

TCR ENGINEERING SERVICES PRIVATE LIMITED

Major Achievements

Doc: TCR/MA

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Over 2000+ customers worldwide use TCR's services to dramatically improve and certify their products, validate material quality, ensure innovation in the marketplace, and to achieve significant competitive advantages. As a result, these companies are bringing the right products to market, at the right time, at the right cost.

1 Services Offering

TCR Engineering Services, is an ISO 17025 accredited independent Material Testing Laboratory and Quality Assurance Company located in India. Currently a market leader in India, based in Navi Mumbai, TCR is slowly strengthening its Middle Eastern presence with recent openings of new offices in Kuwait and Al-Jubail, Saudi Arabia.

The services TCR provides include Vendor Evaluation, Factory Audits, Third Party Inspection, Mechanical Testing, Chemical Analysis, Positive Material Identification (PMI), Non Destructive Testing (NDT including Automated UT using ToFD), Metallography, RoHS Compliance Testing, Corrosion Testing (including HIC/SSC), Failure Analysis Metallurgical Product Evaluation, Heat Treatment, Manpower Deployment, Training, Engineering Research and Consultancy.

Over the past 34 years (founded in 1973), TCR Engineering Services has provided quality assurance and fabrication inspection services to companies in the oil, petro-chemical and natural gas sectors.

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TCR in India is the back-end material and metallurgical testing house for a number of global companies including Chevron, Schlumberger, Caterpillar, Enerflex, Elliott, Sinopec and others. TCR's strengths in performing HIC and SSC corrosion tests as per NACE TM 0177 and TM 0284 for sour gas applications helps a number of companies in the middle east. TCR also performs in-depth salt spray tests, failure investigations, SEM, micro and macro examinations, in-situ metallography, hot temperature tensile (upto 850 degree C) and impact (upto -196 degree C). The range of chemical analysis spectrometers (OES, AA, ICP, GDS, CS Analyser, wet chemistry lab) at TCR is unparalleled in the region it operates.

TCR is also approved by international recognition bodies including American Bureau of Shipping (USA), Bureau Veritas (France), Lloyds Register of Shipping (UK), TuV, EiL, Det-Norske Veritas (Norway), SGS (India) Ltd. Indian Register of Shipping, Mercantile Marine Dept, Bureau of Indian Standards, and others.

TCR also has a rigorous internal Quality Assurance Program for all its services. The Quality Assurance Department conducts frequent and vigorous internal audits to ensure the highest possible level of quality in support of the TCR service offering.

In September 2007, the company has been awarded the "Excellent Laboratory Award for 2007" from NACE International (India chapter).

2 Customers

TCR Engineering Services believes in establishing long-term, strategic relationships with our customers as opposed to short-term, opportunity-based engagements. TCR greatly values the relationships that it has established with over 2000+ customers and are delighted to meet their technical needs.

International customers include ABJ (Kuwait), Chevron, Caterpillar, Enerflex, Bechtel (USA), Komline-Sanderson (USA), Elliott Company (USA), Fisher, Samsung, Hyundai, Unilever, Johnson Screens (Australia), Xalloy (Thailand), MBH Analytical (UK), Micropak (Pakistan), NDT-CCS (Saudi Arabia), GMMOS and Permapipe (UAE), Ariana Afghan Airways (Afghanistan) and other large corporations. We have served customers in Canada, France, UK, USA, UAE, Nigeria, Bangladesh, Indonesia and many other nations.

Armed with the support of numerous faithful customers and a dedicated team of professionals, TCR continues to add to its expertise and capabilities to better address more of the analytical and testing requirements of the community of engineering materials users.

Customers in India - TCR Engineering Services



Customers in India

Global Customers – TCR Engineering



International Customers

3 Major Projects

Every one of the below jobs were part of a unique and interesting challenge to our team. The most rewarding part for TCR was when the clients saw a measurable value in the work of TCR, and came back for additional services and projects. Our noteworthy projects in the past 3 years (the company has a rich history of 34 years) include:

Mechanical and Chemical Analysis

The company has over 2000+ customers that count on its services. The list below does not include Mechanical and Chemical Testing routine business that the laboratory receives on a daily basis.

