carbon Brush</li> </ul>	<ul style="list-style-type: none"> <li>Carbon Brush Tester</li> <li>UTM 10kN</li> </ul>	<ul style="list-style-type: none"> <li>Milli Volt Drop</li> <li>Pig tail &amp; Pull Out</li> </ul>
<ul style="list-style-type: none"> <li>Resin &amp; Varnishes</li> </ul>	<ul style="list-style-type: none"> <li>Brookfield Viscometer</li> <li>Titration</li> </ul>	<ul style="list-style-type: none"> <li>Viscosity</li> <li>Epoxy Content</li> </ul>

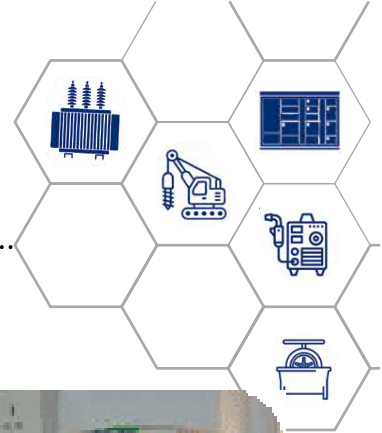


## BHEL Testing & Calibration Services .....

Material	Testing Facility	Tests
<ul style="list-style-type: none"> <li>Transformer Oil</li> </ul>	<ul style="list-style-type: none"> <li>U Tube Viscometer</li> <li>Karl Fischer Titrator</li> <li>Surface Tensiometer</li> <li>Gas Chromatograph</li> <li>Flash Point Meter</li> <li>HPLC</li> <li>Viscometer System</li> <li>Hygrometer</li> <li>Oil BDV Tester</li> <li>Mega Ohm Tester</li> <li>Automatic Schering Bridge</li> <li>Titration</li> </ul>	<ul style="list-style-type: none"> <li>Viscosity</li> <li>Moisture Content</li> <li>Interfacial Tension</li> <li>Dissolved Gas Analysis</li> <li>Flash Point</li> <li>Furan Compounds</li> <li>Degree of Polymerization</li> <li>Density</li> <li>Break Down Voltage</li> <li>Resistivity</li> <li>Tan Delta</li> <li>Acid Value</li> </ul>
<ul style="list-style-type: none"> <li>Electroplated Articles</li> </ul>	<ul style="list-style-type: none"> <li>XRF Spectrometer</li> </ul>	<ul style="list-style-type: none"> <li>Electroplating Thickness of Zn, Cu, Ag, &amp; Sn</li> </ul>





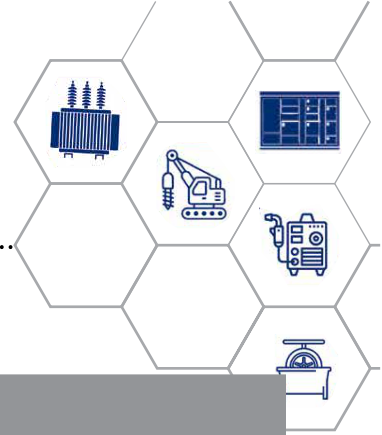


Material	Testing Facility	Tests
<ul style="list-style-type: none"> <li>Paints</li> </ul>	<ul style="list-style-type: none"> <li>Viscosity FC4 Cup</li> <li>Specific Gravity Cup</li> <li>Oven &amp; Balance</li> <li>Scratch Hardness</li> <li>Humidity Chamber</li> <li>Stop Watch</li> <li>Shade Card</li> <li>Centrifuge</li> <li>Paint Desk</li> </ul>	<ul style="list-style-type: none"> <li>Viscosity</li> <li>Mass per 10 Ltr</li> <li>Volume Solid &amp; NVC</li> <li>Scratch Hardness</li> <li>Humidity Resistance</li> <li>Drying Time</li> <li>Colour</li> <li>Pigment Content</li> <li>Pot Life, Finish, etc</li> </ul>
<ul style="list-style-type: none"> <li>Dry Air, Nitrogen, Argon, Helium</li> </ul>	<ul style="list-style-type: none"> <li>Dew Point Meter</li> </ul>	<ul style="list-style-type: none"> <li>Dew Point</li> </ul>

