



TOYO ENGINEERING INDIA PVT. LTD.

C/o. Indian Oil Corporation Limited, Project IPPP 6417 / IPPX 6394.
P.O. - Jhimani, Paradip, Dist - Jagatsinghpur, Odisha - 754141
CIN-U28900MH1981PTC025413

Ref. : IPPP/6417/TOYO-S/EPCC1-S/L-1769
Date : June 21, 2025

M/s Technip Energies India Limited
IOCL, Paradip PTA - Unit,
Dist.: Jagatsinghpur, PO: Jhimani,
Paradip, Odisha - 754 141

Attn. : Mr. Ramanan Narasimman, Site Manager

Subject : PMC Response: Submission of Credentials for approval of M/s TCR Engineering (Bhubaneswar) for External Laboratory Testing (Mechanical & Chemical).

Ref. : RHQ/PJ/PX-PTA-PDR/EPCC-01/LOA Dated Apr. 23, 2021
: Technip Letter No. TENS-TS-L-EPCC01-1963 dated Jun.20, 2025

Dear Sir,

This has reference to the subject and CONTRACTOR's above cited letter regarding approval of M/s TCR Engineering (Bhubaneswar) as an External Testing Laboratory for carrying out Mechanical & Chemical Testing activities pertaining to the EPCC-01 Package for Purified Terephthalic Acid (PTA) Project at IOCL Paradip Refinery, Odisha.

PMC has reviewed the submitted credentials and found it satisfactory in line with the Project requirements. Hence, CONTRACTOR's proposal is noted in order to carry out Mechanical & Chemical Testing of materials / test coupons at M/s TCR Engineering (Bhubaneswar), subject to their valid NABL accreditation status for the intended activity.

It is also intimated that notwithstanding above; CONTRACTOR shall remain fully responsible for the performance of M/s TCR Engineering (Bhubaneswar) and it will be CONTRACTOR's responsibility to ensure all the statutory compliances and complete the works as per terms and conditions of the contract.

CONTRACTOR be informed that, this permission is subject to the suitability and fulfilment with the technical requirements. Moreover, OWNER / PMC wholly reserve the right to revoke / suspend permission, if it is found that the subject agency has failed to comply the contractual/quality requirements at any point of time.

However, this permission is without any risk, cost and time implications to OWNER and the project schedule.

This is for your information and necessary action please.

Thanking you.

For Toyo Engineering India Pvt. Ltd.

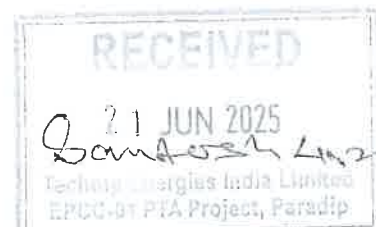
S.G. Mohiuddin
Resident Construction Manager

Encl. : As stated above

CC : Mr. Ranjan Naik - (DGM - Projects), IOCL Paradip.
Mr. Pushkar Joshi - Project Manager, TEIPL Mumbai.

Website : www.toyo-eng.com/in/
Head Office : Toyo House, Lal Bahadur Shastri Marg, Kanjur Marg (W), Mumbai - 400 078
Tel : +91 22 2573 7000, Fax : +91 22 2573 7520/21, E-mail : in.contact@toyo-eng.com
TTC Office : 71, Kanjur Village Road, Kanjur Marg (E), Mumbai - 400 042
Tel : +91 22 2573 5000, Fax : +91 22 2573 5842

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EPCC-01 PTA Project, Paradip			
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ELEC.		DCC	2
HO			
PM-DIR.	2	PD	2
PM	2		
"A" Action Required, "I" for Information			





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C/o. Indian Oil Corporation Limited, Project IPPP 6417 / IPPX 6394.

P.O. – Jhimani, Paradip, Dist – Jagatsinghpur, Odisha – 754141

CIN-U28900MH1981PTC025413

Ref. : IPPP/6417/TOYO-S/EPCC1-S/L-1769

Date : June 21, 2025

M/s Technip Energies India Limited

IOCL, Paradip PTA – Unit,

Dist.: Jagatsinghpur, PO: Jhimani,

Paradip, Odisha – 754 141

Attn. : Mr. Ramanan Narasimman, Site Manager

Subject : PMC Response: Submission of Credentials for approval of M/s TCR Engineering (Bhubaneswar) for External Laboratory Testing (Mechanical & Chemical).

Ref. : RHQ/PJ/PX-PTA-PDR/EPCC-01/LOA Dated Apr. 23, 2021

: Technip Letter No. TENS-TS-L-EPCC01-1963 dated Jun.20, 2025

Dear Sir,

This has reference to the subject and CONTRACTOR's above cited letter regarding approval of M/s TCR Engineering (Bhubaneswar) as an External Testing Laboratory for carrying out Mechanical & Chemical Testing activities pertaining to the EPCC-01 Package for Purified Terephthalic Acid (PTA) Project at IOCL Paradip Refinery, Odisha.

PMC has reviewed the submitted credentials and found it satisfactory in line with the Project requirements. Hence, CONTRACTOR's proposal is noted in order to carry out Mechanical & Chemical Testing of materials / test coupons at M/s TCR Engineering (Bhubaneswar), subject to their valid NABL accreditation status for the intended activity.

It is also intimated that notwithstanding above; CONTRACTOR shall remain fully responsible for the performance of M/s TCR Engineering (Bhubaneswar) and it will be CONTRACTOR's responsibility to ensure all the statutory compliances and complete the works as per terms and conditions of the contract.

CONTRACTOR be informed that, this permission is subject to the suitability and fulfilment with the technical requirements. Moreover, OWNER / PMC wholly reserve the right to revoke / suspend permission, if it is found that the subject agency has failed to comply the contractual/quality requirements at any point of time.

However, this permission is without any risk, cost and time implications to OWNER and the project schedule.

This is for your information and necessary action please.

Thanking you.

For **Toyo Engineering India Pvt. Ltd.**

S.G. Mohiuddin

Resident Construction Manager

Encl. : As stated above

CC : Mr. Ranjan Naik - (DGM - Projects), IOCL Paradip.
Mr. Pushkar Joshi - Project Manager, TEIPL Mumbai.



Website : www.toyo-eng.com/in/

Head Office : Toyo House, Lal Bahadur Shastri Marg, Kanjur Marg (W), Mumbai – 400 078

Tel : +91 22 2573 7000, Fax : +91 22 2573 7520/21, E-mail : in.contact@toyo-eng.com

TTC Office : 71, Kanjur Village Road, Kanjurmarg (E), Mumbai – 400 042

Tel : +91 22 2573 5000, Fax : +91 22 2573 5842



TECHNIP
ENERGIES



Letter No: TENS-TS-L-EPCC01-1963

Paradip, June 20th, 2025

To,
Toyo Engineering India Private Limited
C/o Indian Oil Corporation Limited
Project IPPP 6417 / IPPX 6394
P.O. – Jhimani, Paradip
Dist. – Jagatsinghpur, Odisha – 754141

Project : EPCC-01 Package for Purified Terephthalic Acid (PTA) Project at IOCL Paradip Refinery, Odisha, India
Contract No. : Letter of Acceptance (LOA) Ref.: RHQ/PJ/PX-PTA-PDR/EPCC-01/LOA dated 23 April 2021
PMC Project No. : 6417/IPPP
EPCC Cont. Job No. : 100136C001
Response Required : YES
Attention : Mr. S. G. Mohiuddin, Resident Construction Manager
Subject : **Submission of Credentials for approval of M/s TCR Engineering (Bhubaneswar) for External Laboratory Testing (Mechanical & Chemical)**
Reference : (i) CONTRACTOR's letter ref: TENS-TS-L-EPCC01-1023 dated-26.09.2023
(ii) PMC's Letter ref: IPPP/6417/TOYO-S/EPCC1-S/L-0986 dated -27.09.2023

Dear Sir,

CONTRACTOR would like to bring to the kind attention of PMC / OWNER that CONTRACTOR is intending to utilise the services of **M/s TCR Engineering (Bhubaneswar)** for carrying out the External Laboratory Testing of Mechanical & Chemical Testing activities, pertaining to EPCC-01 PTA Project, under 1.2 MMTPA PX-PTA Package at IOCL Paradeep.

Further, CONTRACTOR requests PMC / OWNER to kindly note that **M/s TCR Engineering (Mumbai)** is already approved by PMC / OWNER for carrying out the said external testing works, and a copy of the approval letter is enclosed herewith for ready reference.

CONTRACTOR has verified the credentials of **M/s TCR Engineering (Bhubaneswar)** and found them in order and enclosing herewith the relevant documents for PMC / OWNER's kind perusal, review and according necessary permission and approval, enabling CONTRACTOR to go ahead further, and complete the works as scheduled.

CONTRACTOR always assures PMC and OWNER of its continued best services.

Yours faithfully,

For **TECHNIP ENERGIES INDIA LIMITED**


Ramanan Narasimman
Site Manager



Encl.: As above

Cc: 1. Shri Ranjan Naik, DGM-Project, IOCL, Paradeep
2. Shri N Sarath Babu, Project Director, EPCC-01, PTA Paradeep

Technip Energies India Limited
(formerly known as Technip India Limited)
A - 4, Sector - 1,
Noida - 201 301,
Uttar Pradesh, India
Phone: +91 120 430 1000

Registered Office:
B - 22, Okhla Industrial Area,
Ph-I, New Delhi - 110 020, India
CIN: U72200DL1971PLC005742
Phone: +91 11 2681 7632
Fax: +91 11 2681 4425



TOYO ENGINEERING INDIA PVT. LTD.

C/o. Indian Oil Corporation Limited, Project IPPP 6417 / IPPX 6394.
P.O. – Jhimani, Paradip, Dist – Jagatsinghpur, Odisha – 754141
CIN-U28900MH1981PTC025413

Ref. : IPPP/6417/TOYO-S/EPCC1-S/L-0986

Date : September 27, 2023

M/s Technip Energies India Limited

IOCL, Paradip PTA – Unit,
Dist.: Jagatsinghpur, PO: Jhimani,
Paradip, Odisha – 754 141

Attn. : Mr. Ashok Bitta, Site Manager.

Subject : Submission of revised NABL Certificate for approval of M/s TCR Engineering – Navi Mumbai for External Testing Laboratory for Mechanical Testing.

Ref. : Technip Work order No. : 27108382 Dated July 19, 2021

Technip Letter No. TENS-TS-L-EPCC01-1023 Dated Sep.26, 2023

Dear Sir,

This has reference to the subject and CONTRACTOR's above cited letter regarding approval of M/s TCR Engineering – Navi Mumbai as an External Testing Laboratory for Mechanical Testing pertaining to the EPCC-01 Package for Purified Terephthalic Acid (PTA) Project at IOCL Paradip Refinery, Odisha.

PMC has reviewed the submitted credentials and found it satisfactory in line with the Project requirements. Hence, CONTRACTOR's proposal is noted in order to carry out Mechanical Testing of materials / test coupons at M/s TCR Engineering – Navi Mumbai.

It is also intimated that notwithstanding above, CONTRACTOR shall remain fully responsible for the performance of M/s M/s TCR Engineering – Navi Mumbai and it will be CONTRACTOR's responsibility to ensure all the statutory compliances and complete the works as per terms and conditions of the contract.

CONTRACTOR be informed that, this permission is subject to the suitability and fulfilment with the technical requirements. Moreover, OWNER / PMC wholly reserves the right to revoke / suspend permission at any point of time, if it is found that the subject agency has failed to comply the contractual requirements.

However, this permission is without any risk, cost and time implications to OWNER and the project schedule.

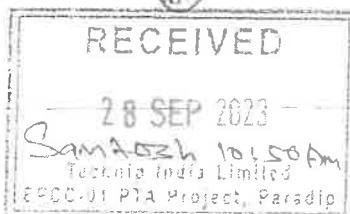
This is for your information and necessary action please.

Thanking you.

Yours faithfully,
For **Toyo Engineering India Pvt. Ltd.**

S. G. Mohiuddin
Resident Construction Manager

Encl. : As stated above



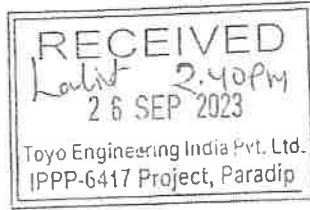
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**TECHNIP
ENERGIES**

Paradip, September 26th, 2023



Toyo Engineering India Private Limited
C/o Indian Oil Corporation Limited
Project IPPP 6417 / IPPX 6394
P.O. – Jhimani, Paradip
Dist. – Jagatsinghpur, Odisha – 754141

Letter No : TENS-TS-L-EPCC01-1023
Project : EPCC-01 Package for Purified Terephthalic Acid (PTA) Project at IOCL Paradip Refinery, Odisha, India
Contract No. : 1. Letter of Acceptance (LOA) Ref.: RHQ/PJ/PX-PTA-PDR/EPCC-01/LOA dated 23 April 2021
2. Workorder No 27108382 dated 19th Jul-2021, Vendor Code 10101573
PMC Project No. : 6417/IPP
EPCC Cont. Job No. : 100136C001
Response Required : Yes
Attention : Mr. S. G. Mohiuddin, Resident Construction Manager
Subject : Submission of revised NABL Certificate for approval of M/s TCR Engineering-Navi Mumbai for External Testing Laboratory for Mechanical Testing.
References : 1) TOYO Letter Reference No. IPPP/6417/TOYO-S/EPCC1-S/L-0610 Dated 11.02.2023
2) TOYO Letter Reference No. IPPP/6417/TOYO-S/EPCC1-S/L-0622 Dated 21.02.2023

Dear Sir,

With reference to the above stated subject, CONTRACTOR is hereby submitting NABL Certificate for approval of M/s TCR Engineering-Navi Mumbai for External Testing Laboratory for Mechanical Testing. Apart from that, we have another two approved Lab (M/s Treat-Kolkata and M/s Orbital-Cuttack) for Mechanical testing, but both the labs are taking much longer time for performing the required test.

Therefore, we request PMC to kindly consider the above approval of M/s TCR Engineering-Navi Mumbai for further testing purpose. You are requested to kindly review and approve the same at the earliest.

CONTRACTOR always assures PMC and OWNER of its continued best services.

Yours faithfully,

For TECHNIP ENERGIES INDIA LIMITED


Ashok Bitta
Site Manager

Encl.: As stated above

Cc: 1. Shri Amarjit Sahu (DGM) / Shri Ranjan Naik (CPJM), IOCL – Paradip

Technip Energies India Limited
(formerly known as Technip India Limited)
Technip Tower,
A - 4, Sector -1,
Noida - 201 301,
Uttar Pradesh, India
Phone : + 91 120 430 1000
Fax: + 91 120 430 1010

Registered Office :
B-22, Okhla Industrial Area,
Ph-1, New Delhi - 110 020, India
CIN : U72200DL1971PLC005742
Phone : +91 11 4150 3213
Website : technipenergies.com



National Accreditation Board for Testing and Calibration Laboratories

(A Constituent Board of Quality Council of India)

T-0294

06.04.2022

GANESH SONAWANE
TCR ENGINEERING SERVICES PVT. LTD.
VKB HOUSE, PLOT NO. EL 182, MIDC TTC,
INDUSTRIAL AREA, ELECTRONIC ZONE
MAHAPE NAVI MUMBAI MAHARASHTRA
NAVI MUMBAI, MAHARASHTRA-400710
Mobile: 9323398284
E-mail: SALES@TCRENG.COM

Subject: Grant of permission to use NABL Accredited CAB Combined ILAC MRA Mark

Dear Sir,

The permission to use NABL Accredited CAB Combined ILAC MRA Mark is being granted to your laboratory as per following details.

CAB ID - T-0294
CAB Name - TCR ENGINEERING SERVICES PVT. LTD.
Certificate No. - TC-6905
Accreditation Validity - 02/03/2024
Permission Valid Till - 02/03/2024

Please note that the permission to use NABL Accredited CAB Combined ILAC MRA Mark on reports / certificates will expire on **02/03/2024**.

~~You have to stop the use of NABL Accredited CAB Combined ILAC MRA Mark on reports/ certificates after **02/03/2024** and have to again obtain the permission to continue the use of NABL Accredited CAB Combined ILAC MRA Mark on reports/ certificates beyond **02/03/2024**.~~

Note:

1. Use of NABL Accredited CAB Combined ILAC MRA Mark without written permission from NABL is strictly prohibited. If found so, strict adverse action will be initiated against the laboratory by NABL.

2. NABL Accredited CAB Combined ILAC MRA Mark shall be used only on reports/ certificates. NABL Accredited CAB Combined ILAC MRA Mark cannot be used on letter heads/ promotional brochures / website etc. For more details please refer latest NABL 133 document.

Yours Sincerely,
Upasna Jain
upasna@nablqc.in.org



National Accreditation Board for
Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

TCR ENGINEERING SERVICES PVT. LTD.

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

**"General Requirements for the Competence of Testing &
Calibration Laboratories"**

for its facilities at

VKB HOUSE, PLOT NO. EL 182, MIDC TTC, INDUSTRIAL AREA, ELECTRONIC ZONE, MAHAPE, NAVI
MUMBAI, MAHARASHTRA, INDIA

in the field of

TESTING

Certificate Number: TC-6905

Issue Date: 03/03/2022

Valid Until: 02/03/2024

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Identity : TCR ENGINEERING SERVICES PVT. LTD.

Signed for and on behalf of NABL



N. Venkateswaran
Chief Executive Officer



National Accreditation Board for
Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

TCR ENGINEERING SERVICES PRIVATE LIMITED

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

**"General Requirements for the Competence of Testing &
Calibration Laboratories"**

for its facilities at

PLOT NO. 125/2094, VISHNU VIHAR, JAYAPUR PAHALA, BHUBANESWAR, KHORDHA, ODISHA, INDIA

in the field of

TESTING

Certificate Number: TC-15993

Issue Date: 30/04/2025

Valid Until: 29/04/2029

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued
satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity: TCR ENGINEERING SERVICES PRIVATE LIMITED

Signed for and on behalf of NABL




Anita Rani
Director


N. Venkateswaran
Chief Executive Officer



TCR»
ENGINEERING

To,

Date: 02.05.2025

The Site Manager,
M/s Technip Energies India Limited,
PTA Project, IOCL Refinery, Paradeep,
Jagatsinghpur, Odisha – 754141.

