

List of Material Testing Equipment

TCR Engineering Services
A Material Testing Laboratory in India

35 Pragati Industrial Estate, N. M Joshi Marg
Lower Parel, Mumbai - 400 011,
Maharashtra, India
Tel : 91-22-23073390, 23092347, 23097921
Tel : 91-22-23097923, 23091938, 23053930
Fax: 91-22-23080197
E-Mail: sales@tcreng.com
Website: www.tcreng.com

D&B® D-U-N-S® Number: 86-216-7249
Ariba Supplier: ANID: AN01-000-504-648

Plot No. EL - 182,
MIDC - TTC,
Electronic Zone, Mhape
Navi Mumbai - 400 705,
Maharashtra, India

International Location:
TCR World, USA
14625 Baltimore Ave. #109
Laurel, MD 20707, USA
Tel: +1-240-505-0739
E-Mail: usa@tcreng.com

Material Testing Equipment at TCR with Calibration Details

Mechanical Testing Equipment

Name of Equipment	Model/ Type/ Make & IN SERVICE	Range/ Accuracy	Traceability
Universal Testing Machine with extensometer	GDR Sr No-283/40 1976	0-100 Ton ±1%	NPL
Universal Testing Machine with extensometer	SFM 30 Sr No. 293505 1992	0-13 Ton ±1%	NPL
Universal Testing Machine	EU40/990.06/86/7 1987	0-40 Ton ±1%	NPL
Universal Testing Machine	MCS-MP/ 156-12/06	0-40 Ton ±1%	NPL
Charpy Izod Impact Testing Machine	FIE/ IT/30 Sr No-789 1975	±0.1 kg. M	NPL
Charpy Impact Testing Machine	IT 300 ASTM Sr. No. 06/12-02	±0.1 Ft.Lb	NPL
Brinell / Vickers Hardness Tester	HPO 250 Sr.No-308/92, 1987	±2%	NPL
Rockwell Hardness tester	RA/FIE Sr No-77/021 1976	±1%	NPL
Rockwell Superficial Hardness Tester	RAS/FIE Sr.No -S-7001 1976	±1%	NPL
Wilson Wolpert Hardness Tester	Type 930-250/ Sr. No- 034 , 2005	(5-30 kg)	NPL
Micro Hardness Tester LECO USA	M-400-HI Sr No-170765, 1996	0-1000gms ±3%	NPL
V Notching Machine	UK 1976	NA	-
Hydraulic Test Pump	Electropneumatic 1990	±1%	-
Cupping machine	FIE /1990	±0.1mm	-
Extensometer	MEC-2 Sr. No. 186-0207	-	NPL
Extensometer	MEC-2 Sr.No. 106/05/02	-	NPL
Digital Thermometer	SE, Sr. No. – 060601	-196 to 200 Deg C	NPL
Temperature Indicator With Sensor	Libratherm TCR/MEC/EQP-10	0-800 Deg C	NPL

Metallography Testing Equipment

Name of Equipment	Model/ Type/ Make & IN SERVICE	Range/ Accuracy	Traceability
Metallurgical Microscope with image analyzer	LECO 500 USA, 1989	±1 Microns	-
Shadowgraph checking machine	MWM/Nr-3178	±0.001 mm	-
Shadowgraph checking	Metzer Biomedical	50X	-

Chemical Analysis - Instrumentation

Name of Equipment	Model/ Type/ Make & IN SERVICE	Range/ Accuracy	Traceability
Automatic Carbon Sulphur Determinator	LECO/CS244 USA 1990	±0.005 C ±0.005 S	-
Automatic Carbon Sulphur Determinator	LECO/CS400 USA 1997	±0.005 C ±0.005 S	-
Atomic Absorption Spectrometer	ParkinElmer AAAnalyst 200 2006	±1% of Concentration	-
Direct Reading Vacuum Spectrometer	ARL QUANTRIS/ Switzerland JUNE 2006	±1% of Concentration	-
ICP Spectrometer Leeman Labs Inc	PRODIGY SPEC Sr No 5003 JUNE 2005	±1% of Concentration	-
Electronic Weighing Machine – Metler/ Shimatzu / Gibratini	Swiss/Japan/Italy	±0.1mg	-