Failure Analysis Projects

Schlumberger Oilfield Services	Failure Investigation Of Mandrel Bypass Of Equalizer Sub.
Wartsila, Finland	Failure Investigation Of Crank Shaft
Thermax	Failure Analysis Of Cupro Nickel Tubing Of Chiller Unit
Weir Mineral India	Root Cause Analysis Of Shaft Failures In Vertical Pumps (Cantilever Design)
Sterlite Industries India Ltd	Volute Casing, Crane Hook / Pump Failure Investigation
GAIL India	Root Cause Analysis At A Lpg Recovery Plant
Hydril Jindal	Failure Investigation Of Die Cracking In Swaging Process (Cold Forming Process) On 500t Press
Siemens Limited	Failure Investigation Of ESV Sleeve DN 200
Welspun Gujarat Sthal Rohen Ltd	Failure Investigation Of Api 5l Psl 2 X60, (Pipe No: 3612) Line Pipe Failed During Hydro Test At Site.
Man Industries (India)Limited	Failure Investigation Of Mechanical Expander Pull Rod
Torrent Power Limited	Failure Investigation Of Blade Of Lp Rotor Stage 4A Of ESM 110MW Unit
Ratnamani Metals & Tubes Limited	Failure Investigation Duplex R 2205 (50.8 X 2.13 Mm) Tube Failed During Hydro-Forming Expansion
Oil India Limited	Corrosion Evaluation Of Oil Well Tubing Through Root Cause Failure Investigation
Caparo Engg P. Ltd	Failure Investigation Of Axel A Rear Suspension Of Car
Munjal Auto Limited	Failure Investigation Of Exhaust Muffler KTPA
Godrej Industries Limited	Failure Investigation Of Reformer Tubes
ALSTOM Projects (I) Ltd	Failure Investigation Of High Density Balancing Weight

Hindustan Petroleum Corporation Limited	Failure Investigation Of Radiant Heater Outlet Header Cap
Avtec Limited	Failure Investigation Of Crank Shaft Of Diesel Car Engine.
Bombardier Transportation India Ltd.	Failure Investigation Of Notching Spring Of Tap Changer
Emerson Process Management (India) P. Ltd	Failure investigation of coriolis mass flow meter sensor
Gujarat Fluorochemicals Limited	failure investigation of Re- Boiler of HF Recovery Plant
Hero Honda Motors Limited	Failure investigation of bending and seizing problem of engine valve

Positive Material Identification

Kuwait Oil Company	2 crews of PMI using portable XRF and portable Optical Emission spectroscopy
Hyundai Heavy Industries	Portable XRF on Pipe Joints
Cochin Refinery	PMI for Stock sorting purposes
Indian Oil Corporation	4 PMI crews deployed for a period of 2 years using portable XRF spectrometers
Bharat Petroleum	One PMI crew for identifying incoming materials at site
Reliance Industries	Detection of Carbon using portable Optical Emission Spectroscopy
Petronas, Malaysia	PMI crew on assignment on behalf of L&T, India
Larsen & Toubro Ltd., Mumbai Godrej & Boyce Mfg. Co. Ltd., Mumbai Oswal Petro Chemicals Ltd. Tyco Sanmar Ltd., Tamil Nadu	Ongoing on-call PMI services provided using portable XRF spectrometers