Subject: Submission of credentials of TCR Engineering Services Pvt. Ltd. for approval of Laboratory of Mechanical & Chemical Testing, Bhubaneswar Facilities.

Dear Sir,

Founded in 1973, M/s TCR Engineering Services has been fully committed to serving the Quality Assurance needs of Oil & Gas Majors across India. As an NDT, Inspection & Materials Testing Company, M/s TCR Engineering has all the required personnel & equipment's to serve M/s Technip Energies India Limited for all its QA needs.

We wish to submit our credentials & Make formal application towards getting approval for Mechanical Testing Agency for M/s Technip Energies India Limited, PTA Project IOCL Refinery, Paradeep, Jagatsinghpur.

M/s TCR Engineering has been currently working on a number of IOCL, GAIL, BGRL & HPCL Project Sites.

The enclosed documentation includes:

- **NABL Certificate of Accreditation & Scope**

We look forward to your kind acceptance & acknowledgement of this application.
Thanking you and with Regards,



Mr. Samir Choudhury
General Manager (TCR Eastern)

REDEFINING ON-TIME QUALITY
Material Testing | NDT | Inspection & Consulting

TCR Engineering Services Pvt. Ltd.

Laboratory Plot No : 125/2094, Vishnu Vihar, Jayapur Pahala,
Bhubaneswar, Odisha- 752101
Mob- +91 6744602472

Regd. Office: 35, Pragati Industrial Estate
N.M.Joshi Marg, Mumbai - 400 011
Tel No: +91-22-23097921



National Accreditation Board for Testing and Calibration Laboratories

SCOPE OF ACCREDITATION

Laboratory Name :

TCR ENGINEERING SERVICES PRIVATE LIMITED, PLOT NO. 125/2094, VISHNU VIHAR, JAYAPUR
PAHALA, BHUBANESWAR, KHORDHA, ODISHA, INDIA

Accreditation Standard

ISO/IEC 17025:2017

Certificate Number

TC-15993

Page No

1 of 39

Validity

30/04/2025 to 29/04/2029

Last Amended on

-

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
Permanent Testing				
1	CHEMICAL- METALS & ALLOYS	Aluminium & its alloys	Copper	ASTM E1251
2	CHEMICAL- METALS & ALLOYS	Aluminium & its alloys	Iron	ASTM E1251
3	CHEMICAL- METALS & ALLOYS	Aluminium & its alloys	Manganese	ASTM E1251
4	CHEMICAL- METALS & ALLOYS	Aluminium & its alloys	Zinc	ASTM E1251
5	CHEMICAL- METALS & ALLOYS	Aluminium & its alloys	Lead	ASTM E1251
6	CHEMICAL- METALS & ALLOYS	Aluminum and its alloys	Chromium	ASTM E1251
7	CHEMICAL- METALS & ALLOYS	Aluminum and its alloys	Magnesium	ASTM E1251
8	CHEMICAL- METALS & ALLOYS	Aluminum and its alloys	Nickel	ASTM E1251
9	CHEMICAL- METALS & ALLOYS	Aluminum and its alloys	Silicon	ASTM E1251
10	CHEMICAL- METALS & ALLOYS	Aluminum and its alloys	Titanium	ASTM E1251
11	CHEMICAL- METALS & ALLOYS	Aluminum and its alloys	Vanadium	ASTM E1251
12	CHEMICAL- METALS & ALLOYS	Aluminum and its alloys	Zirconium	ASTM E1251
13	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Aluminium	ASTM E415
14	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Aluminium	IS 8811
15	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Arsenic	ASTM E415
16	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Arsenic	IS 8811



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SCOPE OF ACCREDITATION

Laboratory Name :

TCR ENGINEERING SERVICES PRIVATE LIMITED, PLOT NO. 125/2094, VISHNU VIHAR, JAYAPUR
PAHALA, BHUBANESWAR, KHORDHA, ODISHA, INDIA

Accreditation Standard

ISO/IEC 17025:2017

Certificate Number

TC-15993

Page No

2 of 39

Validity

30/04/2025 to 29/04/2029

Last Amended on

-

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
17	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Boron	ASTM E415
18	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Boron	IS 8811
19	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Carbon	ASTM E415
20	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Carbon	IS 8811
21	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Chromium	ASTM E415
22	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Chromium	IS 8811
23	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Cobalt	ASTM E415
24	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Cobalt	IS 8811
25	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Copper	ASTM E415
26	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Copper	IS 8811
27	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Manganese	ASTM E415
28	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Manganese	IS 8811
29	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Molybdenum	ASTM E415
30	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Molybdenum	IS 8811
31	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Nickel	ASTM E415
32	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Nickel	IS 8811



National Accreditation Board for Testing and Calibration Laboratories

SCOPE OF ACCREDITATION

Laboratory Name :

TCR ENGINEERING SERVICES PRIVATE LIMITED, PLOT NO. 125/2094, VISHNU VIHAR, JAYAPUR
PAHALA, BHUBANESWAR, KHORDHA, ODISHA, INDIA

Accreditation Standard

ISO/IEC 17025:2017

Certificate Number

TC-15993

Page No

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Validity

30/04/2025 to 29/04/2029

Last Amended on

-

S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
33	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Niobium	IS 8811
34	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Phosphorus	ASTM E415
35	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Phosphorus	IS 8811
36	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Silicon	ASTM E415
37	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Silicon	IS 8811
38	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Sulfur	ASTM E415
39	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Sulfur	IS 8811
40	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Tin	ASTM E415
41	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Tin	IS 8811
42	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Titanium	ASTM E415
43	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Titanium	IS 8811
44	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Vanadium	ASTM E415
45	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Vanadium	IS 8811
46	CHEMICAL- METALS & ALLOYS	Carbon Steel & Alloy Steel	Zirconium	IS 8811
47	CHEMICAL- METALS & ALLOYS	Cast Iron	Carbon	ASTM E1999
48	CHEMICAL- METALS & ALLOYS	Cast Iron	Chromium	ASTM E1999



National Accreditation Board for Testing and Calibration Laboratories

SCOPE OF ACCREDITATION

Laboratory Name :

TCR ENGINEERING SERVICES PRIVATE LIMITED, PLOT NO. 125/2094, VISHNU VIHAR, JAYAPUR
PAHALA, BHUBANESWAR, KHORDHA, ODISHA, INDIA

Accreditation Standard

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S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
49	CHEMICAL- METALS & ALLOYS	Cast Iron	Copper	ASTM E1999
50	CHEMICAL- METALS & ALLOYS	Cast Iron	Manganese	ASTM E1999
51	CHEMICAL- METALS & ALLOYS	Cast Iron	Molybdenum	ASTM E1999
52	CHEMICAL- METALS & ALLOYS	Cast Iron	Nickel	ASTM E1999
53	CHEMICAL- METALS & ALLOYS	Cast Iron	Phosphorus	ASTM E1999
54	CHEMICAL- METALS & ALLOYS	Cast Iron	Silicon	ASTM E1999
55	CHEMICAL- METALS & ALLOYS	Cast Iron	Sulfur	ASTM E1999
56	CHEMICAL- METALS & ALLOYS	Cast Iron	Tin	ASTM E1999
57	CHEMICAL- METALS & ALLOYS	Cast Iron	Titanium	ASTM E1999
58	CHEMICAL- METALS & ALLOYS	Cast Iron	Vanadium	ASTM E1999
59	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Antimony	BS EN 15079
60	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Arsenic	BS EN 15079
61	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Beryllium	BS EN 15079
62	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Cadmium	BS EN 15079
63	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Chromium	BS EN 15079
64	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Cobalt	BS EN 15079



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65	CHEMICAL- METALS & ALLOYS	Copper & Its Alloys	Lead	BS EN 15079
66	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Manganese	BS EN 15079
67	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Nickel	BS EN 15079
68	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Phosphorus	BS EN 15079
69	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Silicon	BS EN 15079
70	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Silver	BS EN 15079
71	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Sulfur	BS EN 15079
72	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Tin	BS EN 15079
73	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Zinc	BS EN 15079
74	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Aluminium	BS EN 15079
75	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Bismuth	BS EN 15079
76	CHEMICAL- METALS & ALLOYS	Copper & its alloys	Iron	BS EN 15079
77	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Aluminum	ASTM E3047
78	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Boron	ASTM E3047
79	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Carbon	ASTM E3047
80	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Chromium	ASTM E3047



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81	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Cobalt	ASTM E3047
82	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Copper	ASTM E3047
83	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Iron	ASTM E3047
84	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Magnesium	ASTM E3047
85	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Manganese	ASTM E3047
86	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Molybdenum	ASTM E3047
87	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Niobium	ASTM E3047
88	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Phosphorus	ASTM E3047
89	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Silicon	ASTM E3047
90	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Sulfur	ASTM E3047
91	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Tantalum	ASTM E3047
92	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Titanium	ASTM E3047
93	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Tungsten	ASTM E3047
94	CHEMICAL- METALS & ALLOYS	Nickel & its alloys	Vanadium	ASTM E3047
95	CHEMICAL- METALS & ALLOYS	Stainless Steel	Carbon	ASTM E1086
96	CHEMICAL- METALS & ALLOYS	Stainless Steel	Chromium	ASTM E1086



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97	CHEMICAL- METALS & ALLOYS	Stainless Steel	Copper	ASTM E1086
98	CHEMICAL- METALS & ALLOYS	Stainless Steel	Copper	IS 9879
99	CHEMICAL- METALS & ALLOYS	Stainless Steel	Manganese	ASTM E1086
100	CHEMICAL- METALS & ALLOYS	Stainless Steel	Molybdenum	ASTM E1086
101	CHEMICAL- METALS & ALLOYS	Stainless Steel	Molybdenum	IS 9879
102	CHEMICAL- METALS & ALLOYS	Stainless Steel	Nickel	ASTM E1086
103	CHEMICAL- METALS & ALLOYS	Stainless Steel	Nickel	IS 9879
104	CHEMICAL- METALS & ALLOYS	Stainless Steel	Phosphorus	ASTM E1086
105	CHEMICAL- METALS & ALLOYS	Stainless Steel	Silicon	ASTM E1086
106	CHEMICAL- METALS & ALLOYS	Stainless Steel	Sulfur	ASTM E1086
107	CHEMICAL- METALS & ALLOYS	Stainless Steel	Sulfur	IS 9879
108	CHEMICAL- METALS & ALLOYS	Stainless Steel	Carbon	IS 9879
109	CHEMICAL- METALS & ALLOYS	Stainless Steel	Chromium	IS 9879
110	CHEMICAL- METALS & ALLOYS	Stainless Steel	Manganese	IS 9879
111	CHEMICAL- METALS & ALLOYS	Stainless Steel	Phosphorus	IS 9879
112	CHEMICAL- METALS & ALLOYS	Stainless Steel	Silicon	IS 9879



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113	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Carbon Steel (Bolts, Screws and Studs)	Proof Load Test	IS 1367 (Part 3)
114	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Carbon Steel and Alloy Steel (Bolts, Screws and Studs)	% Elongation	ISO 898-1
115	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Carbon Steel and Alloy Steel (Bolts, Screws and Studs)	Ultimate Tensile Strength	ISO 898-1
116	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Carbon Steel and Alloy Steel (Nuts)	Proof Load Test	IS 1367 (Part 6)
117	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Fasteners - Carbon Steel and Alloy Steel (Bolts, Screws and Studs)	Proof Load Test	ISO 898-1
118	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	% Elongation	ASTM E8/E8M
119	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	% Elongation	IS 1608 (Part 1)
120	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	% Elongation	ISO 6892-1
121	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	% Reduction in Area	ASTM E8/E8M



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122	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	0.2 % Yield Stress	IS 1608 (Part 1)
123	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	0.2 % Yield Stress	ASTM E8/E8M
124	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	0.2 % Yield Stress	ISO 6892-1
125	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	0.5 % Extension Under Load	IS 1608 (Part 1)
126	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	0.5 % Extension Under Load (EUL)	ASTM E8/E8M
127	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	0.5 % Extension Under Load (EUL)	ISO 6892-1
128	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	1.0 % Proof Stress	IS 1608 (Part 1)
129	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	1.0 % Proof Stress	ASTM E8/E8M
130	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	1.0 % Proof Stress	ISO 6892-1



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131	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Brinell Hardness (HBW 2.5/187.5)	ASTM E10
132	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Brinell Hardness (HBW 2.5/187.5)	ISO 6506-1
133	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Brinell Hardness (HBW 2.5/31.25)	ASTM E10
134	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Brinell Hardness (HBW 2.5/31.25)	ISO 6506-1
135	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Brinell Hardness (HBW 2.5/62.5)	ASTM E10
136	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Brinell Hardness (HBW 2.5/62.5)	ISO 6506-1
137	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Charpy Impact Test (+80 °C to -101 °C & -196 °C)	ASTM E23
138	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Rockwell Hardness (HRB)	ISO 6508-1
139	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Rockwell Hardness (HRC)	ASTM E18



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140	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Rockwell Hardness (HRC)	ISO 6508-1
141	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Ultimate Tensile Strength	ASTM E8/E8M
142	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Ultimate Tensile Strength	IS 1608 (Part 1)
143	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Ultimate Tensile Strength	ISO 6892-1
144	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Macro Indentation, HV 10)	ASTM E92
145	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Macro Indentation, HV 5)	ASTM E92
146	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Macro Indentation, HV 5)	IS 1501 (Part 1)
147	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.3)	ASTM E384
148	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.3)	ISO 6507-1



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149	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.5)	ASTM E384
150	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 1)	ASTM E384
151	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Yield Stress	API 1104
152	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper) - Tube	Flaring Test	IS 2335
153	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper) - Tube	Flattening Test	IS 2328
154	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	% Elongation	ASTM E8/E8M
155	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	% Elongation	IS 1608 (Part 1)
156	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	% Elongation	ISO 6892-1
157	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	% Reduction in Area	ASTM E8/E8M



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158	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	0.2 % Yield Stress	IS 1608 (Part 1)
159	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	0.2 % Yield Stress	ISO 6892-1
160	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	0.5 % Extension Under Load (EUL)	ASTM E8/E8M
161	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	0.5 % Extension Under Load (EUL)	ISO 898-1
162	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	0.5 % Extension Under Load (EUL)	IS 1608 (Part 1)
163	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	0.5% Extension Under Load (EUL)	ISO 6892-1
164	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	1.0 % Proof Stress	ASTM E8/E8M
165	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	1.0 % Proof Stress	IS 1608 (Part 1)
166	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	1.0 % Proof Stress	ISO 6892-1



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167	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	1.0 % Proof Stress	ISO 898-1
168	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Bend Test	IS 1599
169	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Brinell Hardness (2.5/62.5)	ISO 6506-1
170	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Brinell Hardness (HBW 2.5/187.5)	ASTM E10
171	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Brinell Hardness (HBW 2.5/187.5)	IS 1500 (Part 1)
172	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Brinell Hardness (HBW 2.5/187.5)	ISO 6506-1
173	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Brinell Hardness (HBW 2.5/31.25)	ASTM E10
174	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Brinell Hardness (HBW 2.5/31.25)	IS 1500 (Part 1)
175	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Brinell Hardness (HBW 2.5/31.25)	ISO 6506-1



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176	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Brinell Hardness (HBW 2.5/62.5)	ASTM E10
177	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Brinell Hardness (HBW 2.5/62.5)	IS 1500 (Part 1)
178	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Charpy Impact Test (+80 °C to -101 °C & -196 °C)	ASTM E23
179	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Charpy Impact Test (+80 °C to -101 °C & -196 °C)	ISO 148-1
180	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Rockwell Hardness (HRB)	ASTM E18
181	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Rockwell Hardness (HRB)	ISO 6508-1
182	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Rockwell Hardness (HRC)	ASTM E18
183	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Rockwell Hardness (HRC)	IS 1586 (Part 1)
184	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Rockwell Hardness (HRC)	ISO 6508-1



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185	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Ultimate Tensile Strength	ASTM E8/E8M
186	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Ultimate Tensile Strength	ISO 6892-1
187	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Ultimate Tensile Strength	IS 1608 (Part 1)
188	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Macro Indentation, HV 10)	ASTM E92
189	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Macro Indentation, HV 10)	IS 1501 (Part 1)
190	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Macro Indentation, HV 10)	ISO 6507-1
191	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Macro Indentation, HV 5)	IS 1501 (Part 1)
192	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Macro Indentation, HV 5)	ISO 6507-1
193	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Macro Indentation, HV5)	ASTM E92



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194	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 0.1)	ASTM E384
195	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 0.1)	IS 1501 (Part 1)
196	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 0.1)	ISO 6507 (Part 1)
197	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 0.2)	IS 1501 (Part 1)
198	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 0.2)	ISO 6507-1
199	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 0.3)	IS 1501 (Part 1)
200	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 0.5)	ISO 6507-1
201	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 0.5)	IS 1501 (Part 1)
202	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 1)	ASTM E384



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203	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 1)	IS 1501 (Part 1)
204	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV 1)	ISO 6507-1
205	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous) - Tube	Flaring Test	IS 2335
206	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous) - Tube	Flattening Test	IS 2328
207	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	% Elongation	IS 1608 (Part 1)
208	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	% Elongation	ISO 6892-1
209	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	% Elongation	ASTM E8/E8M
210	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	% Elongation	ISO 898-1
211	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	% Reduction in Area	ASTM E8/E8M



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212	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	% Reduction in Area	IS 1608 (Part 1)
213	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	0.2 % Yield Stress	ASTM E8/E8M
214	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	0.2 % Yield Stress	ISO 6892-1
215	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	0.2% Yield Stress	IS 1608 (Part 1)
216	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	0.5 % Extension Under Load (EUL)	ASTM E8/E8M
217	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	0.5 % Extension Under Load (EUL)	IS 1608 (Part 1)
218	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	0.5 % Extension Under Load (EUL)	ISO 6892-1
219	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	1.0 % Proof Stress	IS 1608 (Part 1)
220	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	1.0 % Proof Stress	ASTM E8/E8M