Wet Chemical Analysis

Name of Equipment	Model/ Type/ Make & IN SERVICE	Range/ Accuracy	Traceability
Muffle Furnace	TCR/MEL/EQP/07	40-100°C/ ± 5°C	NPL
Muffle Furnace	SAI/Sr No-412104 TCR/WAO/EQP-010	25-122°C/ ± 5°C	NPL
Oven	Lab Hosar/ TCR/WAO/EQP-0116	50-300°C/	NPL
Oven	EXPO/ TCR/WAO/EQP-014	0-300°C	NPL
Glass Thermometer	Zeal/ TCR/WAO/EQP/01	0-360°C/ ± 2°C	NPL
Glass Thermometer	JRM/ TCR/MEC/EQP/29	-10 - 360°C/ ± 1°C	NPL
Glass Thermometer	JRM/ TCR/MEC/EQP/31	-10 - 360°C/ ± 1°C	NPL

Glass Thermometer	JRM/ TCR/MEC/EQP/31	-10 - 360°C/ ± 1°C	NPL
Analog DC Ammeter	LCC/ TCR/WAO/EQP/018	0-10 A ± 1% FSD	NPL
Analog DC Voltmeter	LEE/ TCR/WAO/EQP/DCV 018	0-15 V ± 1% FSD	NPL
Electronic Digital Balance	Mettler, Model- AB 54-s TCR/wao/eqp/011	0-51 gm ±0.1 mg	NPL
Electronic Digital Balance	Mettler, Model- AB 204	0-200 gm ±0.1 mg	NPL
Digital Thermometer	Model-221P-RTD Sr. No. 060601	-196 To 200 Deg C	NPL
Dial gauge	SE/3534/1 TCR/NM/DG/01	0-1"	NPL
Dial Gauge	SE/3534/2 TCR/NM/DG/01	0-1"	NPL
Dial Gauge	Baker, SE/3534/3 Sr. No. G9490,	0- 10 mm	NPL
Dial Gauge	Mercer India, SE/3534/4 Sr. No. 7892	0-5 mm	NPL
Dial Gauge	SE/3534/5 Sr. No. 2099	0-10 mm	NPL
Dial Gauge	Shock proof /SE/2958/3 Sr. No. J8037	0-10 mm	NPL
Dial Gauge	Mitutoyo SE/3534/6 Sr. No. 9813k7	1µm	NPL

Corrosion Testing Equipment

Name of Equipment	Model/ Type/ Make & IN SERVICE	Range/ Accuracy	Traceability
Pressure Gauges	Poineer	0-600 Kg/Cm2	NPL
Pressure Gauges	Bourdon / SE/1362/2 TCR/MEC/EQP/23	0-250 Kg/Cm2	NPL
Pressure Gauges	Wika/SE/1362/7 (Calib upto 600 kg)	0-1000 Kg/Cm2	NPL
Pressure Gauges	Bourdon / SE/1362/5	0-16 Kg/Cm2	NPL
Pressure Gauges	Fair / SE/1362/1 TCR/MEC/EQP/43	0-70 Kg/Cm2	NPL
Proving Rings	Sr. No. 02033	0-1200 Kgs	
Proving Rings	Sr. No.02035	0-1200 Kgs	
Proving Rings	Sr. No.02034	0-1200 Kgs	
Proving Rings	Sr. No.02028	0-1200 Kgs	
Proving Rings	Sr. No.02026	0-1200 kgs	
Proving Rings	Sr. No.02025	0-1200 kgs	
Proving Rings	Sr. N. 02013	0-1200 Kgs	
Proving Rings	Sr. No.02014	0-1200 Kgs	