## BHEL Testing & Calibration Services .....

Material	Testing Facility	Tests
<ul style="list-style-type: none"> <li>Press Paper/Boards</li> </ul>	<ul style="list-style-type: none"> <li>Conductivity Meter</li> <li>Titration</li> <li>Gravimetric</li> <li>pH Meter</li> <li>Oven</li> <li>Digital Balance &amp; Scale</li> </ul>	<ul style="list-style-type: none"> <li>Conductivity</li> <li>Increase in acidity</li> <li>Increase in Sludge</li> <li>pH of aqueous extract</li> <li>Ash Content</li> <li>Density</li> </ul>
<ul style="list-style-type: none"> <li>Cables, Insulating Materials like tapes, epoxy sheets, resin coated papers, etc</li> </ul>	<ul style="list-style-type: none"> <li>Digital Low Resistance Ohm Meter</li> <li>Micro Ohm Meter</li> <li>UTM for non-metals</li> <li>Hydraulic Presses</li> <li>High Voltage Set</li> <li>Tracking Index Tester</li> <li>Rubber Hardness Tester</li> <li>Oven &amp; Balances Setup</li> </ul>	<ul style="list-style-type: none"> <li>Resistivity, Conductor Resistance</li> <li>Reisistivity</li> <li>Tensile Stregth</li> <li>Resin Flow/Pressing</li> <li>Electric Strength/BDV</li> <li>Comparative Tracking</li> <li>Rubber Hardness</li> <li>Substance, Mica, Glass, Density, Water Absorption, etc</li> </ul>





Material	Testing Facility	Tests
<ul style="list-style-type: none"> <li>Magnetic sheet steel CRNGO, CRGO</li> </ul>	<ul style="list-style-type: none"> <li>Single Sheet Tester</li> <li>Bend Tester</li> <li>Space Factor</li> <li>Coating Thickness Meter</li> <li>Oven</li> </ul>	<ul style="list-style-type: none"> <li>Total Specific Iron Loss, Magnetization, Anisotropy of losses. etc</li> <li>Bend Test</li> <li>Stacking Factor</li> <li>Coating Thickness</li> <li>Ageing</li> </ul>
<ul style="list-style-type: none"> <li>Space heaters</li> </ul>	<ul style="list-style-type: none"> <li>Power Analyser</li> </ul>	<ul style="list-style-type: none"> <li>Wattage</li> </ul>
<ul style="list-style-type: none"> <li>Electrical Machines</li> </ul>	<ul style="list-style-type: none"> <li>Harmonic Tester</li> </ul>	<ul style="list-style-type: none"> <li>Harmonics</li> </ul>
<ul style="list-style-type: none"> <li>Rotating Machines, Transformer and Shunt Reactors</li> </ul>	<ul style="list-style-type: none"> <li>Balance Master TK 83</li> <li>Sound Level Meter</li> <li>Vibration Analyzer</li> </ul>	<ul style="list-style-type: none"> <li>Vibration level &amp; Balancing</li> <li>Sound Level</li> <li>Vibration Level in Shunt Reactor</li> </ul>