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221	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	1.0% Proof Stress	ISO 6892-1
222	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Bend Test	IS 1599
223	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Brinell Hardness (HBW 2.5/187.5)	ASTM E10
224	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Brinell Hardness (HBW 2.5/187.5)	IS-1500 (Part 1)
225	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Brinell Hardness (HBW 2.5/187.5)	ISO 6506-1
226	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Brinell Hardness (HBW 2.5/31.25)	IS 1500 (Part 1)
227	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Brinell Hardness (HBW 2.5/31.25)	ISO 6506-1
228	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Brinell Hardness (HBW 2.5/31.25)	ASTM E10
229	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Brinell Hardness (HBW 2.5/62.5)	ASTM E10



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230	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Brinell Hardness (HBW 2.5/62.5)	IS 1500 (Part 1)
231	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Brinell Hardness (HBW 2.5/62.5)	ISO 6506-1
232	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Charpy Impact Test (+80 °C to -101 °C & -196 °C)	ASTM E23
233	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Charpy Impact Test (+80 °C to -101 °C & -196 °C)	ISO 148-1
234	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Rockwell Hardness (HRB)	IS 1586 (Part 1)
235	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Rockwell Hardness (HRB)	ISO 6508-1
236	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Rockwell Hardness (HRC)	ASTM E18
237	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Rockwell Hardness (HRC)	IS 1586 (Part 1)
238	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Rockwell Hardness (HRC)	ISO 6508-1



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239	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Ultimate Tensile Strength	ASTM E8/E8M
240	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Ultimate Tensile Strength	IS 1608 (Part 1)
241	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Ultimate Tensile Strength	ISO 6892-1
242	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Ultimate Tensile Strength	ISO 898-1
243	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Macro Indentation, HV 10)	ASTM E92
244	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Macro Indentation, HV 10)	IS 1501 (Part 1)
245	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Macro Indentation, HV 10)	ISO 6507-1
246	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Macro Indentation, HV 5)	ASTM E92
247	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Macro Indentation, HV 5)	IS 1501 (Part 1)



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248	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Macro Indentation, HV 5)	ISO 6507-1
249	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.1)	ASTM E384
250	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.1)	IS 1501 (Part 1)
251	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.1)	ISO 6507-1
252	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.2)	ASTM E384
253	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.2)	IS 1501 (Part 1)
254	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.2)	ISO 6507-1
255	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.3)	ASTM E384
256	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.3)	IS 1501 (Part 1)



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257	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.3)	ISO 6507-1
258	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.5)	ASTM E384
259	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.5)	IS 1501 (Part 1)
260	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 0.5)	ISO 6507-1
261	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 1)	ASTM E384
262	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 1)	IS 1501 (Part 1)
263	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)	Vickers Hardness (Micro Indentation, HV 1)	ISO 6507-1
264	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous) - Tube	Flaring Test	IS 2335
265	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Non-Ferrous)- Tube	Flattening Test	IS 2328



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266	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Solid Drawn Copper Tubes	Flattening Test	IS 2501
267	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Tubular Product	Flaring Test	ASTM A370
268	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Tubular Product	Flattening Test	ASTM A370
269	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	% Elongation	API 1104 (Clause 10.3.6.2)
270	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	% Elongation	ASME BPVC Section IX (Clause QW-152)
271	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Bend Test	API 1104 (Clause 10.3.6.2)
272	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Bend Test	ASME BPVC Section IX (Clause QW-160)
273	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Fracture Test	ASME BPVC Section IX (Clause QW-182)
274	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Macro Etch Test	ASME BPVC Section IX (Clause QW-183)



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275	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Macro Examination Test - Metal Expansion	ASME BPVC Section IX (Clause QW-183)
276	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Macro-Examination - Leak Path	ASME BPVC Section IX (Clause QW-183)
277	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Macro-Examination - Leg Lengths	API 1104 (Clause B.2.5.4)
278	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Macro-Examination - Leg Lengths	ASME BPVC Section IX (Clause QW-183)
279	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Macro-Examination - Throat Length	ASME BPVC Section IX (Clause QW-183)
280	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Nick Break Test	API 1104 (Clause 5.6.3)
281	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Peel Test	ASME BPVC Section IX (Clause QB-170)
282	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Peel Test	ASME Section VIII (Figure 17-16)
283	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Shear Load (Pull-out) Test	ASME BPVC Section IX (Clause QW-196.2.1)



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284	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Shear Test	ASME BPVC Section IX (Clause QW-196.2.1)
285	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Ultimate Tensile Strength	API 1104 (Clause 10.3.6.2)
286	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Ultimate Tensile Strength	ASME BPVC Section IX (Clause QW-152)
287	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welded Specimens	Yield Stress	ASME BPVC Section IX (Clause QW-152)
288	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Fracture Test	ASME Section VIII
289	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Charpy Impact Test (+80 °C to -101 °C & -196 °C)	ISO 148-1
290	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Rockwell Hardness (HRB)	ASTM E18
291	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Macro Indentation, HV 10)	IS 1501 (Part 1)
292	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Macro Indentation, HV 10)	ISO 6507-1



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293	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Macro Indentation, HV 5)	ISO 6507-1
294	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.1)	ASTM E384
295	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.1)	IS 1501 (Part 1)
296	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.1)	ISO 6507-1
297	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.1)	ISO 6507-1
298	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.2)	ASTM E384
299	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.2)	IS 1501 (Part 1)
300	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.2)	ISO 6507-1
301	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.3)	IS 1501 (Part 1)



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302	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.5)	IS 1501 (Part 1)
303	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 0.5)	ISO 6507-1
304	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Copper)	Vickers Hardness (Micro Indentation, HV 1)	IS 1501 (Part 1)
305	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	0.2% Yield Stress	ASTM E8/E8M
306	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	0.2% Yield Stress	ISO 898-1
307	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV0.2)	ASTM E384
308	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV0.3)	ASTM E384
309	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials (Ferrous)	Vickers Hardness (Micro Indentation, HV0.5)	ASTM E384
310	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	% Elongation	ASTM A370



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S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
311	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	% Reduction in Area	ASTM A370
312	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	0.2% Yield Stress	ASTM A370
313	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	0.5% Extension Under Load (EUL)	ASTM A370
314	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	1.0% Proof Stress	ASTM A370
315	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	Bend Test	ASTM A370
316	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	Brinell Hardness (HBW 2.5/187.5)	ASTM A370
317	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	Brinell Hardness (HBW 2.5/31.25)	ASTM A370
318	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	Brinell Hardness (HBW 2.5/62.5)	ASTM A370
319	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	Charpy Impact Test (+80 °C to -101 °C & -196 °C)	ASTM A370



National Accreditation Board for Testing and Calibration Laboratories

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320	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	Rockwell Hardness (HRB)	ASTM A370
321	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	Rockwell Hardness (HRC)	ASTM A370
322	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products	Ultimate Tensile Strength	ASTM A370
323	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products (Bolts, Studs & Screws)	Proof Load Test	ASTM A370
324	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials - Steel Products (Nuts)	Proof Load Test	ASTM A370
325	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Bend Test	ASTM E190
326	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Charpy Impact Test (+80 °C to -101 °C & -196 °C)	ISO 9016
327	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Macro Etch Test	ISO 17639
328	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Macro-Examination - Leak Path	ASME Section VIII



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329	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Macro-Examination - Leg Lengths	ASME Section VIII
330	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Macro-Examination - Metal Expansion	ASME Section VIII
331	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Macro-Examination - Throat Length	ASME Section VIII
332	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Shear Load (Pull-out) Test	ASME Section VIII
333	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Shear Test	ASME Section VIII
334	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Vickers Hardness (Micro Indentation, HV 0.1)	IS 1501 (Part 1)
335	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Metallic Materials - Welds & Welded Specimens	Vickers Hardness (Micro Indentation, HV 1)	ASTM E384
336	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Reinforcement Bar/Mechanical Splices	Slip Test	IS 16172
337	MECHANICAL-MECHANICAL PROPERTIES OF METALS	Reinforcement Bar/Mechanical Splices	Static Tensile Test - % Extension Under Load (EUL) at Max. Force	IS 16172



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S.No	Discipline / Group	Materials or Products tested	Component, parameter or characteristic tested / Specific Test Performed / Tests or type of tests performed	Test Method Specification against which tests are performed and / or the techniques / equipment used
338	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Reinforcement Bar/Mechanical Splices	Static Tensile Test - Ultimate Tensile Strength (UTS)	IS 16172
339	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Reinforcement Couplers for Mechanical Splices of Bars	% Elongation	ISO 15835-2
340	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Reinforcement Couplers for Mechanical Splices of Bars	% Reduction in Area	ISO 15835-2
341	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Reinforcement Couplers for Mechanical Splices of Bars	0.2 % Yield Stress	ISO 15835-2
342	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Reinforcement Couplers for Mechanical Splices of Bars	Slip Test	ISO 15835-2
343	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Reinforcement Couplers for Mechanical Splices of Bars	Ultimate Tensile Strength	ISO 15835-2
344	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Steel Plates	Through Thickness Tensile Test	ASTM A770/A770M
345	MECHANICAL- MECHANICAL PROPERTIES OF METALS	Welded Carbon Steel Pipes	Bend Test	IS 3589
346	MECHANICAL- METALLOGRAPHY TEST	Aluminium Alloys Products	Stress Corrosion Cracking Test	ASTM G47



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347	MECHANICAL-METALLOGRAPHY TEST	Aluminum Alloys Products	EXCO Test	ASTM G34
348	MECHANICAL-METALLOGRAPHY TEST	Aluminum Alloys Products	Intergranular Corrosion Nitric Acid (NAMLT Test)	ASTM G67
349	MECHANICAL-METALLOGRAPHY TEST	Austenitic and Ferritic-austenitic (Duplex) Stainless Steel	Intergranular Corrosion (IGC) - Method A	DIN EN ISO 3651 (Part 2)
350	MECHANICAL-METALLOGRAPHY TEST	Austenitic and Ferritic-austenitic (Duplex) Stainless Steel	Intergranular Corrosion (IGC) - Method B	DIN EN ISO 3651 (Part 2)
351	MECHANICAL-METALLOGRAPHY TEST	Austenitic and Ferritic-austenitic (Duplex) Stainless Steel	Intergranular Corrosion (IGC) - Method C	DIN EN-ISO-3651-(Part 2)
352	MECHANICAL-METALLOGRAPHY TEST	Austenitic Stainless Steel	Intergranular Corrosion (IGC) - Practice A	ASTM A262
353	MECHANICAL-METALLOGRAPHY TEST	Austenitic Stainless Steel	Intergranular Corrosion (IGC) - Practice B	ASTM A262
354	MECHANICAL-METALLOGRAPHY TEST	Austenitic Stainless Steel	Intergranular Corrosion (IGC) - Practice C	ASTM A262
355	MECHANICAL-METALLOGRAPHY TEST	Austenitic Stainless Steel	Intergranular Corrosion (IGC) - Practice E	ASTM A262
356	MECHANICAL-METALLOGRAPHY TEST	Austenitic Stainless Steel	Intergranular Corrosion (IGC) - Practice F	ASTM A262
357	MECHANICAL-METALLOGRAPHY TEST	Austenitic Stainless Steel	Intergranular Corrosion (Strauss Test)	IS 10461-2
358	MECHANICAL-METALLOGRAPHY TEST	Austenitic Stainless Steel	Intergranular Corrosion (Huey Test)	IS 10461-1



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359	MECHANICAL-METALLOGRAPHY TEST	Copper Materials, Alloys & Products	Ammonia Vapor Test (Susceptibility to Stress Corrosion Cracking)	ASTM B858
360	MECHANICAL-METALLOGRAPHY TEST	Duplex Austenitic/Ferritic Stainless Steel	Detection of Detrimental Intermetallic Phases (Method A)	ASTM A923
361	MECHANICAL-METALLOGRAPHY TEST	Duplex Austenitic/Ferritic Stainless Steel	Determination of Detrimental Intermetallic Phases (Method C)	ASTM A923
362	MECHANICAL-METALLOGRAPHY TEST	Metallic Material (SG Iron)	Nodularity	IS 7754
363	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Aluminium)	Alternate Immersion Stress Corrosion Test	ASTM G44
364	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Copper)	Micro Examination (Grain Size)	ASTM E112 (by Comparison Method)
365	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Bent-Beam Stress-Corrosion	ASTM G39
366	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Case Depth	IS 6416 (by Microscopic Method)
367	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Case Depth (Hardness Method)	IS 6416
368	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Chloride Stress Corrosion Cracking (CSCC & MgCl ₂) Test	ASTM G36
369	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Decarburization Test	ASTM E1077 (by Microscopic Method)
370	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Decarburization Test	IS 6396 (by Microscopic Method)



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371	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Ferrite Content	ASTM E562 (by Microscopic Method)
372	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Hydrogen Induced Cracking Test (HIC)	NACE TM0284
373	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Inclusion Rating (Method A, D)	ASTM E45
374	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Micro Examination (General Structure)	ASM Volume 9
375	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Micro Examination (Grain Size)	ASTM E112 (by Comparison Method)
376	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Stress Oriented Hydrogen Induced Cracking Test	NACE MR0175/NACE TM0177
377	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Stress Oriented Hydrogen Induced Cracking Test	NACE TM0103
378	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Sulfide Stress Cracking (SSC) Test	EFC 16, Third Edition
379	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Sulfide Stress Cracking (SSC) Test	EFC 17, Second Edition
380	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Sulfide Stress Cracking (SSC) Test	ISO 11439 (Annex A, Clause A.3)
381	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Sulfide Stress Cracking (SSC) Test	NACE TM0316
382	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Sulfide Stress Cracking and Stress Corrosion Cracking	NACE TM0177



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383	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Thickness of Coating	ASTM B499 (by Magnetic Method)
384	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Non-Ferrous)	Bent-Beam Stress-Corrosion	ASTM G39
385	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Non-Ferrous)	Chloride Stress Corrosion Cracking (MgCl ₂) Test	ASTM G36
386	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Non-Ferrous)	Hydrogen Induced Cracking Test	NACE TM0284
387	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Non-Ferrous)	Micro-Examination (General Structure)	ASM Volume 9
388	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Non-Ferrous)	Micro Examination (Grain Size)	ASTM E112 (by Comparison Method)
389	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Non-Ferrous)	Stress Oriented Hydrogen Induced Cracking Test	NACE TM0103
390	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Non-Ferrous)	Stress Oriented Hydrogen Induced Cracking Test	EFC 16, Third Edition
391	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Non-Ferrous)	Sulfide Stress Cracking (SSC)	ASTM G39
392	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Non-Ferrous)	Sulfide Stress Cracking (SSC)	IS 15490
393	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Non-Ferrous)	Sulfide Stress Cracking and Stress Corrosion Cracking	NACE TM0177
394	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (SG Iron)	Nodularity	ASTM A247



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395	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Welded Specimen)	Macro-Examination - Metal Expansion	ASME Section IX
396	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Welded Specimen)	Micro Examination	ISO 17639
397	MECHANICAL-METALLOGRAPHY TEST	Metallic Materials (Ferrous)	Sulfide Stress Cracking (SSC) Test	IS 15490 (Annex B, Clause 8.3.4)
398	MECHANICAL-METALLOGRAPHY TEST	Nickel Based and Chromium Bearing Alloys	Critical Crevice Temperature Test	ASTM G48 (Method D)
399	MECHANICAL-METALLOGRAPHY TEST	Nickel Based and Chromium Bearing Alloys	Critical Pitting Temperature Test	ASTM G48 (Method C)
400	MECHANICAL-METALLOGRAPHY TEST	Nickel-Rich Chromium Bearing Alloys	Ferric Sulfate-Sulfuric Acid Test (Method A)	ASTM G28
401	MECHANICAL-METALLOGRAPHY TEST	Nickel-Rich Chromium Bearing Alloys	Mixed Acid - Oxidizing Salt (Method B) Test	ASTM G28
402	MECHANICAL-METALLOGRAPHY TEST	Stainless Steel	Determination of Detrimental Intermetallic Phases (Method B)	ASTM A923
403	MECHANICAL-METALLOGRAPHY TEST	Stainless Steels and Related Alloys	Ferric Chloride Crevice Corrosion Test (Method B)	ASTM G48
404	MECHANICAL-METALLOGRAPHY TEST	Stainless Steels and Related Alloys	Critical Crevice Temperature Test (Method F)	ASTM G48
405	MECHANICAL-METALLOGRAPHY TEST	Stainless Steels and Related Alloys	Critical Pitting Temperature Test (Method E)	ASTM G48
406	MECHANICAL-METALLOGRAPHY TEST	Stainless Steels and Related Alloys	Ferric Chloride Pitting Test (Method A)	ASTM G48



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407	MECHANICAL-METALLOGRAPHY TEST	Steel	Micro Examination (Grain Size)	IS 4748 (by Comparison Method)
408	MECHANICAL-METALLOGRAPHY TEST	Steel	Micro Examination (Grain Size)	ISO 643 (by Comparison Method)
409	MECHANICAL-METALLOGRAPHY TEST	Steel	Inclusion Content (Method A, D)	ASTM E45



TCR»

ENGINEERING

REDEFINING ON-TIME QUALITY

| Pipeline Asset Integrity Solutions
August 2022

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THE MAGIC

TCR is serving the global industry leaders for close to five decades



50 Years Exp

Clients: Aramco, Sabc,
IOCL, GAIL, BPCL, RIL,
KNPC, KOC, Qchem,
RLOC, PDO

750+

number of TCR Global
experts and technicians
currently working across
3 continents

