



GOLAGHAT-BCPL LAKWA PIPELINE PROJECT

MATERIAL REQUISITION FOR BI-DIRECTIONAL SCRAPER LAUNCHER/ RECEIVER & SIGNALLER

Doc No: P101-MRR-P002

B	07.03.2022	Issued With Tender	PNS	MD	AD
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ABBREVIATIONS

NG	Natural Gas
ANSI	American National Standards Institute
MMTPA	Million Metric Tonne Per Annum.
MT	Metric Tonne
QOEC	Quick Opening End Closure
DFT	Dry Film Thickness
EN	European Norm
WPHY	Wrought Pipe High Yield
WNRF	Weld Neck Raised Face Flange
PSV	Pressure Safety Valve
Pr.	Pressure
Conn.	Connection
SS	Stainless Steel
NPTF	National Pipe Thread Female
ASME	American Society of Mechanical Engineers
API	American Petroleum Institute
ASTM	American Society of Testing and Material



MATERIAL REQUISITION FOR BI-DIRECTIONAL SCRAPER LAUNCHER/ RECEIVER & SIGNALLER

**DOCUMENT NO.
P101-MRR-P002
Rev. B**

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1.0 BACKGROUND

Assam Gas Company Ltd. (AGCL) is a 60 years old Natural Gas transmission and distribution company, wholly owned by the Govt. of Assam with its registered office at Duliajan, Dist: Dibrugarh, Assam 786602.

The company transports Natural Gas through its integrated pipeline infrastructure to several market segments i.e. Power, Fertilizer, Petrochemicals, Industrial, Commercial and Domestic consumers primarily located in upper Assam. The present infrastructure of the company has a transportation capacity of about 6.0 MMSCM of gas per day.

Besides other sources, AGCL is going to transport Natural Gas from the gas fields of ONGCL in Khoraghat region of Golaghat District through its 12" & 8" NB 97 km Khoraghat/ Nambor Uriumghat – Golaghat gas pipeline(N-G-N).

Company is expecting additional transportation of around 130,000 SCMD of Natural gas from the above-mentioned Pipeline. AGCL is planning to supply this additional gas to Brahmaputra Cracker and Polymer Limited (BCPL) through Proposed Golaghat - BCPL Lakwa Pipeline.

Pipeline Engineering Consultants Pvt. Ltd. has been appointed as Engineering Consultant by AGCL for Consultancy services (Engineering, Procurement, RFP preparation and Project Management for the Project.

2.0 PURPOSE

This document is for the design, manufacturing and purchase of Bi-directional Scraper Launcher/ Receiver & Signaller for Construction of Cross-Country Natural Gas Pipelines in Golaghat BCPL Lakwa Districts of Assam

3.0 DEFINITION

Where used in this document, the following terms shall have the meanings indicated below, unless clearly indicated by the context to this order.

PROJECT	GOLAGHAT-BCPL LAKWA PIPELINE PROJECT
CLIENT/ OWNER	Assam Gas Company Limited
EPMC	Pipeline Engineering Consultants Pvt. Ltd. (PLECO) the party to act for and on behalf of OWNER for the Detailed Engineering Services and Project Management.
CONTRACTOR	Agency appointed by CLIENT/ OWNER for execution of assigned tasks
PURCHASER	Either of CLIENT, OWNER or EPMC
VENDOR/ MANUFACTURER	Party, which manufactures and supplies equipment and services to the OWNER or to CONTRACTOR

4.0 PROJECT BRIEF

The brief project details of Golaghat to BCPL, Lakwa pipeline are as follows:

AGCL wants to extend its existing N-G-N pipeline network from Golaghat to BCPL Lakwa Terminal. This project foresees transportation of 1,30,000 SCMD Gas to BCPL via 12" OD cross-country pipeline. The project broadly consists of:

- Laying of 12" x 122 KM (approx.) Carbon Steel Pipeline from Golaghat Station to BCPL plant
- Laying of 12" x 2 (approx.) KM long Carbon Steel Pipeline from BCPL plant to AGCL "O" Point

The preliminary proposed facilities for the pipeline are:

- i. Dispatch station at Golaghat
- ii. Sectionalizing Valve(SV) stations,
- iii. Receiving Terminal at BCPL plant
- iv. Tap off point at AGCL "O" Point

5.0 DOCUMENT PRECEDENCE

It shall be the responsibility of the MANUFACTURER/ VENDOR to inform the PURCHASER of any errors, ambiguities, inconsistencies, discrepancies or conflict of information that may be found to exist in any document, specification or drawing submitted by the PURCHASER.