List of Material Testing Equipment at TCR Engineering

Proving Rings	Sr. No.02015	0-1200 Kgs	
Proving Rings	Sr. No.97504	0-2000 Kgs	
Proving Rings	Sr. No.97502	0-2000 Kgs	
Proving Rings	Sr. No.97506	0-2000 Kgs	
Proving Rings	Sr. No.97508	0-2000 Kgs	
Proving Rings	Sr. No.97505	0-2000 Kgs	
Proving Rings	Sr. No.97507	0-2000 Kgs	
Proving Rings	Sr. No. 3957	0-7500 lbs	
Proving Rings	Sr. No. 3956	0-7500 lbs	
Proving Rings	Sr. No.03001	0-600 Kgs	
Proving Rings	Sr. No.03002	0-600 Kgs	
Proving Rings	Sr. No.03003	0-600 Kgs	
Proving Rings	Sr. No.03004	0-600 Kgs	
Pressure Gauges	Bourdon SE/1362/3	0-600 Kg/Cm2	NPL

Inspection - Positive Material Identification (PMI), RoHS, Feritscope, Portable Hardness

Name of Equipment	Model/ Type/ Make & IN SERVICE	Range/ Accuracy	Traceability
X –MET 3000 TX	Finland	±5%	-
X –MET 3000 T	Finland	±5%	-
Metal Master 2000	Finland	±5%	-
Niton XLT 898	USA	±5%	-
Innov-X Alpha Analyzer (RoHS Test)	Netherlands	±5%	-
ARC Met 8000 (Portable OES)	UK	±5%	-
Feritscope (MP30E-S) Sr. No. – 106-23060A	Fischer / USA	-	-
Portable Hardness Tester	TH-130/ China	5%	-

Quality Audit Equipment

Name of Equipment	Model/ Type/ Make & IN SERVICE	Range/ Accuracy	Traceability
Stop Watch	Make – RACER	-	
Bevel Protractor	Aerospace Sr .No.-4-601196	0-180Deg	NPL
Metric Scale	SE/3289/1	0-20 mm	NPL
Metric Scale	Technika SE/2963/2	0-1000 mm	NPL
Dial Vernier Caliper	Mitutoyo SE/1095/1, Sr. No. 1089607	0-200 mm	NPL
Dial Vernier Caliper	Mitutoyo SE/2261/1, Sr. No. 35J311	0-150 mm	NPL
Dial Vernier Caliper	Mitutoyo SE/2343/1, Sr. No. 1096302	0-150 mm	NPL
External Micrometer	Mitutoyo Sr.No.2031023 SE/1223/1	0-25 mm	NPL
External Micrometer	Mitutoyo Sr.No.099416 SE/2958/2	0-25 mm	NPL
Tube Micrometer	Mitutoyo Sr.No.56063638 SE/2958/1	0-25 mm	NPL
Tube Micrometer	Mitutoyo Sr.No.9109 SE/2963/1	0-25 mm	NPL
Pipe Micrometer	Mitutoyo Sr.No. 207759/SE/0299/2	0-15 mm	NPL

About TCR Engineering Services

Founded in 1973, TCR Engineering Services (TCR) is India's most reputed and established, NABL and ISO 17025 accredited independent material testing laboratory. The core services TCR provides include Mechanical Testing, Chemical Analysis, Positive Material identification (PMI), Non Destructive Testing, Metallography, Corrosion Testing, Failure Analysis, Raw Material Inspection, Metallurgical Product evaluation, Engineering Research and Consultancy.

TCR has pioneered in introducing latest analytical facilities and has upgraded the same every decade. TCR has state-of-the art testing facilities for testing of Engineering Goods, Ferrous and Non-Ferrous Metals, Non-Metallic Materials such as Polymers, Ceramics, Glass, etc.

More than 1000 Quality driven clients (in India and a select few globally) in Aerospace, Automotive, Oil Refineries, Petrochemical plants, Chemical Processing, Defense, Nuclear Power and Capital Goods manufacturing trust TCR to handle their Material Testing and Research & Development requirements.