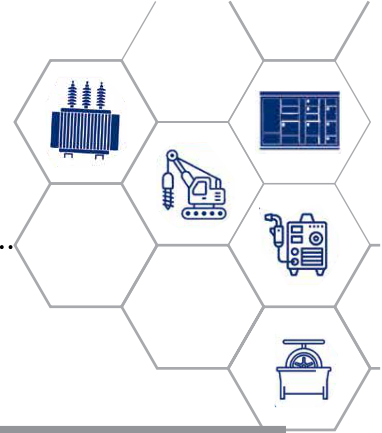




## Calibration Facilities of Technical Services Division

Calibration Facility	Calibration Parameter	Range
<ul style="list-style-type: none"> <li>Multifunction Calibrator Fluke 5700A &amp; 5522A with 50 Turns current Coils (Source Capability)</li> </ul>	<ul style="list-style-type: none"> <li>D C Voltage</li> <li>A C Voltage</li> <li>D C Current</li> <li>A C Current</li> <li>D C Resistance</li> <li>Temperature Simulation (Indicators/ Controllers/ Recorders)</li> </ul>	<ul style="list-style-type: none"> <li>1.0000 mV to 1000.000 V</li> <li>1.0000 mV to 1000.000 V (50Hz to 1KHz)</li> <li>10 microA to 1000 A</li> <li>30 microA to 1000 A (50Hz to 1KHz)</li> <li>1 Ohm to 100 Megaohm</li> <li>RTD Mode -200 to 800 °</li> <li>Thermocouple J Type -200 to 1200 °C</li> <li>Thermocouple K Type -200 to 1372 °C</li> <li>Thermocouple R Type 0 to 1700 °C</li> <li>Thermocouple S Type 0 to 1700 °C</li> </ul>
<ul style="list-style-type: none"> <li>Decade Meg Ohm Box, H Tinsley, Model 4720 &amp; Megadek Biddle Standard Air Resistors of 1 TΩ, 2 TΩ &amp; 5 TΩ</li> <li>(Source Capability)</li> </ul>	<ul style="list-style-type: none"> <li>High Resistance</li> </ul>	<ul style="list-style-type: none"> <li>1 kΩ to 1.0 TΩ</li> <li>1.0 TΩ, 2 TΩ, 5 TΩ</li> <li>(125 V to 5 kV)</li> </ul>
<ul style="list-style-type: none"> <li>Standard Resistance Box 4737B/C &amp; Standard Shunt (Source Capability)</li> </ul>	<ul style="list-style-type: none"> <li>Low Resistance</li> </ul>	<ul style="list-style-type: none"> <li>250 μΩ to 1000 Ω</li> </ul>





Calibration Facility	Calibration Parameter	Range
<ul style="list-style-type: none"> <li>Power Calibrator Fluke 6100B, 6101B (Source Capability)</li> </ul>	<ul style="list-style-type: none"> <li>3 Phase Power</li> <li>3 Phase AC Energy</li> <li>Voltage Harmonics</li> <li>Current Harmonics</li> </ul>	<ul style="list-style-type: none"> <li>0.5 Watt to 4500 Watt</li> <li>0.5 Watt- hr to 4500 Watt-hr</li> <li>1 to 50</li> <li>1 to 50</li> </ul>
<ul style="list-style-type: none"> <li>Multifunction Calibrator Fluke 5522A, Reference Multimeter Fluke 8508A (Source Capability)</li> </ul>	<ul style="list-style-type: none"> <li>Frequency</li> </ul>	<ul style="list-style-type: none"> <li>10 Hz to 2 MHz</li> </ul>
<ul style="list-style-type: none"> <li>Turns Ratio Standard, TRS100 Eltel (Source Capability)</li> </ul>	<ul style="list-style-type: none"> <li>Transformer Turns Ratio</li> </ul>	<ul style="list-style-type: none"> <li>0.8 to 2220</li> </ul>
<ul style="list-style-type: none"> <li>Reference Multimeter Fluke 8508A, Shunt, Megaohmmeter TERA 1501, Multifunction Calibrator Fluke 5522A, Frequency Counter Model PLA FC 100 (Measure Capability)</li> </ul>	<ul style="list-style-type: none"> <li>D C Voltage</li> <li>A C Voltage</li> <li>D C Current</li> <li>A C Current</li> <li>D C Resistance</li> <li>Low Resistance</li> <li>Frequency</li> </ul>	<ul style="list-style-type: none"> <li>1 mV to 1000 V</li> <li>10 mV-1000 V (50Hz) &amp; 10 mV-1000 V(1kHz)</li> <li>100 microA to 20 A</li> <li>30 microA to 20 A</li> <li>1 ohm to 5 TeraOhm</li> <li>0.25 ohm to 1 ohm</li> <li>10 Hz to 2 MHz</li> </ul>