In case of conflict, the order of precedence shall be as follows:

- a. Data Sheet
- b. MR
- c. Basic Documents (Specifications)
- d. Codes and Standards

As a general rule in the event of any discrepancy between technical matter and local laws/ regulations (and documents above listed) the most stringent shall be applied.

MANUFACTURER/ VENDOR shall notify PURCHASER of any apparent conflicts between MR, specifications, related datasheets, any code and standards and any other specifications noted herein. (Resolution and/ or interpretation precedence shall be obtained from PURCHASER in writing before proceeding with the design/ manufacturer or completion of services.)

6.0 SCOPE OF SUPPLY

Design, Engineering, manufacture, procurement of materials and bought out components, manufacture, assembly at shop, inspection, testing at manufacturer's works, packing, shipment, delivery & commissioning of Bi-directional Scraper Launcher and Receiver conforming to specification P-SPC-313 and Pig signaller's conforming specification P-SPC-314 and as per following details including supply of all pre commissioning, commissioning spares, special tools &

documentation as per the enclosed engineering standard, specifications and data sheets etc. attached or referred.

Scope of Supply of Scraper Launcher/ Receiver & Pig Signaller's:

S. No.	Item Description	Data Sheet No.	Qty. (Nos.)
1	18" X 12", 300# Bi-Directional Scraper Launcher/ Receiver, Pig Signallers and Accessories (Including supply of Pig handling system (trolley) matching flanges for the entire flanged end nozzle. Required studs, Nuts, bolts, Gaskets and foundation Bolts)		
1.1	Supply of 18" x 12", 300#, Bi-Directional Scraper Launcher/ Receiver including QOEC & Pig Handling system (trolley)	P101-DSH-P001	2
1.2	Pig Signalers (Intrusive Type) to be mounted on Pig Launcher & Receiver for Item 1.1	P101-DSH-P002 SHEET 3 OF 2	2
1.3	Pig Signalers (Intrusive Type) with Isolation Ball Valve to be welded on 12" Pipeline	P101-DSH-P002 SHEET 3 OF 3	2
1.4	Door seal for QOEC for above item 1.1 @ 2 Nos. for each Pig Launcher and Receiver	-	4
1.5	Complete set of spare seals for Pig Signaller's for above item 1.2 @ 1 Sets/ Pig Signaller)	-	2 Set
1.6	Complete set of spare seals for Pig Signaller's for above 1.3 (@ 1 Sets/ Pig Signaller)	-	2 Set
2	Portable jacking tool for removing pig signaller for online maintenance.		2

7.0 INSTALLATION LOCATION

S. NO.	Location	Quantity (Nos)	Size & Rating
Bi-Directional Scraper Launcher/ Receiver			
1.1	Golaghat NGL Terminal	1	Size 18" x 12", 300#
	BCPL Lakwa	1	Size 18" x 12", 300#

Pig Signaller (For 12" Main Line & 18" x 12" Bi-Directional Scraper Launcher/ Receiver)			
1.2 & 1.3	Golaghat NGL Terminal	2	1 No- Mounted on Scraper Launcher/ Receiver
			1 No. – Welded on pipeline
	BCPL Lakwa	2	1 Nos – Mounted on Scraper Launcher/ Receiver
			1 Nos – Welded on pipeline

NOTES:

1. Major barrel for launchers and receivers shall be designed for the longest intelligent tool plus 10%. Minor barrel length shall be optimized for inspection tool diameter and shall be subjected to COMPANY approval.
2. End closures shall be fitted with a pressure activated locking mechanism to prevent opening while the Scraper Launcher/ Receiver is pressurized. Scraper Launcher/ Receiver including QOEC shall be internally coated with liquid epoxy paint with DFT of 30 to 50 microns.
3. The quick opening end closure shall be of band-lock type or equivalent design and shall consists of a safety pressure release system allowing the opening only when there is no pressure in the Scraper Launcher/ Receiver. End closure shall be hand operated by a single lever operation and operable by one operator. Hinge of the closure shall be so designed that the weight of the end closure is fully supported without sagging. Bidder shall furnish names of proposed manufacturers of QOEC including cross sectional detail drawings with the offer.
4. Bi-Directional Scraper Launcher/ Receiver shall be delivered at AGCL store near Golaghat. All transportation, handling, delivery be in the Bidder's scope. Also Vendor shall arrange checking of all material as per item list before handling over. In case materials are packed in boxes, boxes shall be open for after inspection. All transportation, handling, delivery shall be in bidder's scope.
5. Bi-Directional Scraper Launcher/ Receiver (including all components) shall be designed and suitable for NG.
6. Certification shall be EN 10204 type 3.2.
7. Vendor shall check all calculations of Bi-Directional Scraper Launcher/ Receiver based on design conditions and manufacturing requirements and submit necessary to company for approval.
8. Bi-Directional Scraper Launcher/ Receiver shall be provided with suitable scraper handling system to facilitate handling of latest intelligent tools.
9. All physical and mechanical testing shall be in accordance with the requirements of connected line pipe.
10. Bi-Directional Scraper Launcher/ Receiver material shall be subjected to Charpy V-notch test at temperature -29° C & Hardness test. Design Data for the Project are:
 - Design pressure : 49kg/cm²g
 - Pipeline Service : NG
 - Max Design Temp (Above Ground) : 65° C
 - Min Design Temp : (-)29° C

11. Bidder shall furnish quotation for all item of MR only in case he can supply all material strictly as per this MR and specification/ data sheets forming part of MR.
12. The submission of prices by the bidder shall be construed to mean that he has confirmed compliance with all technical specifications of the corresponding item(s). Prices quoted against all items shall be inclusive of Pig handling system & prices of recommended spares and accessories required during start-up and commissioning. Pig lifting devices (davit etc.) are not in vendor's scope of supply.
13. If the offer contains any technical deviations or clarifications or stipulates any technical specifications (even if in line with MR requirements) and does not include complete scope & Technical/ Performance Data required to be submitted with the offer, the offer shall be liable for rejection.
14. Bidder must submit all documents/ drawings/ calculations as specified in relevant specification along with his offer and after award of order.
15. Bidder must submit duly filled up and signed data sheets, Checklist, Compliance Statement, Deviation Sheet, reference list and other forms along with his offer.
16. In the absence of this information, Company reserves the right to reject bidder's offer without any reference to Bidder in this regard.

8.0 LIST OF ATTACHMENTS



1. Data Sheet – Bi-directional Scraper Launcher/ Receiver, Doc no. P101-DSH-P001
2. Data Sheet – Pig Signaller, Doc no. P101-DSH-P002
3. Specification for Scraper Traps, Doc no. P-SPC-313
4. Specification for Pig Signaller, Doc no. P-SPC-314
5. Painting Specification Doc No. P-SPC-410
6. ITP for Scraper Trap-Doc. No. P-ITP-011
7. ITP for Pig Signallers: Doc No. P-ITP-011
8. Checklist Doc. No. P-STD-001
9. Reference List Doc. No. P-STD-002
10. Compliance statement Doc. No. P-STD-003
11. Deviation sheet Doc. No. P-STD-004
12. Drawing & Documents Doc. No. P-STD-005
13. Instruction to Bidders Doc. No. P-STD-006
14. Vender drawing document schedule. Doc. No. P-STD-007
15. TPI List,

GOLAGHAT-BCPL LAKWA PIPELINE PROJECT

DATA SHEET FOR BI-DIRECTIONAL SCRAPER LAUNCHER/ RECEIVER

Document Number :- P101-DSH-P001

Rev.	Date	Description	ORG	REVIEW	APPROVAL
B	05.03.22	Issued With Tender	PNS	MD	AD
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 ASSAM GAS COMPANY LTD (A GOVT. OF ASSAM UNDERTAKING)		ASSAM GAS COMPANY LIMITED		JOB NO. 101			
		GOLAGHAT-BCPL LAKWA PIPELINE PROJECT		Document Number :- P101-DSH-P001			
		DATA SHEET FOR BI-DIRECTIONAL SCRAPER LAUNCHER/ RECEIVER		Sht. 2 of X	Rev.		
		X	B				
		31.12.21	05.03.22				