ISO 17025

Radiography Services
accredited to NABL
and ISO 17025
guidelines

84+

Radiography Project
Sites Currently
Ongoing in India*
*Aug 2022

3 Departments

Materials Destructive
Testing Lab, NDT
Services and Asset
Integrity Management

3 Alliances



Pipeline Infrastructure

Pipeline Inspection for Anomalies

- Automated Radiographic Testing of circumferential butt welds from Internal Pipelines using Crawlers
- External X-Ray or Gamma ray radiation for detection of both surface and subsurface defects in welds
- UT shear-wave anomaly evaluation, Phased Array (PaUT) and ToFD for seam-weld scanning
- Automated Ultrasonic Testing and LRUT/Guided Wave including A/B/C-Scans as per API 1104
- Weld assessment of difficult-to-access, small diameter pipes of 1.5" up to 3.5" using palm scanner

Digitalization of RT Films as per IOCL and GAIL Spec

Material Verification Programme

- Destructive Testing Lab for PQR/Welder qualification and MOC confirmation
- Corrosion Damage Evaluation and Metallographic Replica on Weld Joints
- Positive Material Identification for Sorting

O & M Service Providers

Pipeline Asset Integrity Management with AIOM Software

Pipeline Assessment and Asset Enhancement

- Failure Analysis, Fitness for Service, Remaining Life Assessment
- Internal Corrosion and External Corrosion Direct Assessment - NACE SP 0206/NACE SP 0502
- Pipeline remaining strength and lifetime according to ASME B31G, API 579, ASME FFS
- Visual Inspection of underground pipelines using Robotic Crawlers
- Corrosion Loop Identification for RBI Study per API 580/581

Tests on Insulated Pipelines to corrosion under insulation (CUI) using PEC

In-Line Inspection using Smart Pigs for Leak detection - API 1163, API 1130, API 1175



UNLOCKING VALUE OF INDIA'S NATIONAL MONETISATION PIPELINE

- Material selection for main line pipe and pipe fittings
- Design & lay out of station, mainline & crossings
- Selection of proper coating system
- Designing an effective Cathodic protection (CP) system
- Ensuring appropriate safety factors during design
- Environmental Impact assessment



Design &
Engineering
Phase

- Proper inspection
- Adherence to approved specification and procedures
- Monitoring workmanship
- Hydrostatic test
- Records for future reference



Construction
Phase

- Line Patrolling/ROW Inspection
- Inspection of Mainline Facilities
- Online Monitoring of Pipeline Parameters through Software tools
- Leak detection systems (LDS) to detect any abnormal change in pressure and flow parameters and to locate the location of incidence



Operation &
maintenance
Phase

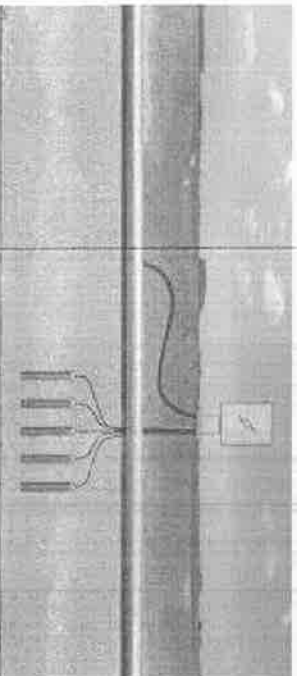
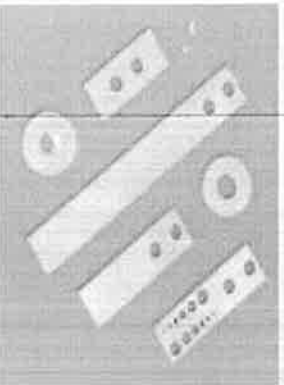


Threats to Pipeline Integrity

TCR's comprehensive Pipeline Asset Integrity Program

Pipeline Monitoring

- **Internal Corrosion Rate Monitoring**
 - Advise and Installation of corrosion coupons and ER probes, electrochemical noise technique (ECN probes) or Linear polarization technique (LPR probes) & UT sensors



- **Cathodic Protection (CP) monitoring**
 - Monitor effectiveness of installed Permanent CP units at feeding points

Pipeline Survey

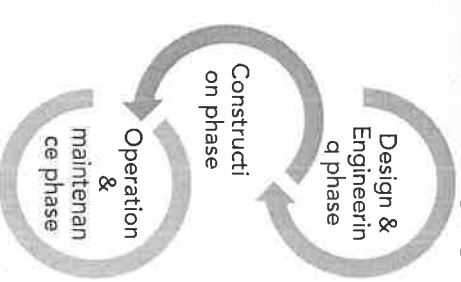
- **Intelligent Pigging In-Line**
 - Detecting corrosion, stress corrosion cracking, illegal fittings intending for piferage and deformation anomalies including dents, gouges, grooves, Mill-Related Anomalies & weld cracks



- **Coating Survey**
 1. CIPPL ["On" & "Off"]
 2. Pearson Survey
 3. CAT Survey
 4. DCVG Survey
 5. Coating conductance survey.
 6. Casing & Carrier short surveys.

Pipeline Integrity

- **Quantitative Risk Assessment**
 - During Design Stage
- **Condition Assessment**
- **Pipeline Fitness for Service**
- **Pipeline Failure Analysis**
- **Pipeline Remaining Life**
- **Pipeline Weld Integrity**





ICX ENGINEERING

Client	Type	Description of case
GAIL India Ltd., Hazira	Condition assessment	Condition assessment of 36" diameter HVJ pipeline carrying Compressed Dry Natural Gas
Indraprastha Gas Ltd.	Failure Investigation	pipeline carrying natural gas failed during hydro-test
Reliance Gas Pipelines Ltd.	Metallurgical assessment	Metallurgical assessment of pipeline material
GAIL India Ltd. (VSPL LPG)	Failure Investigation	Failure investigation of 6" x 3" reducer
Mahanagar Gas Ltd.	Failure Investigation	Failure investigation of 3" valve of gas carrying pipeline
GAIL India Ltd.,	Failure Investigation	12" API 5L X60 pipeline
Cairn Energy Ltd., Barmer	Failure Investigation	Failure investigation of 20" pipeline
Cairn Energy Ltd.,	Failure Investigation	8" Underground pipeline of Natural Gas
British Gas E&P	Failure Investigation	Failure investigation of gas pipeline
Welspun Ltd., Anjar	Failure Investigation	Failure investigation of 42" spiral welded pipes
Maharashtra Seamless Ltd.	Failure Investigation	12" pipeline ruptured during hydro-test



गोल (इंडिया) लिमिटेड

GAIL (India) Limited

THE UNIVERSITY OF CHICAGO

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2000年4月21日

1991

THE UNIVERSITY OF CHICAGO

Richard N. Smith

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CONSTITUTIONAL PROVISIONS: The United States Constitution, which has been amended 27 times, is the supreme law of the land. It is the foundation of the federal government and the states. The Constitution is divided into three parts: the Preamble, the Articles, and the Amendments. The Preamble states the purpose of the Constitution, which is to establish a more perfect union, justice, domestic tranquility, and to secure the blessings of liberty to the people. The Articles define the structure of the federal government, including the executive, legislative, and judicial branches. The Amendments are changes to the original Constitution, with the first ten amendments known as the Bill of Rights. The Constitution is a living document that has shaped the nation's history and continues to guide the country's future.

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System for
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40074





WPS-PQR DEVELOPMENT WELD EXPERTS

AWS D1.1, ASME IX, API 1104, EN 288
Evaluate the existing welding procedures, Perform welding quality control inspections, Supervise and inspect critical weld procedures in the field.

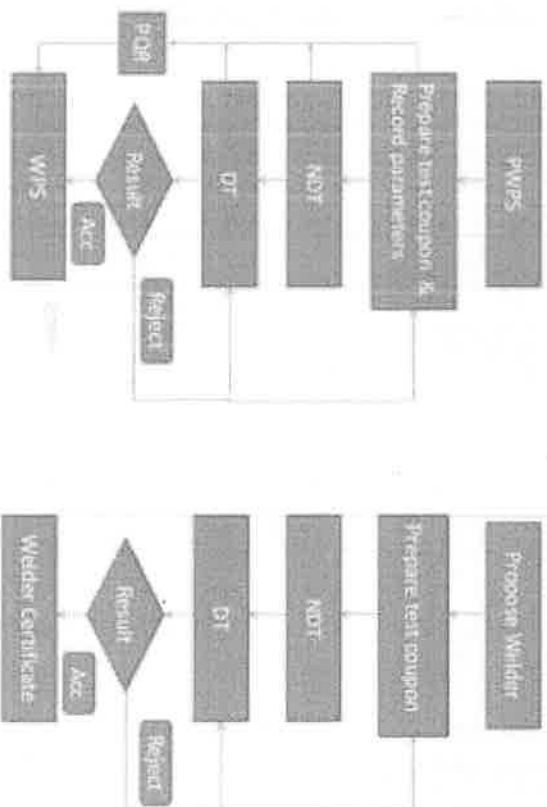


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Welding Procedure & welder qualification test



Department Head - Jaydeep Yora

- 30 years experience. Ex AVP of Godrej.
- Expert in ASME U, U2, U3, S & R stamp qualification.
- Qualified Welding Procedures on Stamicarbon - SAFUREX; Cr-Mo-V Steels; Titanium, Zirconium, Inconel, Monel; DIROS 500
- Successfully welded 2.25Cr-1Mo item weighing 950MT
- Automatic nozzle welding using SAW
- Automatic GMAW for welding Dish ends
- Tandem Submerged Arc Welding (SAW) using up to three wires simultaneously to reduce the cycle time
- Implemented High speed Electro Slag Strip Cladding



PIPELINE LRUT, TOFD & PAUT EXPERIENCE INTERNATIONAL

Client	Service	Description of case
MARAFIQ (Yanbu)	LRUT	LRUT inspection performed for Pipelines.
FMQ	ToFD	ToFD Inspection of Pipelines in Karan Project for Mc Dermott - Saudi Aramco
TEKFEN	ToFD	ToFD Inspection of pipelines connecting water injection facility in Khurais. TEKFEEN – Saudi Aramco
ENCOCORP	ToFD	Pipelines inspection in Jeddah International Airport.
GPIC-Bahrain	PAUT	Pipeline inspection performed using PAUT to identify HTHA.
HNGL	PAUT	Inspection of various pipelines in Hawiyah Gas Plant.
SAUDIKAYAN	PAUT	Inspection of various pipe lines using PAUT during major Shutdown .
SAFCO-IBB and SAFCO 3	LRUT	Inspection of pipelines during Plant Shutdown using LRUT
NESMA & PARTNERS-Trading	Corrosion Mapping	Inspection of Sanitary lift section discharge line at Jeddah KAUSAT Project
ARAMCO-RASTANURA	Corrosion Mapping	Various Pipelines Inspection in gas plant using Corrosion Mapping.
ARAMCO-Berri Gas Plant	Corrosion Mapping	Inspection of Different pipe lines using Corrosion Mapping.
Hawiyah NGL	High Temperature ToFD/PAUT/CM	Online Inspection of Pipelines & equipments.
Satorp	High Temperature ToFD/PAUT/CM	Used various techniques in SATORP during major TA
SABIC-Sharq	High Temperature ToFD/PAUT/CM	Performed High temperature PAUT for online pipe scanning.

TR
ENGINEERING

A black and white photograph of a kitchen. On the left is a refrigerator with a microwave mounted on top. To the right of the refrigerator is a small table with a chair tucked under it. The kitchen appears to be part of a larger living space.



Midnight Neuroscience Board for
Testing and Calibration Laboratories

TCK ENGINEERING SERVICES PVT. LTD.

1441 **Keywords:** *displacement and acculturation; acculturation with the dominant*

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“General Requirements for the Competence of Testing & Calibration Laboratories”

for the treatment of

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Abstract

In the Field at

TESTING

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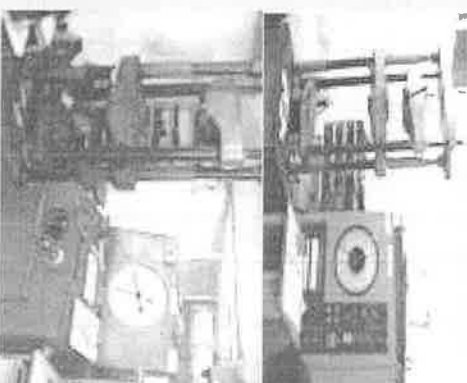
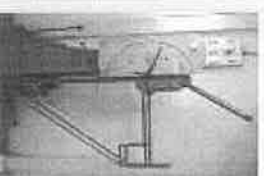
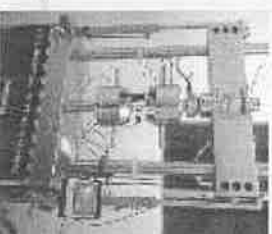
It has been found, for example, that the degree of Neocorticalization is greater in the same area subject to predation of small-bodied prey compared to the same area of the island in the presence of *N. Vulp.*

2.2.2. **Preparation of the monomers.** The monomers were prepared by the following procedures:

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Neurobiology of Disease





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Mechanical and Chemical Testing

*TCR has been awarded work
to undertake destructive
testing with permission from
GAIL under witness of Mecon
on the Mumbai-Nagpur
pipeline*



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Tower 'A', Aloraggaikam Campus
Maurit Promenade, Road, Post Box No. 979
Chennai - 600 026, Tamil Nadu, INDIA
Tel: +91 44 2252 5035 / 5036
Fax: +91 44 2249 2317
www.lathydrocarbon.com

Ref. No. : LTHE-CS/MNPL/LOA-002 /Amend-01
Date : October 25th, 2021

M/s. TCR Engineering Services Pvt. Ltd.
35, Pragati Industrial Estate
N.M. Joshi Marg, Mumbai,
Maharashtra - 400 011, India

Kind Attn: Mr. Rohit Bafna
Email: rohit@tcreng.com
Contact No.: +91- 9833530400

Subject: Amendment of SOR Pertaining to Letter of Acceptance for Destructive & Chemical Testing
work - Mumbai Nagpur Pipeline, Maharashtra.

Dear Sir,

With reference to existing order no. LTHE-CS/MNPL/LOA-002 dated 27-Sep-2021, subsequent discussions that we had with you, we are issuing this amendment to the referred LOA on SOR Clause. Kindly refer revised SOR attached as ANNEXURE-I Rev 01.

You are advised to contact Mr. Amresh Kumar Jaiswal (QA/QC), Mumbai Nagpur Pipeline for further details. Address for correspondence & mobilization shall be communicated during course of works.

Excluding the above-mentioned clause, all other terms and conditions of this existing LOA shall remain the same.

Please send us the signed and stamped copy of this LOA-Amendment as a token of your acceptance for our record at the earliest.

Thanking you,

Yours faithfully,

For L&T Hydrocarbon Engineering Limited

Accepted & Acknowledged by,

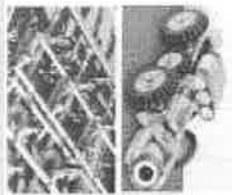
M/s. TCR Engineering Services Pvt. Ltd

Santanu Ghosh
Resident Construction Manager
MNPL Project
Encl.: Annexure I Rev 01

Authorized Signatory & Seal

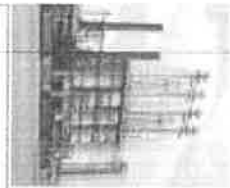
PIPELINE SURVEY & BASELINE THICKNESS

UNDERGROUND Visual Inspection

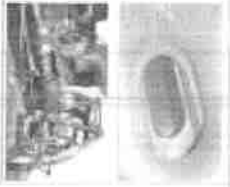
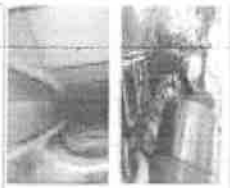


Robotic Crawler based pan tilt zoom camera for inspection of pipelines of 20" + diameter upto 200 meter length to ensure the lines are free from defects and foreign particles.

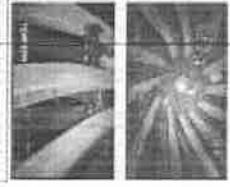
COKE DRUM & Vessels



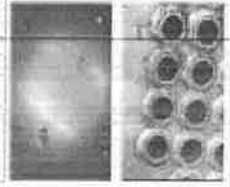
TURBINE INSPECTION



STORAGE TANK

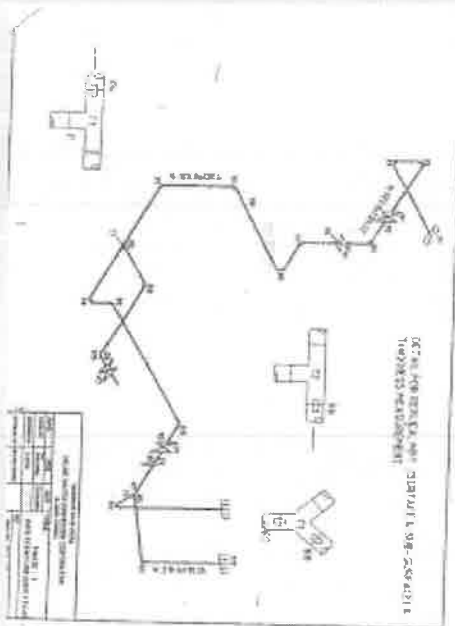


PIPFAN/HEAT EXCHANGER



Baseline Thickness Survey

- Segregate the given lines as per Corrosion Loops
- Create Isometric drawings for all the loops
- Mark the Thickness Measurement Locations (TML) on loops as well as at Site as per isometric drawing
- Identification of inspection requirement including scaffolding, insulation removal and high temperature measurement
- Review of all thickness reports



TCR will create isometric sketches of all test points surveyed

Percent of wall loss determination

The nominal thickness is the thickness of a fitting or piping that corresponds with A.S.A. Pipe Schedule Manufactures Chart. There is a 12.5% mill tolerance (higher or lower) from the chart.