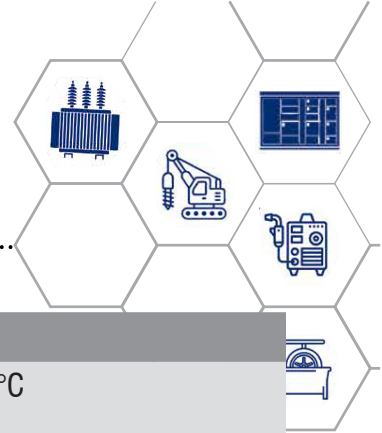


## BHEL Testing & Calibration Services .....

Calibration Facility	Calibration Parameter	Range
<ul style="list-style-type: none"> <li>Multifunction Calibrator, GE DPI620G, Multifunction Calibrator Fluke 5522A (Measure Capability)</li> </ul>	<ul style="list-style-type: none"> <li>Temperature Simulation (Indicators/ Controllers/ Recorders) at lab/On-Site</li> </ul>	<ul style="list-style-type: none"> <li>RTD Mode -200 to 800 °</li> <li>Thermocouple J Type -200 to 1200 °C</li> <li>Thermocouple K Type -200 to 1372 °C</li> <li>Thermocouple R Type 0 to 1700 °C</li> <li>Thermocouple S Type 0 to 1700 °C</li> </ul>
<ul style="list-style-type: none"> <li>Decade Meg Ohm Box, H Tinsley, Model 4720 &amp; Megadek Biddle Standard Resistors of 1 TΩ, 2 TΩ &amp; 5 TΩ (On Site Source Capability)</li> </ul>	<ul style="list-style-type: none"> <li>High Resistance</li> </ul>	<ul style="list-style-type: none"> <li>1 ohm to 5 TeraOhm (125 V to 5 kV) 1 kΩ to 5 TΩ</li> </ul>
<ul style="list-style-type: none"> <li>Standard Resistance Box 4737B/C (On Site Source Capability)</li> </ul>	<ul style="list-style-type: none"> <li>Low Resistance</li> </ul>	<ul style="list-style-type: none"> <li>250 μΩ to 1000 Ω</li> </ul>
<ul style="list-style-type: none"> <li>AC/DC Digital kV Meter with Potential Divider, Hipotronics KVM 100/ 200 (On Site Source Capability)</li> </ul>	<ul style="list-style-type: none"> <li>DC High Voltage</li> <li>AC High Voltage</li> </ul>	<ul style="list-style-type: none"> <li>1 kV to 200 kV</li> <li>1 kV to 200 kV (50Hz)</li> </ul>







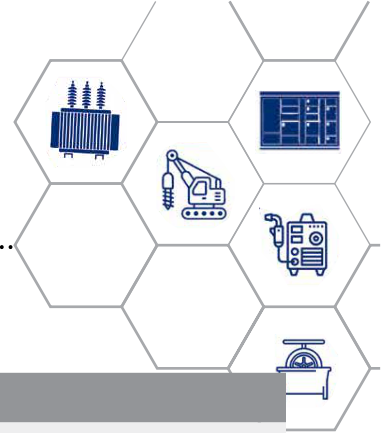
Calibration Facility	Calibration Parameter	Range
<ul style="list-style-type: none"> <li>Digital Thermometer with SSPRT and Oil Baths</li> </ul>	<ul style="list-style-type: none"> <li>RTDs, Thermocouples with or without Temperature Indicator, Digital Thermometers, Dial Thermometers, Glass Thermometers</li> </ul>	<ul style="list-style-type: none"> <li>0°C to 270°C</li> </ul>
<ul style="list-style-type: none"> <li>Multifunction Calibrator with Standard R Type Thermocouple and Dry Block Calibrator</li> </ul>	<ul style="list-style-type: none"> <li>Thermocouples with or without Temperature Indicator, Digital Thermometers</li> </ul>	<ul style="list-style-type: none"> <li>270°C to 1000°C</li> </ul>
<ul style="list-style-type: none"> <li>ULM-400</li> </ul>	<ul style="list-style-type: none"> <li>Plain Ring Gauge</li> <li>Plunger Dial Gauge LC: 0.001 mm</li> </ul>	<ul style="list-style-type: none"> <li>3 mm to 225 mm</li> <li>0 to 50 mm</li> </ul>
<ul style="list-style-type: none"> <li>ULM-1000</li> </ul>	<ul style="list-style-type: none"> <li>Feeler Gauge</li> <li>Micrometer Setting Rod</li> </ul>	<ul style="list-style-type: none"> <li>0.03 mm to 1 mm</li> <li>25 mm to 1000 mm</li> </ul>
<ul style="list-style-type: none"> <li>ULM-800LE</li> </ul>	<ul style="list-style-type: none"> <li>Bore Dial Gauge</li> <li>Thickness foil</li> <li>Length Bar</li> <li>Plain Plug Gauge</li> <li>Thread Measuring Wire</li> <li>Thread Plug Gauge Effective Diameter</li> </ul>	<ul style="list-style-type: none"> <li>0 to 1 mm</li> <li>0.03 to 1 mm</li> <li>25 to 275 mm</li> <li>3 to 225 mm</li> <li>0.17 to 5 mm</li> <li>3 mm to 220 mm</li> </ul>
<ul style="list-style-type: none"> <li>Gauge Block Calibration</li> </ul>	<ul style="list-style-type: none"> <li>Gauge Block Set</li> </ul>	<ul style="list-style-type: none"> <li>0.5 mm to 100 mm</li> </ul>