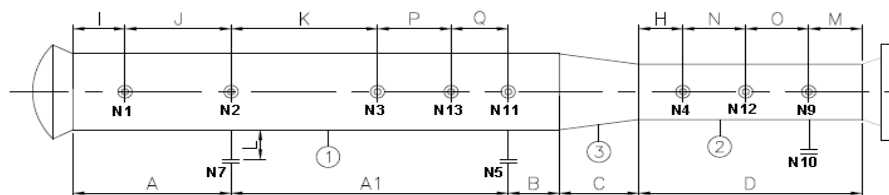
BI – DIRECTIONAL SCRAPER TRAP DETAILS (18" x 12")

GENERAL PARAMETERS	
Scraper Trap Manufacturer
Scraper Trap Specification No.	P-SPC-313
Type of Scraper Trap	Bi-directional, Pig Launcher/ Receiver suitable for Intelligent pig
Design Pressure (kg/cm ² g)	49
Design Temperature (°C)	-29 to 65
Pipeline Design Code	ASME B31.8
Design Code -Scraper Trap & QOEC	ASME B31.8 & ASME Section VIII, Division I
Corrosion Allowance, mm	3
Design Factor	0.5
ANSI Rating	300#
Design Life	25 Year
Tag No. (s)	As per P&IDs

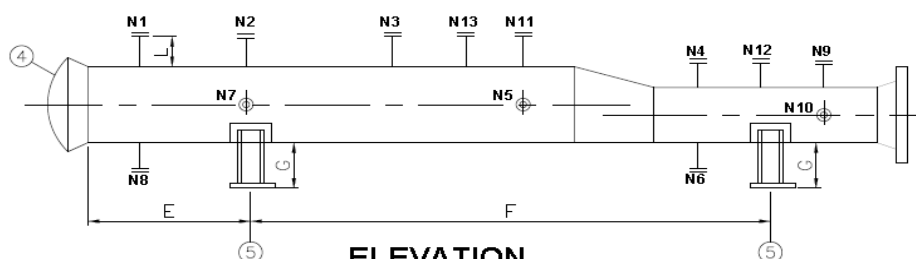
PIPELINE DETAILS			
Pipeline Nominal Diameter, mm (inch)	323.3 (12")	Thickness, mm	7.1
Pipeline Material	API 5L GR X-42, PSL-2	Service	NATURAL GAS (NG)

Part No.	Description	Item	Ends/Type	Material (Equiv./Sup.)	SIZE(NB) (Note 6)
1	Body	Major Barrel (Pipe)	BW, QOEC, Welded	API 5L GR.X-42 PSL 2	18"
2	Body	Minor Barrel (Pipe)	Flanged WNRF	Pipe: API 5L GR.X-42 PSL 2, Flange :ASTM A694 Gr.F42 (CHARPY)	12"
3	Reducer	Eccentric	BW, Welded	MSS SP – 75 WPHY 42 - (CHARPY)	18" X 12"
4	End Closure	Forged	Quick Opening	ASTM 105 (CHARPY)	18"/ 300#
5	Supports	Plate	Welded	ASTM A 36	As Required
N1 & N4	Vent	Weldolet+ pipe+ Flange	Flanged, WNRF	ASTM A105 (CHARPY)+ ASTM 106 Gr.B (CHARPY)+ ASTM A105 (CHARPY)	2"
N2	PSV conn.	Weldolet+pipe+ Flange	Flanged, WNRF	ASTM A105 (CHARPY)+ ASTM 106 Gr.B (CHARPY)+ ASTM A105 (CHARPY)	2"
N3, N12 & N13	Pr. Gauge conn.	Weldolet+pipe+ Flange	Flanged, WNRF	ASTM A105 (CHARPY)+ ASTM 106 Gr.B (CHARPY)+ ASTM A105 (CHARPY)	2"
N5	Bypass conn.	Weldolet + Pipe+ Flange	Flanged, WNRF	ASTM A105 (CHARPY)+ ASTM 106 Gr.B (CHARPY)+ ASTM A105 (CHARPY)	4"
N6	Utility conn./ Drain	Weldolet + Pipe+ Flange	Flanged, WNRF	ASTM A105 (CHARPY)+ ASTM 106 Gr.B (CHARPY)+ ASTM A105 (CHARPY)	2"
N7	Kicker conn.	Weldolet + Pipe+ Flange	Flanged, WNRF	ASTM A105 (CHARPY)+ ASTM 106 Gr.B (CHARPY)+ ASTM A105 (CHARPY)	4"
N8	Drain conn.	Weldolet + Pipe+ Flange	Flanged, WNRF	ASTM A105 (CHARPY)+ ASTM 106 Gr.B (CHARPY)+ ASTM A105 (CHARPY)	2"
N9 (XX1)	Pig Signaler	As per Pig Signaler Data Sheet No. P101-DSH-P002			
N10	Pressure Balancing conn.	Weldolet+ pipe+ Flange	Flanged, WNRF	ASTM A105 (CHARPY)+ ASTM 106 Gr.B (CHARPY)+ ASTM A105 (CHARPY)	2"
N11	Purge Connection	Weldolet+ pipe+ Flange	Flanged, WNRF	ASTM A105 (CHARPY)+ ASTM 106 Gr.B (CHARPY)+ ASTM A105 (CHARPY)	2"