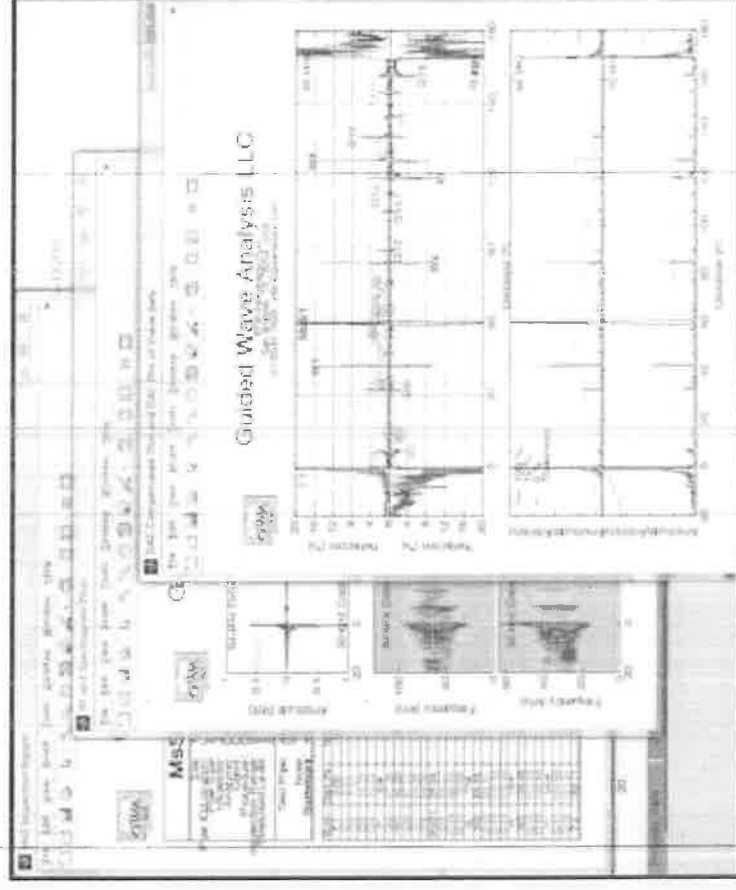
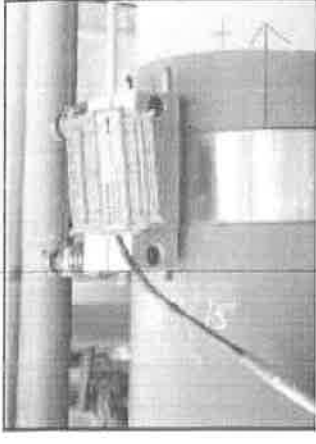
- Any (TML) from 12.5% thru 19% lower is light wall loss.
- Any (TML) from 20% thru 39% lower is moderate wall loss.
- Any thickness readings found to be 40% or greater is severe wall loss and recommended to be replaced and reported



PIPELINE INTEGRITY GUIDED WAVE

Long Range UT (LRUT) for the Cross Country IOCL/GAIL Projects

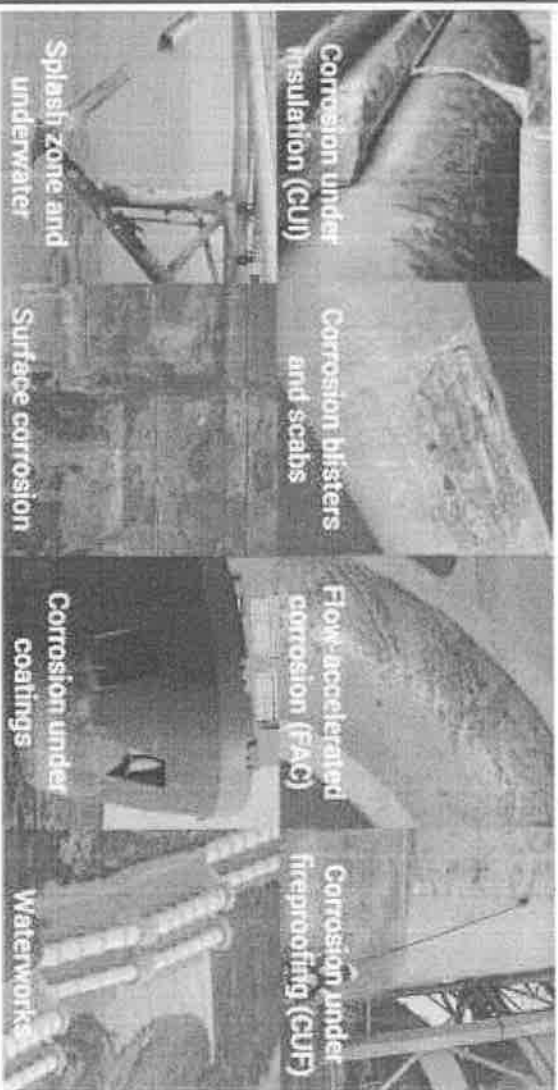
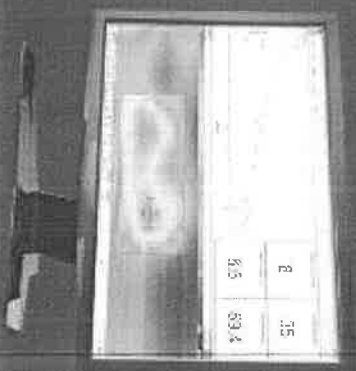
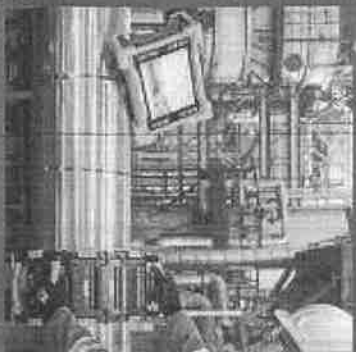
- ☐ Detecting corrossions and cracks in aboveground, buried, and insulated pipe
- ☐ Inspection of any material and diameter pipe including plate, vessel, and tank wall
- ☐ Volumetric inspection along pipe
- ☐ Probes can be attached for long term monitoring
- ☐ MsS dry coupling tool allows for high temperature inspection without removing heat tracer lines : up to 500°C surface temp





PULSED EDDY CURRENT CORROSION UNDER INSULATION (CUI)

TCR's Lyft CUI test equipment can scan through metal thicknesses up to 100 mm (4 in) with insulation as thick as 300 mm (12 in) in stainless steel / aluminum / galvanized steel weather jacket.



Tank floor probe enables the in-service inspection of storage tank annular rings to slide up to 400 mm (16 in) under tank floor edges, assessing the remaining wall thickness.

Splash zone probe can tackle offshore applications detect damages in metal up to 76 mm (3 in) thick and insulation or marine growth up to 203 mm (8 in) thick.

Underwater probes for deeper offshore applications are used on metal as thick as 100 mm (4 in), as well as insulation and marine growth as thick as 300 mm (12 in).

Reverse Engineering and Design Consultancy Engineering Design and Analysis Services

Leading Software - CATIA, Pro/ENGINEER, UniGraphics, I-DEAS, Inventor, SolidWorks, DELCAM, Ansys, CAESAR, HyperMesh, NX Nastran, Moldflow

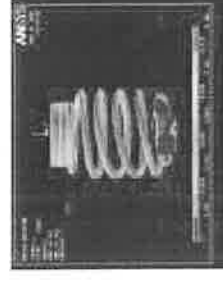
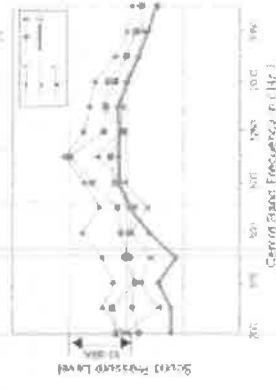
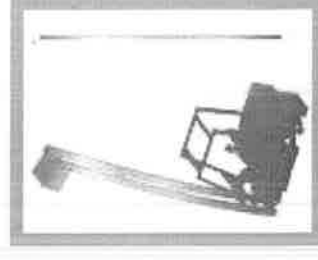


Computer Aided Designing (CAD/CAM) for 2D to 3D Conversions, Solid Modeling, Surfacing as well as Legacy Data Conversion

Computer Aided Engineering (CAE) including Finite Element Analysis (FEA) using Ansys

Structural Analysis including Pipe Support Analysis

Noise, Vibration, Harshness (NVH) analysis



Radiography Options



TCR has an RT Solution for every Budget

Digital RT

Strong experience in Saudi Arabia in the area of Digital RT and the knowledge gained overseas is being taken to India.

Equipment: 3ENDT and Carestream

RT with Film Digitalization

Most cost effective solution with 3 rapid film scanning machines available at TCR Engineering in India. These machines have been used across multiple project sites with success.

Conventional RT

Radiography Services with Gamma Ray, External X-Ray and Crawlers that are currently working Pan-India on a number of project sites.

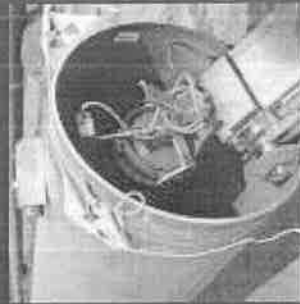
For more information, visit us

www.tcrong.com



PIPELINE & WELD JOINTS RADIOGRAPHY 12" - 36" Dia Pipeline Crawler

Experienced NDT Level III expert along with dedicated team of technicians perform External X-Ray, Gamma Radiography with projectors/crawlers and digitization services including Computed and Digital RT.



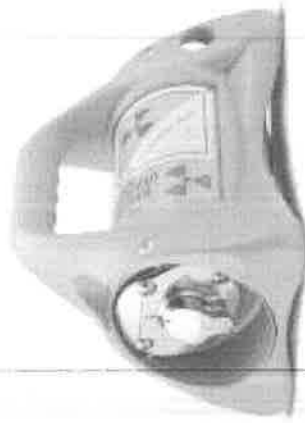
For more information, visit us
www.tcreng.com



X-ray pipeline crawlers with high radiographic quality, high imaging sensitivity and low failure rate

Portable headless, motorized and gas-filled X-ray NDT equipment

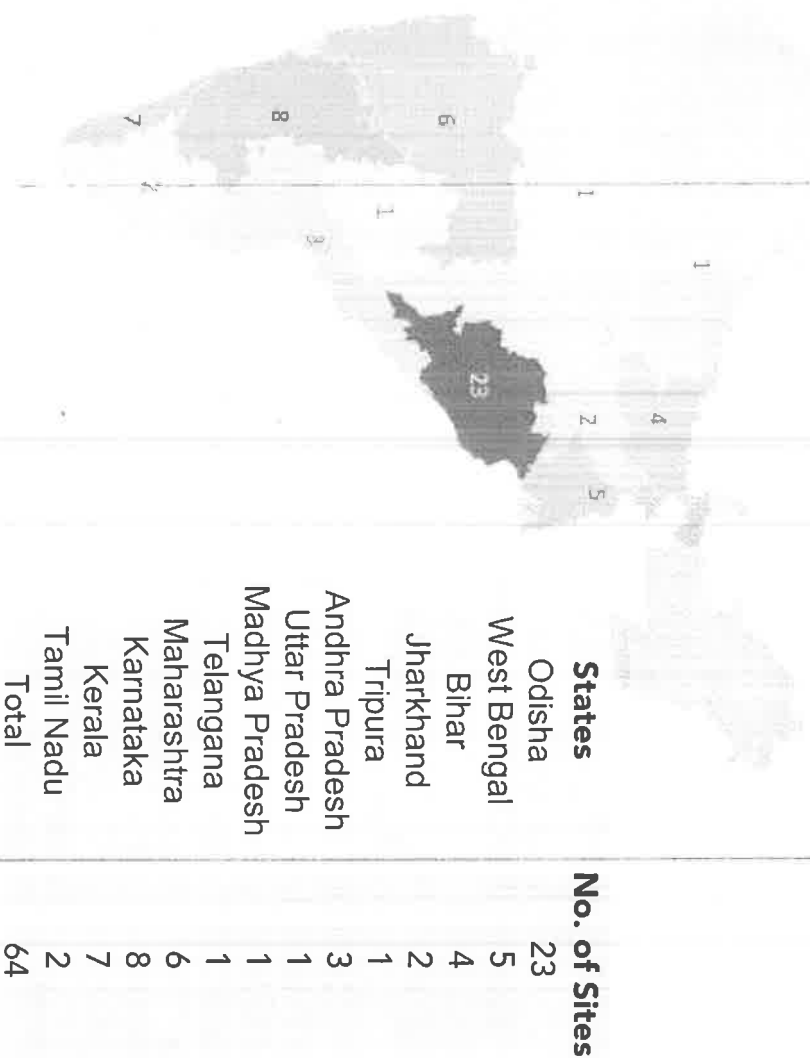
Class IIIE Dieudonne



SENTINEL 880 Delta
Gamma Projector



PAN INDIA PRESENCE



Noteworthy Project undertaken:

1. 36" Dia Dhamra to Angul (DAPL) pipeline for GAIL
2. 2 Spreads of Kandla-Gorakhpur LPG pipeline of IOCL
3. 4 spreads of Srikakulam (Andhra Pradesh) - Angul (Odisha) Pipeline of GAIL
4. Koyali-Ahmednagar-Solapur Pipeline
5. Paradip-Somnathpur-Haldia Pipeline pipeline line (PHPL)



Safe and Secure

TCR provides complete assurance that all legal requirements and legislative notifications are adhered to, including the transportation of isotopes, protective enclosure barriers and warning systems

 भारत सरकार प्रमाणित उच्च शिक्षण परिषद	GOVERNMENT OF INDIA ATOMIC ENERGY REGULATORY BOARD
	Issue Date: 17/01/2020 Expiry Date: 17/01/2023
Case File Number: 2019/2536/INSP Document Number: 20-3RLEOP-46736	Licence for Possession and Operation of Radiography Exposure Unit for Industrial Radiography
This has reference to the submission no. 20-555962 dated 06.01.2020. In exercise of powers conferred under Section 7 and 13 of the Atomic Energy Act, 1962 as applicable, read in conjunction with rule 13 of the Atomic Energy (Radiation Protection) Rules, 2012, the Atomic Energy Regulatory Board (AERB) hereby issues the Licence in favour of M/s. NIELAM BAPNA ENGINEERING SERVICES PVT. LTD., New Mumbai to possess and operate the Industrial Radiography Exposure Unit (IRED) containing radiography source / radiation distribution equipment for industrial radiography purposes in accordance with the AERB (IRED) REGULATORY SERVICES PVT. LTD., New Mumbai and M/s. NIELAM BAPNA is hereby authorised to the Employer and Licensee respectively for the purpose of assigning the responsibilities specified in the Atomic Energy (Radiation Protection) Rules, 2012, to ensure radiation protection of workers, public and environment because of possession and operation of IRED as per the AERB (IRED) REGULATORY SERVICES PVT. LTD., New Mumbai. The Licence shall obtain its validity from AERB prior to the routine operation of such IRED after its registration. The Employer/ Licensee shall be responsible for: • Ensuring compliance with the relevant provisions of the Atomic Energy Act, 1962. • Atomic Energy (Radiation Protection) Rules, 2012. • Atomic Energy (Safe Transport of Radioactive Material) Rules, 1987. • AERB Safety Code on Industrial Radiography, AERB SC-18-1, 2001, Safety Code on Transport of Radioactive Material AERB SC-19-1, 2001. • Code of Security of Radioactive Sources in Radiation Facilities and AERB (IRED) REGULATORY SERVICES PVT. LTD. • Radiography Manual (RAM) being issued for AERB (IRED) REGULATORY SERVICES PVT. LTD. • Other applicable regulatory documents issued by AERB. In exercising compliance with the terms and conditions stated above and stated in Annex-1 this Licence may be suspended, modified or withdrawn at present or in the event of contravention in the provisions of the Atomic Energy Act / Rules / Codes or manuals and standards. A copy of this Licence should be available and displayed in office/ radiography site where the IRED is being being operated / stored.	
MRS. NIELAM BAPNA FOR ENGINEERING SERVICES PVT LTD	G. Nageswara Rao Chairman



APPROVED BY IOCL FOR CROSS COUNTRY AND CGD WORKS

Approval upto 30" Dia

*TCR is working on KGPL, Koyali -
Ahmednagar - Solapur Pipeline,
Ennore-Thiruvallur-Bengaluru-
Puducherry-Nagapattinam-
Madurai-Tuticorin R-LNG
Pipeline, Paradip-Somnathpur-
Haldia Pipeline, Paradip-Haldia-
Barauni Pipeline*

For more information, visit us

www.tcreng.com



IOCL Engineering Services Pvt. Ltd.

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GAIL APPROVAL - CROSS COUNTRY & CGD



MECON LIMITED
A COMPANY OF NEW ZEALAND

[illegible]

1530-4009

Klaus Fuchs, 1911-1988

30" Dia DAPL Pipeline

CGD Pipeline



गेवर्कीन लिमिटेड (गारित सड़काए का सस्थान)

MECON LIMITED, A COMPANY OF INDIA INCORPORATED

[illegible]

Ref. 01.0317230QJ 6844

29

M/s. MAS construction
 Shree Nitinayanda C.H.S. Rd 1/2
 Plot no.5, Sec-3, New Panvel(E)
 Kavi Mumbai-410308
 Ph: 022 2748647/5269197
 Email: masbombsay@gmail.com

Clined A100 - Mr. Sunny Mathew

Sub: Underground Steel Pipe Laying in areas - FOA no. GGL/BL/UCGGD/C&P/STEEL PIPE LAYING/ 15524 dtd. 01/12/15 under part B & 60 % under part A - Approval of ICR engineering

Ref: 1 M6. MAS constructions letter ref.no. MAS/CR/PROG/UBEL/04/03/10 dtd 23.01.16
2 M4. MAS constructions mail dtd 28.01.16

This has reference to Mrs. MMS construction letter ref. no. MMS/357-ENG-180102453 to dated 23.01.16 and subsequent mail under ref 2 above seeking approval for the appointment of NPT agency, Mrs. TCR engineering services pvt. ltd. for carrying out radiography services for the above pending works of the subject project. The presence of Mrs. TCR engineering services furnished by Mrs. MMS have been reviewed and found to be in order. In view of the above, Mrs. TCR engineering services pvt. Ltd. is approved for carrying out radiography services for the subject project.