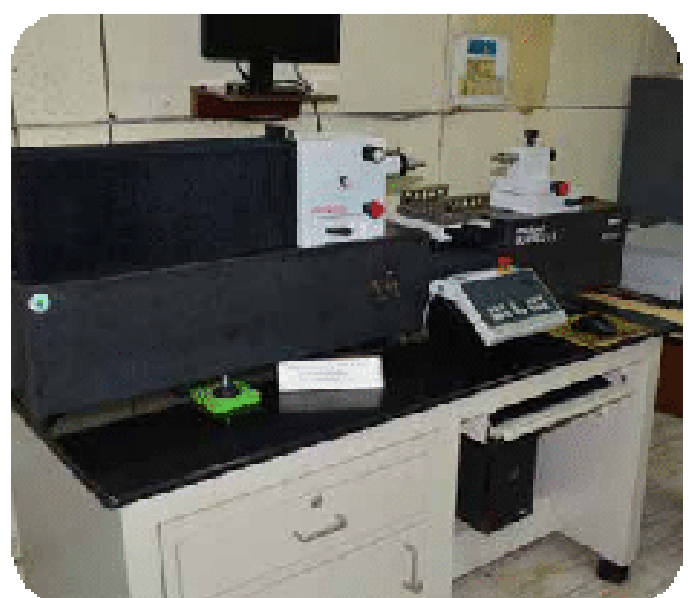
## BHEL Testing & Calibration Services .....

Calibration Facility	Calibration Parameter	Range
• Gauge Block Set	• Caliper (Vernier/Dial/Digital)	• 0 to 5000 mm
	• Depth Gauge (Vernier/Dial/Digital)	• 0 to 500 mm
	• Depth Micrometer	• 0 to 300 mm
	• External Micrometer	• 0 to 300 mm
	• Straight Edge	• 300 to 1600 mm
	• Height Gauge (Vernier/Dial/Digital)	• 0 to 1000 mm
• Thread Measuring Wire	• Thread Plug Gauge Effective Diameter	• 3 to 220 mm
• Length Bar	• Caliper (Vernier/Dial/Digital)	• 0 to 1500 mm
	• Depth Gauge (Vernier/Dial/Digital)	• 0 to 500 mm
	• Depth Micrometer	• 0 to 300 mm
	• Height Gauge (Vernier/Dial/Digital)	• 0 to 1000 mm
• Caliper Checker	• Caliper (Vernier/Dial/Digital)	• 0 to 600 mm
	• Height Gauge (Vernier/Dial/Digital)	• 0 to 600 mm
• Dial Gauge Calibrator	• Lever Dial Gauge	• 0 to 1 mm
	• Plunger Dial Gauge	• 0 to 5 mm
	• Height Gauge (Vernier/Dial/Digital)	• 0 to 1000 mm





Calibration Facility	Calibration Parameter	Range
• Surface Plate	• Height Gauge (Vernier/Dial/Digital) • Straight Edge	• 0 to 1 mm • 0 to 5 mm • 0 to 1000 mm
• Setting Ring Gauge	• Plain Plug Gauge • Thread Ring Gauge Effective Diameter	• 0 to 1000 mm • 300 mm to 1600 mm
• Setting Ring Gauge	• Plain Plug Gauge • Thread Ring Gauge Effective Diameter	• 3 mm to 100 mm • 3 mm to 220 mm
• Digital MKS Vacuum Calibrator	• Absolute Vacuum Gauges	• 1 mmHg to 0.001 mmHg
• Dead Weight Tester, make Budenberg	• Pressure Gauge	• 1000 mbar to 10 mbar (105 Pa - 103 Pa)
• Digital Pressure Calibrator DPI610, make Druck	• Lever Dial Gauge • Plunger Dial Gauge • Height Gauge (Vernier/Dial/Digital)	• 120 to 1200 kg/cm <sup>2</sup>
• Digital Manometer, make Yokogawa	• Vacuum Gauge	• 0 to (-) 0.9 kg/cm <sup>2</sup>







#### Product Testing

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