Engineers, Chemists, Metallurgists & Technicians, at TCR, have the qualifications, the education and the experience to meet rigorous standards in the testing field, whether serving the Private and Public Sector, Government or the Military.

Customer Service Representatives, at TCR, provide clients with up-to-the-minute information on the status of your sample through our in-house laboratory automation software. The need for responsiveness is something understood by everyone in the company. We have improved turnaround time without sacrificing quality by operating 12 hours a day in the lab, 16 hours a day in the machine shop.

TCR laboratories are located in Lower Parel, Mumbai and Electronic Zone, Navi Mumbai with a sample collection office in the Mumbai Metal market. TCR Advanced Services, a TCR Engineering affiliate company, has its laboratory in Baroda. Engineering professionals travel across India to conduct on-site material testing. International clients are served by a sales office in Washington DC, USA.

ISO 17025 Accredited Laboratory in India

TCR Engineering Services is a Bureau of Indian Standards and NABL accredited laboratory. NABL approval is from Department of Science and Technology, Government of India. NABL provides laboratory accreditation services to laboratories that are performing tests / calibrations in accordance with ISO 17025.

TCR is one of the select few test houses, in India, to be on the approved list of such organization as Bharat Heavy Electrical Ltd., Nuclear Power Corporation of India Ltd. (NPCIL), Larsen & Toubro Ltd. (L&T), Engineers India Ltd. (EIL), Toyo Engineering India Ltd., Oil & Natural Gas Commission (ONGC), Bhabha Atomic Research Centre (BARC), Vikram Sarabhai Space Centre (VSSC), Dept. of Defense, DGS&D, Indian Railways, Mumbai Municipal Corporation, Dept. of Telecommunications, Electronic Corporation of India Ltd and others.

TCR is also approved by international recognition bodies such as American Bureau of Shipping (USA), Bureau Veritas (France), Lloyds Register of Shipping (UK), Det-Norske Veritas (Norway), SGS (India) Ltd. and others.

Material Testing Laboratory Services

TCR Engineering Services' ability to provide value to our metal testing customers is based on organizing our talents into a focused set of technological capabilities. This gives us the unique ability to apply appropriate combinations of capabilities and expertise to provide multi-disciplinary solutions for our clients.

We have several testing services, but, no matter which discipline we use, one thing is certain. When you send a sample to TCR, you can have confidence in the results, because you are working with a company that has a reputation for being meticulous.

The list of services offered by TCR includes:

Mechanical and Physical Testing

Comprehensive range of Mechanical Testing with a dedicated machine shop to assist in sample preparation. Capabilities include: Tensile, Impact, Weldability, Bend, Compression, Flaring/Flattening, Hardness, Dynamic Loading, Drop Weight, Proof Load, Fasteners, Hydraulic/Pneumatic, Component Testing, and more.

Chemical Analysis

State of the art Chemical Analysis laboratory allows our expert chemists to analyze ferrous and non-ferrous metals, ceramics, glass, refractories, mineral and ferro alloys in PPB or PPM level or in percentage. Our capabilities include: Wet Chemistry, Optical Emission Spectroscopy (OES), Inductively Coupled Plasma (ICP) Spectrometer, Automatic Combustion based Carbon and Sulfur determination, Glow Discharge spectrometer for (GDS) chemical depth profiling, and more.

Positive Material Identification (PMI)

TCR Engineering's Positive Material Identification service is fast becoming an integral part of process safety management in the petroleum refining, petrochemical and electric power generation industries in India, Middle-East and Asia-Pacific. Our capabilities include: Portable Optical Emission Spectrometer and a number of Portable X-Ray Florescence (XRF) Spectrometers.

Failure Analysis and Metallography Testing

Our facilities include Optical Microscope with Image Analysis system, Micro Hardness Tester, In-situ Metallography Kits, Stress Analyzer, Dilatometer, and Electronic Polishing and Etching system. TCR can procure on-hire basis, a scanning electron microscope and an elemental analysis by EDAX.