MECON Bangalore



Pipelines Division

李作昌(1913-1992) 湖南邵阳人。1935年毕业于湖南大学。1936年毕业于中央大学。1937年毕业于中央研究院。1938年毕业于中央研究院。1939年毕业于中央研究院。1940年毕业于中央研究院。1941年毕业于中央研究院。1942年毕业于中央研究院。1943年毕业于中央研究院。1944年毕业于中央研究院。1945年毕业于中央研究院。1946年毕业于中央研究院。1947年毕业于中央研究院。1948年毕业于中央研究院。1949年毕业于中央研究院。1950年毕业于中央研究院。1951年毕业于中央研究院。1952年毕业于中央研究院。1953年毕业于中央研究院。1954年毕业于中央研究院。1955年毕业于中央研究院。1956年毕业于中央研究院。1957年毕业于中央研究院。1958年毕业于中央研究院。1959年毕业于中央研究院。1960年毕业于中央研究院。1961年毕业于中央研究院。1962年毕业于中央研究院。1963年毕业于中央研究院。1964年毕业于中央研究院。1965年毕业于中央研究院。1966年毕业于中央研究院。1967年毕业于中央研究院。1968年毕业于中央研究院。1969年毕业于中央研究院。1970年毕业于中央研究院。1971年毕业于中央研究院。1972年毕业于中央研究院。1973年毕业于中央研究院。1974年毕业于中央研究院。1975年毕业于中央研究院。1976年毕业于中央研究院。1977年毕业于中央研究院。1978年毕业于中央研究院。1979年毕业于中央研究院。1980年毕业于中央研究院。1981年毕业于中央研究院。1982年毕业于中央研究院。1983年毕业于中央研究院。1984年毕业于中央研究院。1985年毕业于中央研究院。1986年毕业于中央研究院。1987年毕业于中央研究院。1988年毕业于中央研究院。1989年毕业于中央研究院。1990年毕业于中央研究院。1991年毕业于中央研究院。1992年毕业于中央研究院。

Max Farnsworth, President of the
 1st District, March 1900
 Max Farnsworth, Secretary, Boston
 1st District, March 1900

[illegible]

EVALUATION

[illegible]

Based on the comments, the materials submitted, approval may then be given by the Board of Directors, or it is merely accepted with following conditions:

1. Approximately 1 of any position will not require M/A/Mos Engineer Engineering license from the religious within the corporate.

Friedberg, 2002]

CONCLUSIONS

30" Dia PDBPL Pipeline

125. J. E. H. van der Sluis

[illegible]

ALBUQUERQUE JETTED CARS THROUGH THE CITY
DURING NOV. 4, 1968

Department of Applied Mathematics, The University of Hong Kong, Pokfulam, Hong Kong

Ref. 100. No. 285, dated 29.10.1912 submitted to M.V. Al. for registration. Sent to the Fed. for the work of having to Cit. 286 for approval of work carried out, passed from SIGNING authority. Forwarded to Moscow (Director Administrative-Military) by 29.10.1912. Received (Director Military, Administrative).

2000-2001

This is with reference to subject experimental and some better dated 17-21-JUL, as being the approval to AFM. I am forgetting between the 11th and 12th whether the 12th is correct?

Moreover, this program does not deterrence. No. At least not perhaps. Because if a car thief is responsible for a contractor for the job and is not if any damage identified as negligent contractor, then it will prevail.

7731

UNIVERSITY OF ALABAMA

18" Dia ASPL Pipeline

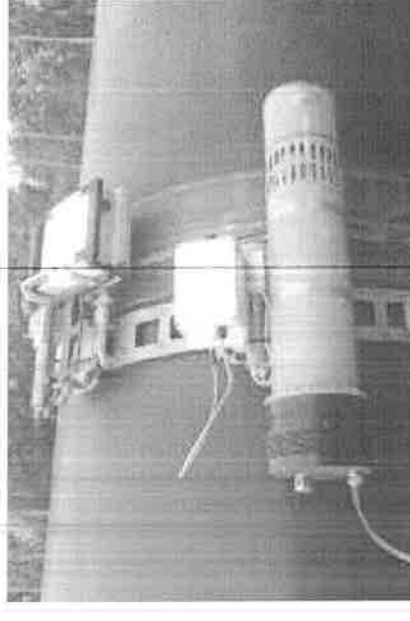
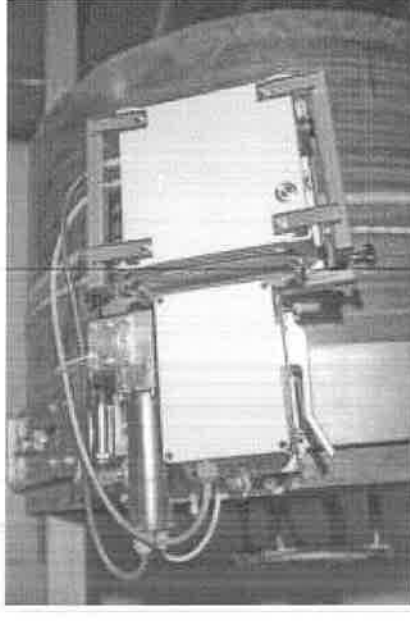
[illegible]

TCR's Computed Radiography (CR) provides a reliable alternative to conventional film by employing flexible, reusable phosphor plates (screens) to capture images.

The exposed phosphor plates are digitally scanned, creating a saved digital image for interpretation.

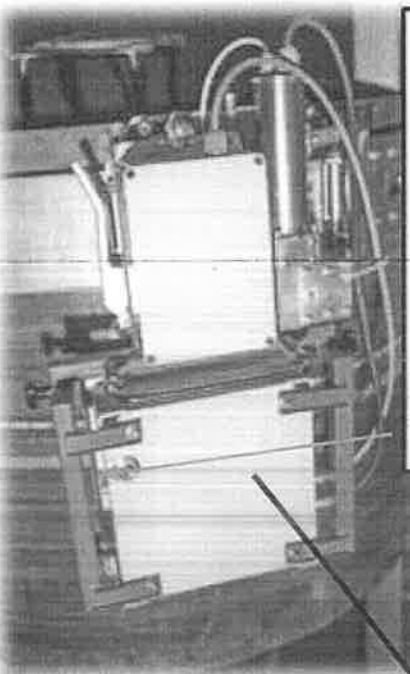
Images can be enhanced and filtered to improve visual representation and highlight areas of concern including:

- Weld inspection
- Confirmation of wall thickness
- Identification of corrosion and erosion
- Detection and measurement of corrosion scabs
- Detection and assessment of blockages in pipes
- Corrosion Under Insulation (CUI)
- Valve operational issues
- Liquid – vapor interface



SYSTEM Composition

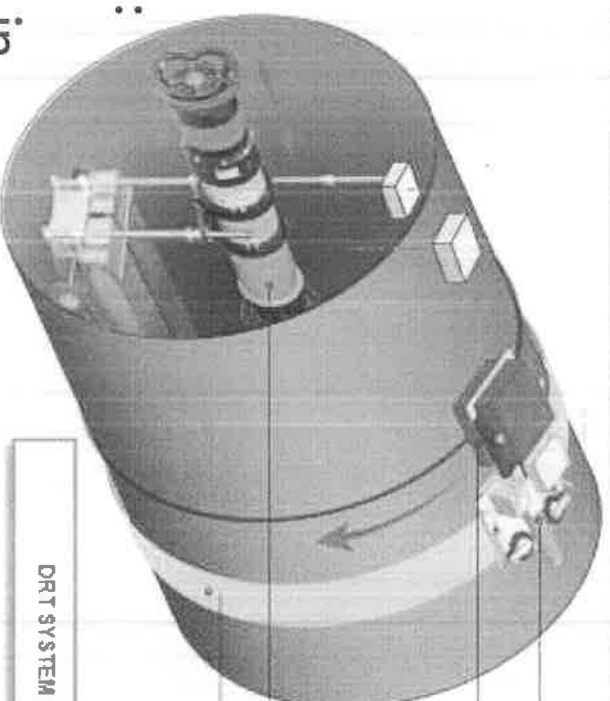
DC motor driven
carrier



Monoblock unit comprising:

- Flat panel X-ray detector, Li-ion batteries
- On-board computer, 120 GB memory and WiFi

- Internal memory of the monoblock unit can store up to 200 welds
- Crew perform 10 to 12 welds/hour
- Flexible Imaging plates of size range:
4.5 in x 10 in, 8 in x 10 in, 10 in x 12 in,
4.5 in x 17 in, 7 in x 17 in and 14 in x 17 in



Electric motor

Monoblock unit comprising:

- Detector
- Batteries
- Control computer
- WiFi module

Crawler with x-ray unit

Guiding pipe band

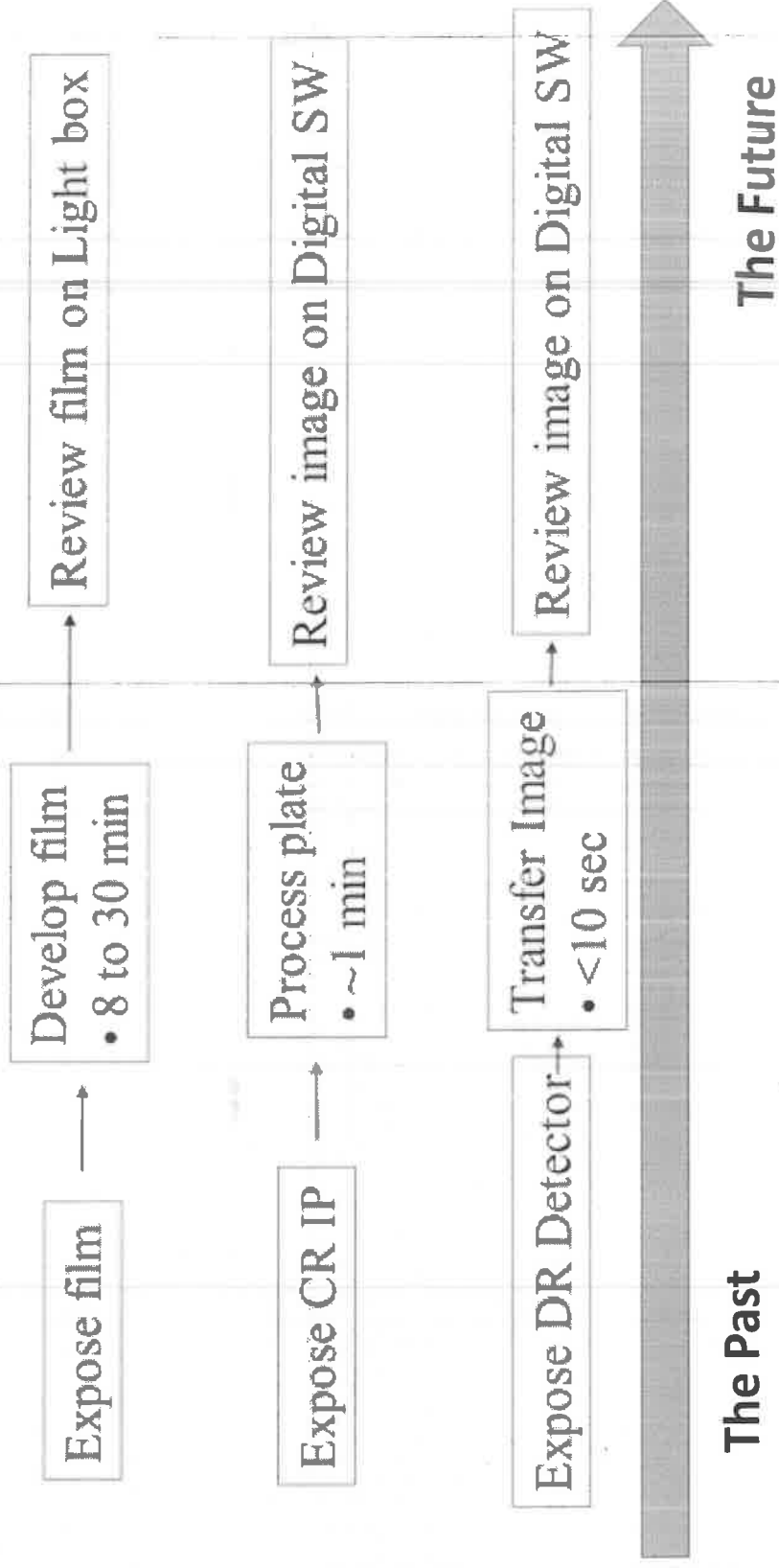
Laptop with real-time radiographic image acquisition and processing

DRT SYSTEM FOR PIPELINE GIRTH WELDS

FLOW OF FILM

CONVENTIONAL VS DIGITAL DETECTOR ARRAY (COMPUTED RT)

Flow of film, CR and DDA



- Detector static during image capture eliminates image distortion due to vibration
- IQI present in every image
- Advanced software feature to stitch images generating seamless weld image

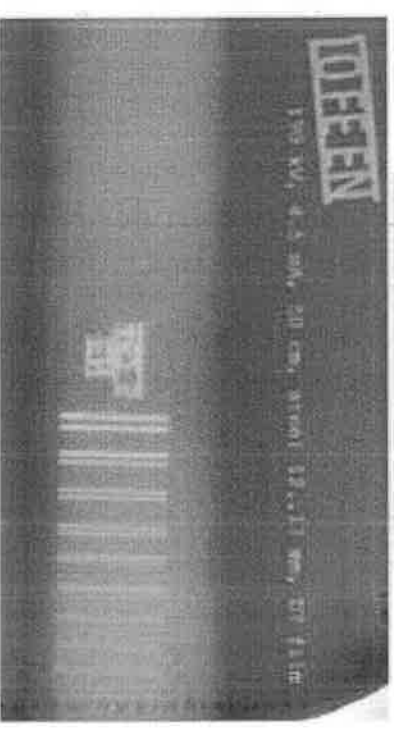
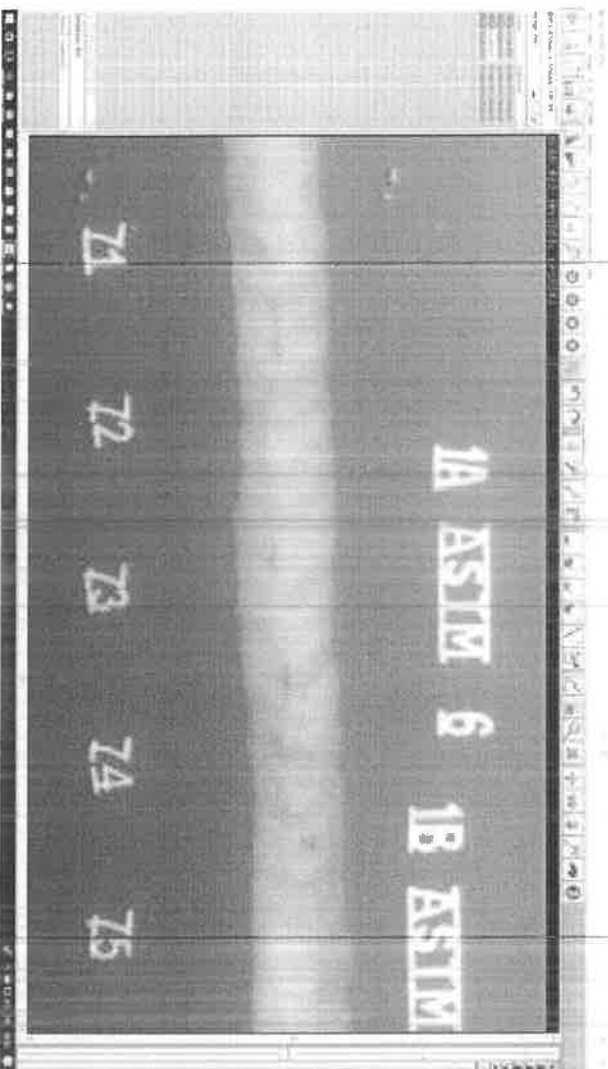


Image from a Type 2 film



Image from DRT system

- TCR has experience working with Carestream INDUSTREX software
 - Currently doing trail study using the Carestream solution provided by KPTL for the JSW Project from Nuagaon to ISP Paradip Slurry pipeline project spread 2 (Project to start March end – Equipment given by KPTL):
 - 32" Dia with 19/23/24/26/29 mm thickness over 200 kms pipeline
- TCR Arabia, the sister concern of TCR Engineering based in Saudi has been undertaking Digital RT works for Sabic, Farabi and Tasnee using 3ENDT Equipment.