Metallography Assignments

Constar, USA	SEM Analysis of Plastic samples taken on 3-4 KX, 20 KV voltage magnification
NDT-CCS	Evaluation of Metallographic Replicas
Reliance	Over 1200 metallographic replicas created and analyzed to evaluate post fire damage
Zamil Group	Micro Hardness Testing
Alsom	SEM and EDAX Analysis
Massod John Brown, Dubai	SEM analysis to characterize the carbide morphology types in cobalt based alloys such as FXS 414
Biosync Scientific Pvt. Ltd.	Measurement of drug Coating layer on Drug coated stent used in Angioplasty
Godrej Industries Limited	Remaining life assessment was carried out through Insitu Metallography route
Lupin Limited	Remaining life assessment of fermentor vessel was carried out by Evaluating microstructure at critical locations
Gujarat Power Generation Co. Ltd; Bharuch	Microstructure evaluation at critical locations of HRSG Unit
National Thermal Power Corporation	In situ Metallography conducted on critical components of turbine.
IFFCO	Insitu Metallography for evaluation degradation of microstructure of ammonia plant for remaining life assessment.
IPCL	Insitu metallography at critical locations of naphtha plant
L & T	Insitu Metallography for microstructure evaluation after various manufacturing stages of critical components
Bharat Petroleum Corporation Limited	Damage assessment of Scrubber column and condenser tubes.
Indian Oil Corporation Limited	Insitu Metallography of FCC plant
Gulbrandsen Limited	Damage assessment through Insitu Metallography route on ammonium chloride anhydrous vessel
Nagarjuna Fertilisers & Chemical	Insitu Metallography of ammonia plant

Limited	
United Phosphorous Limited	Insitu Metallography of evaporator support to assess the stress corrosion cracking
Tata Chemicals Limited	Insitu Metallography conducted at various critical locations of Urea Plant
Gujarat State Fertilizer Company	Insitu-metallography work on Reducer of Outlet Bottom Header of Reformer at Ammonia – IV Plant
Zuari Industries Limited,	Metallography Work Conducted On Various Critical Locations Of Process Steam Supply. Heater Outlet Piping
Hindustan Petroleum Corporation Limited	Insitu Metallography of reformer tubes
Suzlon Windfarm Services Ltd.	Damage assessment of windmill caught in accidental fire through insitu Metallography route
Tata Power Company	Insitu Metallography work conducted on critical locations of Gas Turbine Unit -7 during outage.
Elecon Engineering Limited	Insitu Metallography at various locations of large size Gear
Essar Steel Limited	Insitu Metallography on cooling coil of furnace.

Corrosion Detection

Caterpillar, USA	Weight loss corrosion test for over 35 samples
KPIOS, Kuwait	Hydrogen Induced Cracking Test as per NACE standard for over 15 plate samples
Enerflex Canada	HIC and SSC corrosion tests as per NACE TM 0177 and TM 0284 for over 20 samples
Ecolab Canada	Salt Spray test at a Coco Cola plant
GMMOS, UAE	HIC and SSC testing on over 15 samples
Larsen and Toubro (L&T)	HIC testing as per NACE TM 0284 on an ongoing basis
Jutal, China	SSC test based on Sinopec approved standard(closely adopted to NACE guidelines)
Xalloy, Thailand	Chloride Stress Corrosion Cracking, Inter-granular Corrosion as per ASTM A262
Johnson Screens, Australia	Weigh Loss Corrosion Tests
Walchandnagar Industries	HIC and SSC Testing

NDT Projects

ONGC, Uran	40 team member crew deployed for shutdown activity including conventional NDT, scaffolding, and shutdown project management
NPCIL, Kota	Shutdown Crew deployed for NDT including 20 NDT Level II and a NDT Level III person
Unilever Bangladesh	Ferrite Survey, UT Thickness Measurement and Hardness Checking
Indian Naval Shipping	NDT and RLA Study of LPG Tanker
KOC, Kuwait	Automated UT using ToFD for Storage Tanks based on API 650 Appendix U. Project undertaken with HHI as EPC contractor
Tekfen, KSA	Automated UT using ToFD based on Code Case 181 undertaken at Aramco's PetroRabigh site
Several projects for EIL and L&T	Ongoing daily callouts for UT, DP, MP, PT, Ferrite Measurement, Portable Hardness