Corrosion Testing

TCR performs a wide range of Corrosion and Stress Corrosion Tests as part of the AST, NACE or client supplied specifications. Senior staff members are available to help and advise on corrosion problems or materials selection in laboratory or on-site inspection. Routine tests undertaken to evaluate the corrosion resistance of materials to environmental corrosion, pitting corrosion, resistance of materials to stress corrosion and inter-granular attack, including HIC, and SSCC tests.

Specialized Non Destructive Testing (NDT) Services

Radiography Testing, Ultrasonic Flaw detection, Magnetic Particle and Liquid Dye Penetrant Testing, Portable Hardness detection, Ultrasonic Thickness Gauging survey and Raw Material Inspection. Residual Life Assessment (RLA) of Boilers and pressure vessels.

Locations

We welcome service and technical inquiry, from simple questions to more involved interpretations of codes and specifications. We are located at:

 TCR Engineering Services Pvt. Ltd.
35 Pragati Industrial Estate,
N. M Joshi Marg, Lower Parel,
Mumbai - 400 011, India
Tel : 23073390, 23092347, 23097921
Tel : 23097923, 23091938, 23053930
Fax :+ 91-22-23080197
E-Mail: sales@tceng.com
Website: www.tceng.com

 TCR Engineering Services
Plot No. EL-182, MIDC-TTC, Electronic Zone,
Behind Nelco, Mhape, Navi Mumbai-400 710
Maharashtra, India
Tel: 27610921/22/23, 27612324, 27631508
Tel: 32936355, 65160805, 65168100/8200
Fax: +91-22-27612044
24 hours Cellular Phone: +91-9323397295
E-Mail: navimumbai@tceng.com

(USA, China, Asia-Pacific, and Europe)
 TCR World Inc., USA
14625 Baltimore Ave, Box 109
Laurel, MD 20707, USA
Tel: +1-240-505-0739
E-Mail: usa@tceng.com

 TCR Advanced Engineering, Baroda
36/2/9, First Floor, Abhishek Complex
G.I.D.C., Makarpura
Vadodara - 390 010, Gujrat, India
Tel: +91-(0265)- 2657233, 2643024
Fax: +91-(0265)- 2634375
E-Mail: baroda@tceng.com
Website: www.tcradvanced.com

 TCR Arabia
C/o GAS Arabian Services
P.O.Box 3422, King Saud Street
Opp. Juffali Showroom,
Dammam 31471, Saudi Arabia
Tel: +966-5049-97683
E-Mail: saudi@tceng.com
Website: www.tcr-arabia.com

 TCR Kuwait
Fahaheel-64023
Ahmadi, Kuwait
Tel: +965-5072765
E-Mail: kuwait@tceng.com

 TCR ENGINEERING MALAYSIA
2D-03-06 Mutiara Idaman,
Solok Tengku Jelutong,
George Town Pulau Pinang
11600 Malaysia.
Tel/Fax : +604 - 2817477
Mobile : +6016 - 445 8283
Email : malaysia@tceng.com

 Mumbai Metal Market
TCR Engineering Services
2/10, Kikabhai Mansion,
7 Kika Street,
Mumbai - 400 004
Maharashtra, India
Tel : +91-22-23428642, 56363267

Sample collection centers in India:

KHB Engineering Services
C/o. K. K. Engg. Works
Shed No. 10 of M. P. L. U. N.,
Behind Allahabad Bank, 'A' Sector, Industrial Area,
Govindpura, Bhopal, Madhya Pradesh, India
Tel : +91-(0755)-2586531, 5261264
Fax : (+91)-(0755)-5261297

Navi Mumbai Metal Market
Shop No. 44, Mahesh Shopping,
Sector 15 CBD Belapur (East), Konkanbhavan,
Navi Mumbai 400 614, Maharashtra, India
Tel : +91-(022)-27577650, 27576185,
Cell: +91-9223235114