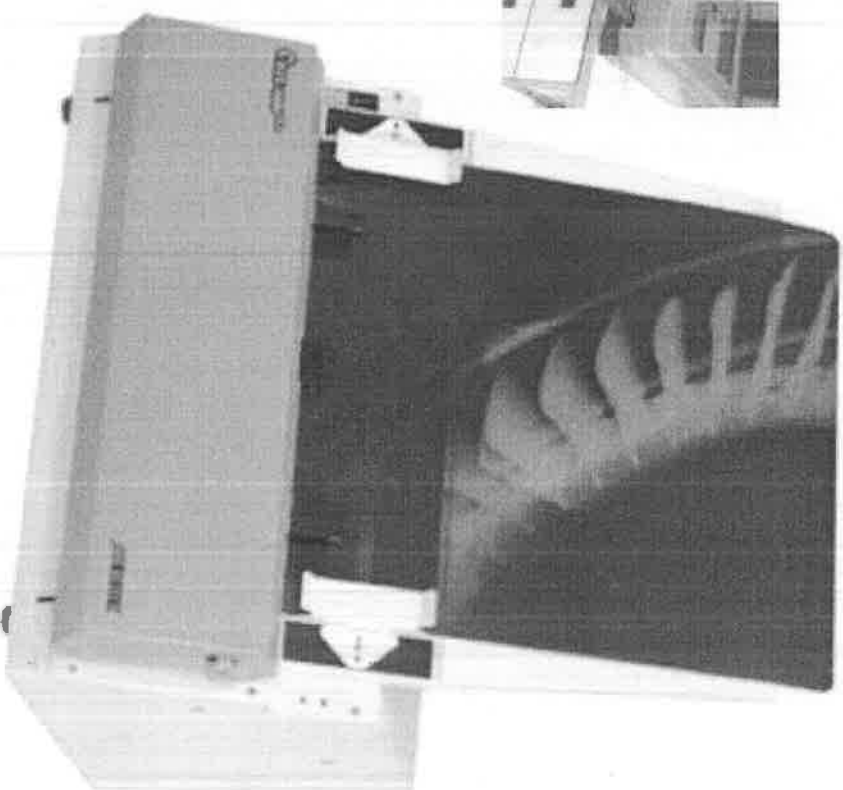
RT FILM SCANNING DIGITALIZATION Cloud based Delivery

Bengaluru based central operations team with IT and Google Certified experts remotely co-ordinate with Pan India sites aligned with the stringent film density and resolution understanding



Key Benefits of NDT Film Digitizing

- ❖ Eliminates aging of films, retaining image quality
- ❖ Storage to custom Zoho Portal or Google Cloud
- ❖ Inspection reports, UT, MPI can also be archived
- ❖ Eliminates storage costs of film
- ❖ Artificial Intelligence based retrieval and compare of scans





GIRTH WELD JOINTS
IOCLPQR
APPROVAL -
INTERNAL XR

Cross Country from Durgapur to Murzafarpur

Acceptance Criteria based on API 1104 and IOCL specifications

[illegible]



30" Dia HBPL Pipeline from Haldia to Baruni

Approved PQR and RT procedure to ensure stringent examination of the welds for internal discontinuities such as Lack of penetration, Lack of fusion, gas porosities, oxides, other inclusions and cracks.

[illegible]



MAJOR NDT WORKS – CROSS COUNTRY (1/7)

Sr. No	Name of Client	Brief details of Work	Project	Actual completion time (Months)
1	Power Mech Projects Ltd	Supply of NDT technicians (RT, UT) & In-situ metallography		03 months
2	Emerson	Radiography testing (X-RAY & Gamma Ray) of butt weld joints ranging from 1" Ø to 3"Ø for pressure Hook-up & other Rosemount projects of IOCL. Total number of joints – Approximately-2250 Nos.	IOCL	06 Months
3	MAS Construction	Radiography testing (X-RAY & Gamma Ray) of butt weld joints ranging from 1"Ø to 18"Ø for our TRPL Pipeline laying and terminal works at GAIL (India) Limited Mumbai	GAIL	09 Months
4	Triofab	Radiography testing (X-RAY & Gamma Ray) of butt weld joints ranging from 1"Ø to 36"Ø.		03 Months
5	Euroslot KDSS	Radiography testing (X-RAY & Gamma Ray) of butt weld joints ranging from 1"Ø to 24 "Ø.	RIL	06 Months
6	MAS Construction	X-ray & gamma ray of 8" NB steel P/L network & associated works in Rajpura Region, Punjab	GAIL	14 Months
7	MAS Construction	Radiography works on 8", 6" and 4" NB U/G Steel P/L Network and associated works in Bangalore	GAIL	Ongoing
8	MAS Construction	X ray & Gamma ray of 8" & 4" NB steel P/L network & associated works at Ernakulam, Kerala for Adani	GAIL	06 Months
9	MAS Construction	X-ray of 8" & 6" NB steel P/L network & associated works at Patna, Bihar	GAIL	Ongoing
10	Rambaran Singh Apex	Internal & External X-ray of 12" NB steel P/L works at Patna, Bihar for KPTL Project	IOCL	Completed
11	Corrtech Energy Ltd	X-ray, UT, MT & PT of 30" NB steel P/L and station piping of cross country Pipeline at Jaigarh Dabhol Pipeline Project, H-energy Tie-In connection of JDPL with DUPL, Dabhol.	H-Energy	Completed
12	ABC Trans Carrier Pvt. Ltd.	Internal & External X-ray, UT, MT & PT of 30" NB steel P/L and station piping works at Haldia Baruni, West Bengal for Cross Country Pipeline from Gobindpur RCP to West Bengal Jharkhand border under the PHBPL Pipeline Project	IOCL	Ongoing
13	ABC Trans Carrier Pvt. Ltd.	Radiography of the 18" OD 344km Cross Country Product Pipeline from Praradip pump station via Somnathpur terminal under Praradip Somnathpur Haldia (PSHPL), Group B, Kansana Bans River Crossing to Odisha/WB Border	IOCL	Ongoing
14	EnProCon TJTC Enterprises	Internal & External X-ray, UT, MT & PT of 16" NB piping works at Kolar (Karnataka) and Andhra Pradesh of the Cross Country R-LNG pipeline from IP-101 (Paliyagram) to IP 105 (Ramanthapuram) & Spurlines, Thiruvallur to Bengaluru Mainline & Spurlines and IP-102 to Puducherry Branchline and Associated Sectionalising Valve (SV) Stations, Receiving Terminals (RT) & Station Works under ETBPNMTPL Project, Group-F : IP 201 to Bengaluru	IOCL	Ongoing

Sr. No	Name of Client	Brief details of Work	Project	Actual completion time (Months)
14	Pan Solution Pvt. Ltd. (under Al-Mu'Aser Petroleum Services)	Internal & External X-ray, UT, MT & PT of 18" NB steel P/L and station piping works at Ahmednagar of the 236 Km (approx.) cross country product pipeline from existing Marketing Terminal at Akolner to Pakni Terminal Station (Solapur) under Ahmednagar-Solapur Pipeline project (ASPL) project	IOCL	Ongoing
15	Kalpataru Power Transmission	Radiography of the 18" OD Cross-Country Pipeline at the Haldia Mahishrekha Pipeline Project (HMPL)	IOCL	Ongoing
16	Kalpataru Power Transmission	Cross Country 18" OD RT works of the Praradip Somnathpur Haldia (PSHPL) project	IOCL	Ongoing
17	Kalpataru Power Transmission	Radiography works on 30" OD Cross Country pipelines with sub contractor SNS Trenchless in the DAPL Project	GAIL	Ongoing
18	Likhitha Infrastructure	CGD Pipeline of the 3LPE Carbon Steel pipeline in Vizag GA under Mecon	GAIL	Completed
19	Likhitha Infrastructure	Cross Country Radiography of the product pipeline from Paradip pump station to IOCL PHBPL pump station via Somnathpur terminal under PSHPL Project, Group-A	IOCL	Ongoing
20	Rambaran Singh Apex	External Radiography at the CGD Pipeline of the 3 LPE coated carbon steel pipeline in Aurangabad geographical area part-3 (group A3), Aurangabad, Bihar. HDPL-IOCL BG Section SP-4, Bihar (Barauni-Gidha)	IOCL	Ongoing
21	Rambaran Singh Apex	Radiography works at the 10" dia Underground Pipeline City Gas Distribution in Koderma, Jharkhand	IOCL	Ongoing
22	Rambaran Singh Apex	Radiography works for 8" dia pipeline at the CGD Madhepura and CGD Purnia	Think Gas	Ongoing
23	MG Infra Projects	Radiography works for 12" OD, 1800 meters Gas Pipeline Project in Kathjodi, Cuttack	GAIL	Completed
24	Power Mech	Internal & External X-ray for cross country pipeline of 18" line for Koyali, Ahmednagar to Solapur project (320 kms), Client undertaking CH 180 to CH 269 (Approx. 90 kms).	IOCL	Ongoing
25	Pravakar Engineers (sub-vendor of NR Patel Projects)	NDT works including RT and UT for the project HDD and associated works for the Bhubaneswar and Cuttack Spur pipeline of the Jagishpur-Haldia-Bokaro-Dhamra Pipeline Project (PH-II)	GAIL	Completed
26	Cortech Energy Ltd	Radiography works at BAPL Spurline Project, Jharsiguda Odisha	IOCL	Ongoing
27	IBF Engineering Services (sub-vendor of Cortech)	Digitalization of RT images at the 12" pipeline project of OMLP in Managalore	GAIL	Completed
28	Advance Infrastructure	Radiography works of 18" dia pipeline of Section-I and Section-II of the Praadip Spurline of JHBDPL PH-II	GAIL	Ongoing
29	MAS Construction	Radiography works for 8" and 6" NB 3LPE Carbon Steel Pipeline for the CGD in Rewa GA Part 1 (Group R1)	IOCL	Completed



MAJOR NDT WORKS – CROSS COUNTRY (3/7)

Sr. No	Name of Client	Brief details of Work	Project	Actual completion time (Months)
30	MAS Construction	Radiography of 4", 6", 8", 10" & 12" NB U/G Steel P/L Network & Associated works, For Ahmed Nagar	GAIL	Ongoing
31	MAS Construction	Radiography works on 4", 6", 8", 10" & 12" NB U/G Steel P/L Network & Associated works for Sangli	GAIL	Ongoing
32	Atulya Construction	NDT including RT for the 30" dia HBPL Pipeline Project	IOCL	Completed
33	MAS Construction	Radiography works on 8" & 12" of carbon steel pipeline in Kolhapur GA for HOGPL	GAIL	Ongoing
34	MAS Construction	Radiography works for dia 4" 6", 8" Laying of Steel Pipeline Project Kasargod, Kannur for IOAGPL Project, Kerala	IOCL	Ongoing
35	MAS Construction	Radiography works for dia 6", 8" & 12" Laying of Steel Pipeline Project Palakkad For IOAGPL Project, Kerala	IOCL	Ongoing
36	Sopan O&M Company	Radiography works at JHBDPL project site	Adani Gas	Ongoing
37	Potaliya Enterprises	Radiography Of 8" Dia X 22 Km Laying and Terminal Works for various Spurlines in Bokaro Angul Pipeline Project of JHBDPL Phaseli Project under Mecon	GAIL	Ongoing
38	Pragati Construction	Laying of 18" OD Cross Country Pipeline from Akholner to Solapur under the ASPL IOCL Pipetline Project as per tender no. PLCCITT I	GAIL	Ongoing
39	Corrtch Energy Ltd	Radiography works at the BAPL Spurline BAPL-SPUR-SP-III project in Jharsuguda Odisha	IOCL	Ongoing
40	Techno Global Services	NDT RT Work - for 36" OD, Pipeline DAPL project at Jaipur Odisha	GAIL	Ongoing
41	Managalam Associates	NDT Services for HDD in Jagdishpur-Haldia-Bokaro-Dhamra pipeline project B across Mahanadi River	GAIL	Ongoing
42	Kuku Organization	NDT Services for 18 inch dia IOCL KASPL Pipeline	IOCL	Completed
43	Kalya Construction	NDT for BGRL Project (Spd-2) Ahmednagar of RT for 24-inch Mainline 3LPE Coated Line as per API 5L Gr. X-60 (9.5mm thick) 24 kms and 16-inch mainline 3LPE Coated line pipes API 5L Gr. X-65 (6.4mm wall thickness) 14 kms	BGRL	Ongoing
44	Essar Construction	NDT service for 26" JSPL Slurry pipeline from Barbil to Dudipani (0 to 100 Km) in Odisha	IOCL	Ongoing
45	APRA infraprojects	RT works for UCSPL Spurline From Sv 04 To Patalganga Lpg Plant & Associated Composite Works At Patalganga Bottling Plant	HPCL	Ongoing

Sr. No	Name of Client	Brief details of Work	Project	Actual completion time (Months)
46	Intech Engineering Services	Radiographic Inspection By X RAYS Of 12" Dia & 4" Dia, Laying & Construction Of CS 3 LPE Coated Underground Pipeline Of CGD Network From Huvinahadagali To Maryamma Ballari & Gadag Ga Project In State Of Karnataka	BGRL	Ongoing
47	Motiprabha Infrotech	NDT works on CGD Pipeline in Purnia, Bihar	IOCL	Ongoing
48	Likhitha Infrastructure	Laying & Construction of 8" & 4" NB U/G CGD Steel Pipeline Network & Associated Works for Malappuram GA of IOAGPL	Indian Oil Adani Gas	Ongoing
49	Likhitha Infrastructure	Laying & Construction of 8" & 4" NB U/G CGD Steel Pipeline Network & Associated Works for Kozhikode GA of IOAGPL	Indian Oil Adani Gas	Ongoing
50	Likhitha Infrastructure Limited	Laying & Construction of 8" & 4" NB U/G Steel Pipeline Network & Associated Works for Malappuram GA of IOAGPL Group B(Gamma Ray)	IOAGPL	Ongoing
51	SJD Services	NDT Services For Gas Pipeline Project of M/s. Indian Oil Corporation Limited At Katihar Purnea Bihar	IOCL	Ongoing
52	Vichitra Construction	NDT service at our Angul CGD GAIL project	GAIL	Ongoing
53	Rambaran Singh Apex	Mainline and Combined station works for conversion of existing 18" Crude Oil Mainline of Haldia-Barauni section of PHBPL to product service.	IOCL	Ongoing
54	Advance Infrastructure	Laying & Construction of Slurry Pipeline from 100-200 Km, Dudipani to Angul plant	IOCL	Ongoing
55	Bridge & Roof Co.(India) Ltd.	Digitalization of RT images at IOCL PSHPL Project Site, Haldia, W.B.	IOCL	Ongoing
56	Pravakar Engineers (sub-vendor of NR Patel Projects)	the project HDD and associated works for the Bhubaneswar and Cuttack Spur pipeline of the Jagishpur-Haldia Bokaro-Dhamra Pipeline Project (PH-II)	GAIL	Ongoing
57	Likhitha Infrastructure Limited	Laying of Carbon Steel Pipeline in Muzaffarnagar, Meerut & Shamli GA for Segment-7 Muzaffarpur-Mothari Pipeline Projects	IOCL	Ongoing
58	Southern Telecom	Radiography (X-ray) works of 8" steel pipe & MDPE-125mm Dia works at CGD Projects AG&P Kanchipuram	IOCL	Ongoing
59	Likhita Infrastructure Limited	Northeast Gas Grid Pipeline Projects, Section 5&9	IGGL	Ongoing
60	Aneri Construction Pvt. Ltd.	U/G Steel Pipeline & associated work for at geographical areas of Jagatsinghpur	IOCL	Ongoing
61	Pravakar Engineers India Pvt. Ltd.	Work Order for carrying out the NDT Services for the line gas pipe line project at adani port dhamara, bhadrak	IOCL	Ongoing



MAJOR NDT WORKS — CROSS COUNTRY (5/7)

Sr. No	Name of Client	Brief details of Work	Project	Actual completion time (Months)
62	Mass Constructions	Work Oder for NDT Services for 18" Diameter Pipeline, Koyali Ahmesnagar Solapur Pipeline-Hill Crossing	IOCL	Ongoing
63	Dwarkamai Sai Prasand Infracon Pvt. Ltd.	Dharma Angul Pipeline Projects 36" Dia	GAIL	Ongoing
64	Aneri Construction Pvt. Ltd.	Project-Laying & Construction of underground steel P/L network & associated works at Kolkata Ga	GAIL	Ongoing
65	Cortech Internanational	PL.0109 Dapl Sec III Pipeline projects	GAIL	Ongoing
66	Tough Team Icon Projects Pvt. Ltd.	NDT RT Works for 18" OD X 23.5 KM pipeline projects-Mprtha to Tadepalli at Tanuku(KGBP-1 Project)	GAIL	Ongoing
67	Tough Team Icon Projects Pvt. Ltd.	NDT RT Work for 18" OD X 23.5 KM Pipeline Project-Kotipalli to K. Cheruvu at Gangavaram (KGBP-2 Project)	Gail	Ongoing
68	Advance Infrastructure Pvt Ltd.	Laying of 24" X 78KM Pipeline Srikakulam Angul (Sec-II) Pipeline Projects of M/s. Gail	Gail	Ongoing
69	Advance Infrastructure Pvt Ltd.	Laying of 12"/10"/6" Dia for Koyali-Dumad Pipeline Project of M/s. IOCL-Digitization of RT Films	IOCL	Ongoing
70	Inderjit Mehta Constructions Pvt. Ltd.	Laying of 8" and 12" Dia for bagalkot Pipeline Projects	AG&P	Ongoing
71	Rambaran Singh Apex	Laying 18" , 16" ,12" and 8" Cross Country Lpg Pipeline from MP/UP border to IOCL Gorakhpur under kandla gorakhpur LPG Pipeline projects	IOCL	Ongoing
72	Adorn Infra Energy Pvt. Ltd.	Work Oder For NDT Services by X-ray External Unit at Jagatsinghpur-Kendrapara GA Part-c	BGRL	Ongoing
73	Likhitha Infrastructure Limited	Laying & Construction of 8" & 4" NB U/G Steel Pipeline Network & Associated Works for Trivandrum	IOAGPL	Ongoing
74	Corrtech Energy Ltd	Radiography Work at BGRL CGD Project Jajpur-Kendujhar,Odisha	BGRL	Ongoing