Third Party Inspection Services

Komline Sanderson, USA	AWS Welding Inspector as well as QA/QC Personnel deployed at a vendor site in India
EMC Sp. Z.o.o., Poland	QA/QC inspection and Pre-shipment loading audit of electric light bulbs at a vendor site in Mysore, India
Permapipe, UAE	Over 6 month long project to undertake QA/QC inspection including dimensional verification and specification compliance of insulation material used in refinery piping
Elliott Company, USA	Factory Audit and QA/QC inspection on behalf of the USA based company at their supplier site in western India. Project is ongoing for past 2 years.

Uniflex Cables, Kuwait	Inspection and Witness of Goods at a supplier site in India
Bloxwich, UK	QA/QC inspection with daily photographs and status reports advising client of vendor's progress and quality status
Metpost, UK	Inspection of fabrication and Factory Audit of casting and forging companies in India
American Industrial Supply, USA	Third party Inspection, Stamp Transfer and Shipment Audit
Aventech, Candada	Factory Audit and Sourcing Assistance of Casting Suppliers
Flowserve, UK	QA/QC inspection at Audco in Chennai on an ongoing basis

RoHS Compliance Services

Sys Concept, Canada	Detection of RoHS restricted elements using the screening and verification methods
Birla Copper	Test of Lead content in samples
Emerson Climate Technologies	RoHS testing on an ongoing basis for over 500 samples
Parveen Industries	RoHS compliance for 28 plastic samples

A. Serving Multiple Industry Verticals

TCR has a long standing track record of delivering quality assurance services to some of the best known organizations in the oil and gas, refining, chemicals, electronics, construction, power generation, automotive, defense, aerospace, mining, pharmaceutical, biotechnology, manufacturing, process industry and public sector verticals.

B. Global Delivery Model

TCR's rapidly growing global delivery services model allows TCR to be the preferred back-end material testing laboratory for some of the world's largest corporations. This allows global customers to take advantage of reduced cost for material testing while maintaining the same quality standards that they expect in their county. To date, TCR has performed laboratory testing and inspection services for numerous customers in the North America, Europe, Africa, Middle-East and Asia-Pacific.

Over 2000+ customers in India and Overseas use TCR's services to dramatically improve and certify their products, validate material quality, ensure innovation in the marketplace, and to achieve significant competitive advantages. As a result, these companies are bringing the right products to market, at the right time, at the right cost.

4 Award from NACE International – India Chapter

NACE International, India chapter has selected TCR Engineering Services (Navi Mumbai) as a recipient for the prestigious NIIS Award for "Excellent Laboratory." NACE commended TCR on the company's achievement and deserved recognition.

The award distribution was held during the Inaugural function of the CORCON 2007 conference on 26th Sept 2007 at Hotel Intercontinental The Grand, Mumbai, India.



NACE INDIA
INTERNATIONAL SECTION

305-A, Galleria, Hiranandani Gardens, Powai, Mumbai – 400076.

NACE International India Section

Presents

CORROSION AWARENESS AWARD - 2007

(Sponsored by NIIS)

To

TCR Engineering Services Pvt. Ltd.
Award for excellent Laboratories in Private Sector

**In recognition of their contributions in
the field of Corrosion Sciences**

Dr. Baldev Raj
Chairman Awards Committee

A M Uplenchwar
Chairman India Section



(East Asian & Pacific Region)
305-A Galleria, Hiranandani Gardens, Powai, Mumbai - 400 076
Phone : 91-22-2579 7354. Fax : 91-22-6692 1572
E-mail : nace@mtnl.net.in ● Website : www.naceindia.org

To,
M/s TCR Engineering Services Pvt. Ltd.
Plot No. EL-182, MIDC-TTC,
Electronic Zone, Behind Nelco,
Mhape, Navi Mumbai – 400705

Date: 12th Sept 2007

Kind Attn: Rohit Bafna, Director

Sub:- 13th NIIS Corrosion Awareness Award – 2007

Dear Sir,

On behalf of NACE International India Section , we take the pleasure to congratulate you and convey to you the decision of the Award Committee bestowing you the prestigious **NIIS Award for Excellent Laboratories (Private Sector)** sponsored by NACE International India Section. We are proud of your achievement and deserved recognition.

NIIS is organising the International Conference on Corrosion CORCON-2007 during 26-28 Sept 2007 at Hotel Intercontinental The Grand, Mumbai to deliberate state of the art technologies on corrosion mitigation devices. **We shall request you to make yourself present at the Inaugural function of the conference at 0900 hrs on 26th Sept 2007 at the venue.** The award giving ceremony will be held after inauguration. Your august presence will be a step forward in our efforts to enlarge the base of corrosion awareness and inspire all those who are working in the same professional field to move further to minimize the losses due to corrosion. Hope you will be with us on the said date and time.

The conference provides the platform for the industries to take a note of emerging technologies to minimise corrosion losses which are eroding the GDP of the nation. An effort is also made to quantify corrosion losses to assess how badly the nation is affected. A brochure on the same is attached. The Section Governing Board desires you to register for this meet to participate. This will be complementary to you.

With warm regards


N K Bhattacharyya
Executive Director

Encl: One brochure of CORCON 2007

FAXED 2761 2044
ON: 12/9/07
AT: 4:50

5 Customer Testimonial Letters



GODREJ INDUSTRIES LTD.

Burjorjinagar, Plot No. 3, Village Kanerao,
Taluka Valia, District Bharuch, Gujarat 393 135
Phone : +91 02643 - 72356 (4 lines) Fax : 70018

GIL/BKG/29/9/07

September 29, 2007

To Whom It May Concern

Letter of Appreciation

We had a bend failure in our hydrogen line in 2006 and we contacted TCR Advanced Engineering Pvt. Ltd., Vadodara to conduct an in- depth root cause failure analysis. The work carried out by the dedicated team of TCR helped us take necessary corrective actions for the second hand plant of "Hydrogen Generation" procured from England. The entire plant was thoroughly assessed by NDT and metallography with Health Assessment approach by TCR. The components included Reformer section, Pigtails, SS pipelines /Carbon steel/Alloy steel pipe lines Heat exchangers etc. TCR's assessment approach is scientific by knowledge of anticipated degradation mechanism of different components with organized team work by trained and qualified man power.

TCR also provided services on Remaining life Assessment of aged components by destructive analysis. We have got benefited by the getting Repair Weld Procedures of aged Incoloy 800H header joints by TCR.

We appreciate the enthusiasm and dedication of TCR Team members towards accepting such challenging assignments and provided us satisfactory services.

For Godrej Industries Ltd-Valia

B K Gupta

Vice President- Engineering & Projects



Reliance Industries Limited

Village Motikhavdi, P.O. Digvijaygram, Jamnagar - 361 140.

TO WHOMSOEVER IT MAY CONCERN

TCR Advanced Engineering Baroda, was awarded the job of carrying out metallographic analysis by in-situ metallography technique of piping and piping components affected by fire in Oct 2006. M/s TCR deployed a team of engineers and technicians for taking replica's of components by in-situ metallographic technique. M/s TCR had mobilised the state of art of metallurgical microscope at site for immediate viewing of the microstructure and interpretation. The microscope had all the facilities for converting the replicas into computerised images for evaluation by experts in other parts of the world. A total of about 1200 replicas were taken in a period of about 15 days, working round the clock, which is considered a remarkable feat.

The knowledge of the crew deployed at site, the quality of the replica's and the zeal and enthusiasm with which the crew completed the work is commendable and highly satisfactory.

We wish TCR Advanced, all the very best in future assignments.

A handwritten signature in blue ink, appearing to read 'U. Anand'.

(U Anand)
Asst Vice President
Corrosion & Inspection dept.
Reliance Industries Limited
Refinery Division