Sr. N o.	Name of Client	Brief details of Work	Project	Actual completion time (Months)
75	Mansi Ganga Builders & Engineering Pvt. Ltd	18" Dia Pipeline Across Major River crossing of PSHPL Projects	GAIL	Ongoing
76	Coritech International Limited- Pipeline Division	PL.0089 MBPL P-II Section VI Project, Mehсан #Bathinda Pipeline Projects # Phase II, Section VI (MBPL Project)-RT Film Digitization	GIGL	Ongoing
77	Techno Soil Infraventure Pvt. Ltd.	NDT Services at 26" Slurry Pipe Line Project at Kyonjhar, Odisha	IOCL	Upcoming
78	Diyam Associates Pvt Ltd	Ndt Service at Angul CGD GAIL project	Gail	Ongoing
79	Kalpataru Power Transmission Limited (KPTL)	NDT Work (Radiography system (CRS) for digital RT) of PJPL Project.	JSW	Ongoing
80	Shaurya Greentech Private Limited	X-ray Radiography Work At Kolkata GA	GAIL	Upcoming
81	Essar Construction India Limited	NDT Service for 26" JSPL Slurry Pipeline Barbil To Dudipani Sections(0-50Km) In Odisha	IOCL	Ongoing
82	Krita Engineering (P) Limited.	Gamma Radiography Work at Gail Malappuram Site	GAIL	Ongoing
83	Tough Team Icon Projects Pvt. Ltd.	Execution and lying of 18" OD of CS 3LPE coated Pipeline for SAPL In Buguda & Ganjam In the state of Odisha	GAIL	Upcoming
84	Inderjit Mehta Constructions Pvt. Ltd.	Laying of 8" and 12" Dia for Hadgadi Haveri Pipeline Projects	AG&P	Closed
85	Inderjit Mehta Constructions Pvt. Ltd.	Laying of 8" and 12" Dia for Hassan Pipeline Projects	AG&P	Ongoing
86	Inderjit Mehta Constructions Pvt. Ltd.	Laying of 8" and 12" Dia for Koppal Pipeline Projects	AG&P	Closed
87	Control Plus Oil & Gas Solutions Pvt. Ltd,	Radiography work at SMD-Pipeline Project, Gujarat	RIL	Ongoing
88	Coritech International Limited- Pipeline Division	PL.0109 Dharma Angul Pipeline(DAPL.03) RT Film Digitization Works	GAIL	Ongoing
89	Ankan Enterprises	NDT Job for Mecon/BGCL Gas Pipeline Projects	BGCL	Ongoing
90	R. S. Construction	Cross Country LPG Pipeline from IOCL Sanad To Mp/Up Border Under Kandla Gorakhpur Lpg Pipeline Projects Group-10 SV27 (CH. 329-343 Km Ex-Dumad) To IOCL Ujain (56 Km Ex-Sv27)	IOCL	Ongoing



MAJOR NDT WORKS – CROSS COUNTRY (7/7)

Sr. No	Name of Client	Brief details of Work	Project	Actual completion time (Months)
91	Megha Engineering & Infrastructures Ltd.	Work order for carrying Non-Destructive test (Radiographic Testing Using X-ray), Interpretation and related works for our CGD Project-Khammam	IOCL	Ongoing
92	IBF Engineering Services (sub-vendor of Corrtch)	Ndt Work of 12" inch diameter pipeline of IOAGPL	IOAGPL	Ongoing
93	Enprocon Enterprise Limited	Ndt Works as per GAIL-MECON/Projects-Jajipur	GAIL	Ongoing
94	Enprocon Enterprise Limited	Ndt Works as per GAIL-MECON/Projects-Barbil	GAIL	Ongoing
95	Turgo Infra Energy	Work Order for NDT services by X-ray External Unit At jagatsinghpur-Kendrapara GA Part-C	BGRL	Ongoing
96	Advance Infrastructures Pvt. Ltd.	Laying and Construction of Steel Gas Pipeline & Associated Facilities Of NEGG pipeline Section-6 & 14 of M/s. IGGL	IGGL	Ongoing
97	Shree Khattu Infraprojects Private Limited	Work Order for Ndt Services by X-ray External Unit at Haveri, City Gas Distribution Networks	AG&P	Ongoing
98	SRMV Engineeris Pvt. Ltd	Work Order for Ndt Services by X-ray External Unit at Hassan, City Gas Distribution Networks-CGD-Steel Pipeline Network-BKR.GA-Hassan	AG&P	Ongoing
99	SRMV Engineeris Pvt. Ltd	Work Order for Ndt Services by X-ray External Unit at Bagalkot, City Gas Distribution Networks-CGD-Steel Pipeline Network-BKR.GA-Bagalkot	AG&P	Ongoing
100	JSWI Infrastructure Private Limited	Work Order for carrying out NDT work (Gamma Ray) for Dhamra-Angul Pipeline Project JHBDPL Phase-II (Section-II)	GAIL	Ongoing
101	Sopan O&M Company Pvt	Work Order for Digitization of Radiography Films job at Our GAIL-Jharsuguda Site.	GAIL	Ongoing
102	Roy's Infocom	Work Order for Ndt Services by X-ray External Unit at Haveri, City Gas Distribution Networks-Kolkata	BGRL	Ongoing
103	Advance Infrastructures Pvt. Ltd.	Laying & Associated work section-II if paradipl Surline of JHBDPL Project of M/s. GAIL-Film Digitalization	GAIL	Ongoing



Supported by over 150+ NDT Level II Technicians, Safety Officers and dedicated Project Managers work closely with Metallurgists and Fracture Mechanic Experts to cover all aspects of Pipeline Asset Integrity

FOCUSSED & RESPONSIVE TEAM



SURESH ACHARYA
Country Head



AVINASH TAMBEWAGH
Head, Advanced and Civil



SRIRAM SHANBHAG
Head, Technical Lab



SHEMI BASKARAN
Head, NDT



GANESH SONAWANE
Head, Quality Control



LALIT SURVE
Head, Finance



SAMIR CHOUDHURY
Regional Manager (E)

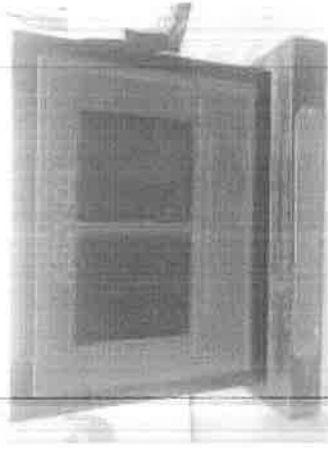
Former Plant / Industry Veterans	
Engineering Designers	Simulated Researchers
Risk Based Inspection / IOW Moderators	
API 570,579,653 Inspection	API 580/581 Knowledge
Fitness for Service and RLA Experts	
HTHA Experts	Corrosion Specialists
NDT Level III Experts & Cross Country RT Specialists	
Destructive Lab Tech	Civil Lab and Field Services
Metallurgists	

KEY INDIA CLIENTS



KEY GLOBAL CUSTOMERS

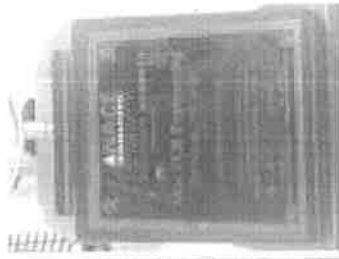




Appreciation Award by Vikram Sarabhai Space Center for Contribution in the launch of space shuttle ASLV-D3



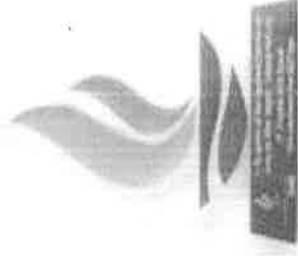
Appreciation from ISNT



Memento from NACE



American Society of Metals (ASM) acknowledged Mr. Paresh Haribhakti at International Conference on 'Material Testing & Characterization'



Recognized by KNPC, Kuwait for contributions to the 'Plant Integrity Solutions Workshop'



KK Award presented to Mr. Paresh Haribhakti, MD, TCR Advanced in the Category of Professional Field for the Year 2015 by Indian Institute of Metals (Baroda)

APPRECIATION LETTERS - KPTL



KALPA TARU POWER TRANSMISSION LIMITED,
IOCL Gas Division
PSHDPL Augmentation Project (Group-A) MWPT Project
Kaptipara Mainland, Purba Medinipur (WB) - 721 626
E-mail: kptl@kalpataru.com, kptl@kalpatarupower.com

Dated 8th February 2021
Reference: TCR/HMPL/KPTL/002

To
The TCR Engineering Services Pvt Ltd
VKB House, EL-182 MIDC-ITC
Mahape, Navi Mumbai
Maharashtra 400 710, India

Subject: Partial job completion certificate of 18" Dia Haldia Maharashtra cross country Pipeline (PHDPL) for IOCL

Ref LOA No.: KPTL/SERVICE/IOCL/53/20-21 dated: 23.07.2020
Ref Work Order No: 2300120314 dated 07.11.2020

Dear Sir,

This is to certify that M/S TCR Engineering Services Pvt. Ltd. have successfully mobilised their crew since August 2020 to till date and completed the radiography of 20 km of Mainline welding using Internal Crawler and External X rays of 18" dia Cross Country Pipeline Project at Haldia, West Bengal.

Duration of work: August 2020 to date

No of joints radiography done: 1688 joints

The radiography job done by M/S TCR Engineering Pvt. Ltd. is fully satisfied and appreciable.

We look forward to award the NIT works to M/S TCR Engineering Pvt. Ltd in our future project.

Thanking you and with regards

18" Dia PHDPL Pipeline of IOCL



KALPA TARU POWER TRANSMISSION LIMITED,
PSHPL Project (Group-C), Uttar Jaleskarnhar
Ward No. 21, PS-Central, Near Central Bus Stand,
Ghat, Purba Medinipur, West Bengal (721603)
E-mail: kptl@kalpataru.com, kptl@kalpatarupower.com

Dated 8th February 2021
Reference: TCR/PSHPL/KPTL/001

To
The TCR Engineering Services Pvt Ltd
VKB House, EL-182 MIDC-ITC
Mahape, Navi Mumbai
Maharashtra 400 710, India

Subject: Partial job completion certificate of 18" Dia Paradip Somnathpur Haldia cross country Pipeline (PSHPL) for IOCL

Ref LOA No.: KPTL/SERVICE/LOL/53/20-21 dated: 23.07.2020
Ref Work Order No: 2300120314 dated 07.11.2020

Dear Sir,

This is to certify that M/S TCR Engineering Services Pvt. Ltd. have successfully mobilised their crew since August 2020 to till date and completed the radiography of 40 km of Mainline welding using Internal Crawler and External X rays of 18" dia Cross Country Pipeline Project at Central, West Bengal.

Duration of work: August 2020 to date

No of joints radiography done: 2010 joints

The radiography job done by M/S TCR Engineering Pvt. Ltd. is fully satisfied and appreciable.

We look forward to award the NIT works to M/S TCR Engineering Pvt. Ltd in our future projects.

Thanking you and with regards

18" Dia PSHPL Pipeline



ABC TRANS CARRIERS
 CM - 080205025197TC011753 PVT. LTD.

Reference: ABCTEPL/HBPL/09/2020/21

Dated 28th January 2021

To

The TCR Engineering Services Pvt Ltd,
 VKB House, EL-182 MIDC-TTC
 Mahape, Navi Mumbai
 Maharashtra 400 710, India

Subject: Partial Job completion certificate of 30" Dia HBPL Pipeline from IOCL HBPL VALDIA TO BAHAMU TERMINAL STATION AND ASSOCIATED STATION WORKS, M/S BSNL

Dear Sir,

This is to certify that M/S TCR Engineering Services Pvt. Ltd. Has successfully completed total crew since 2019 to its date and completed the radiography of 12 km of Mainline welding using Internal Cranes and External X rays of 30" dia HBPL Cross Country Pipeline Project at Burchaman, West Bengal.

Duration of work: November 2019 to January 2021

No of joints radiography done: 3568 joints.

The radiography job done by M/S TCR Engineering Pvt Ltd is fully satisfactory and acceptable.

We look forward to award the HOT works to M/S TCR Engineering Pvt Ltd in our future projects.

Thanking you and with regards

For ABC Transcarriers Pvt. Ltd.



General Manager (OPE)



Dated 02nd September 2020
 Reference: TCR/Corrtech/20-01-0104

To

The TCR Engineering Services Pvt Ltd,
 VCB House, EL-182 MIDC-TTC
 Mahape, Navi Mumbai
 Maharashtra 400 710, India

Subject: Job completion certificate of 30" Dia cross country Pipeline at Jaigarh Dabhol Pipeline Project, Hecanergy Tie-In connection of JDPL with DDPL, Dabhol, East of Western Gateway Project Early Production Facilities

Dear Sir,

This is to certify that M/S TCR Engineering Services Pvt. Ltd. have successfully completed their crew since 27 May 2019 to 31 Aug 2020 and completed the radiography of 30" Dia Cross Country Pipeline Project from Dabhol Terminal to DDPL Tie-In Point using X rays & UT of at Gharaghat, Dabhol, East of Western Gateway Project Early Production Facilities

Duration of work: 27 May 2019 to 31 Aug 2020

The radiography job done by M/S TCR Engineering Pvt. Ltd. is fully satisfactory and appreciable.

We look forward to award the HOT works to M/S TCR Engineering Pvt. Ltd in our future projects.



Thanking you and with regards

30" Dia HBPL Pipeline of IOCL

30" Dia JDPL Pipeline

APPRECIATION LETTERS



Dated: 2nd February 2021
Reference: TCR/ENPROCON TITC/1

To
The TCR Engineering Services Pvt Ltd,
VKB House, E2-182 MIDC-TTC,
Mahape, Navi Mumbai
Maharashtra 400 113, India

Subject: **Partial job completion certificate** of 18" Dia cross country RANG PL from IP-103-Pallygram to IP-104-Bannabpuzam & RT & Station works under EIPNMTP, PJ Group-F-IP 201 to Bangalore for IOCL.

Dear Sir,

This is to certify that M/S TCR Engineering Services Pvt. Ltd. have successfully mobilized their crew since July 2020 to till date and completed the radiography of 50 km of Mainline welding using Internal Crawler and External X rays with UT of 18" dia Cross Country Pipeline Project at Kolar, Karnataka.

Duration of work: July 2020 to date

No. of Joints radiography done: 1100 Joints.

The radiography job done by M/S TCR Engineering Pvt. Ltd. is fully fulfilled and appreciable.

We look forward to award the NDT works to M/S TCR Engineering Pvt. Ltd. in our future projects.

Thanking you and with regards

Authorized Signatory
M/S ENPROCON TITC



16" Dia Pipeline of IOCL



September 23, 2020

Managing Director
TCR Engineering Pvt. Ltd.
VKB House, E2-182, MIDC-TTC
Electronics Zone, Mahape,
Navi Mumbai, Pin-400710
India

Subject: **Appreciation letter for RT work at our ASPL project**

Re: Our PO-PSPL/ASPL/IOCL/NDT/2020 dated 24.01.2020

Dear Sir,

We deeply appreciate your support and cooperation given to our team on the above-mentioned project.

Your Radiographic Testing Crew worked all through the COVID-19 pandemic with a singular purpose of ensuring our project success and timely delivery of the works.

We look forward to co-operating and working again with M/S TCR Engineering Services in our future projects as well.

Thanking You and Regards,
Yours Sincerely,

Authorized Signatory
PAN SOLUTIONS PVT. LTD.



18" Dia ASPL Pipeline

MAS CONSTRUCTION – JOB COMPLETION CERTIFICATE



MAS CONSTRUCTIONS
 Bawe Marg Road C.A.S. B.H. 12, Plot No. 5, Sec. 13, New Forest (E), Near Mumbai-410 126.
 (MC, Rajesh, Maharashtra, Ph. (022) 2745 9641/569, H-22-2746 2363)
 Email: mas_construction@rediffmail.com Website: www.masconstruction.com

To,

M/S TCR ENGINEERING SERVICES Pvt. Ltd.,
 E-1333, Electronic zone, Behind IELCO,
 MIDC, TTC, Mahape, Near Mumbai-400710.

Sub: Job Completion Certificate

Dear Sirs,

This is to certify that M/S TCR Engineering Services Pvt. Ltd. has successfully completed Radiography testing (X-RAY, Gamma Ray) and Ultrasonic Testing of both weld joints ranging from 2" Ø to 12Ø for our TITR PIPELINE LAYING AND TERMINAL WORKS AT GAIL, (India) Limited Mumbai.

Total Number of Joints- Approximately-1750 Nos. Duration of work-2013-2014.

Total work order value = INR. 27 Lakhs.

The job done was up to our satisfaction.



For Mas Constructions



Project for GAIL (India)



Date: 05/03/2015



"TO WHOMSOEVER IT MAY CONCERN"

This is to certify that M/S. TCR Engineering Services Pvt. Ltd. worked with us with Radiography Services (NDE) at our GGB Pipeline Project in Rewa M.P. under Client IOCL, from 11.01.2020 to 31.03.2021.

During This tenure of his association with us we found them to be hard working, diligent and knowledgeable to perform duties. We are pleased to work with this organization.

We wish him the very best in all his future endeavours.

Thanking you



For Mas Constructions.

Date:-31.03.2021

Rewa, M.P.



Project for IOCL



ENPROCON TJC
 EN: (941) 520-6220 FAX: (941) 520-6227

61447
-64 68591-1215
19119501-42503
61448 68591-1215
19119501-42503

Department of Psychiatry, Washington State University Medical Center, 1959 North
 Republican Avenue, Spokane, WA 99205, USA
 (fax: +1 509 325 4144; e-mail: benjamin@spokane.psych.wa.edu).
 Received 10 November 2003; accepted 10 December 2003

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Future of **Quality Assurance**



TCR is leading the new way of Quality Assurance by defining the future

At TCR, we are continuously working towards improving our offerings to provide a better and a more efficient Quality Assurance for your Optimum Asset Health

Industry-specific Solution

- Plant and industry veterans with understanding of process/operations challenges
- Aware of the business risk versus failure probability
- Keeping abreast on new materials and plant items

Equipment-specific Solution

- Researching new techniques for inspection
- Constantly buying probes and accessories to ensure no downtime at site
- Train-the-trainer approach to spread knowledge

Problem-specific Solution

- Corrosion damage evaluation is a specialty
- Metallurgy is the core of all investigation
- Look at a problem through multiple angles
- Asset Integrity Management Solutions



INDIA



TCR ENGINEERING SERVICES

EL-182 MIDC-TTC, Electronic Zone,
Mahape, NAVI MUMBAI-400710
Tel : +91-22-67380900
www.tcreng.com

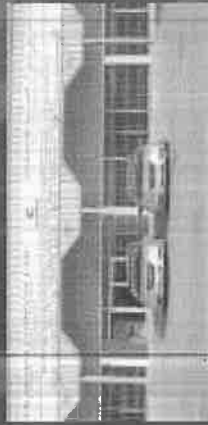


TCR ADVANCED ENGINEERING

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