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		DATA SHEET FOR BI-DIRECTIONAL SCRAPER LAUNCHER/ RECEIVER		Sht. 2 of X	Rev.		
		X	B				
		31.12.21	05.03.22				



PLAN



ELEVATION

DIMENSION DETAILS			
Marking	Dimension (mm)	Marking	Dimension (mm)
A +A1+B	4300	I	300
		J	300
		K	300
C	381	L	Note 3
D	4300	Marking	400
E	Note-3	N	Note 3
F	Note-3	O	Note 3
G	800	P	Note 3
H	300	Q	Note 3

Legend: BW– Butt Welded, WNRF– Weld Neck Raised Face, SW – Socket welded, SAW-Longitudinal Seam Submerged Arc Welded

NOTES

- Charpy and hardness test shall be carried out with as per specification no. P-SPS-313
- Nozzles numbers, nozzle orientation & naming of all the nozzles are indicative only and shall be confirmed & approved by Company during manufacturer's drawing approval stage.
- The dimensions shown in above table are suggested dimension only. The Manufacturer shall check and provide dimensions suitable for accommodating latest online inspection tool and by considering other technical criteria. Final dimensions shall be approved by Company.
- Charpy and hardness test shall be carried out with as per specification no. P-SPS-313
- Manufacturer shall check thickness of the scraper based on pipeline design conditions and manufacturing requirements, and submit necessary calculations to Company for approval.
- Hydrotest of scraper trap shall be hydrotested at 1.5 times of design pressure.
- Flanges welded on Scraper trap shall have smooth face finish to 125-250 AARH. Flanged end, if specified shall have flanges as per ASME B16.5 for size up to NB 600 mm 24"
- All carbon steel fittings/ flanges made from ASTM A105 material shall be heat treated by normalizing in accordance with ASTM A961. All carbon steel fittings and flanges made from ASTM A105 material shall be finish forged i.e. forged to be the required shape. Machined fittings and flanges are not acceptable. Machining is permitted for weld end preparation and flange face finish preparation.
- All Weldolets shall be as per MSS-SP-97 & all Nippolets shall be as per Manufacturer's Standard. Stub-in or pipe to pipe connection shall not use for making branch connections.
- End closure gasket shall be self-energized type.
- End closure shall be designed with ASME Section VIII Division I.
- Circumferential weld on scraper trap body and neck shall not be permitted.
- Butt weld end, if specified shall have ends prepared as per ASME B16.25. However, end preparation for butt welding end having unequal thickness with respect to connecting pipe shall be as per ASME B 31.8 as applicable.
- The thickness of eccentric reducer shall match with the adjoining body/ neck.

GOLAGHAT-BCPL LAKWA PIPELINE PROJECT

DATA SHEET - PIG SIGNALLER

Document Number :- P101-DSH-P002

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**STANDARD SPECIFICATION
FOR SCRAPER TRAPS
(ONSHORE)**

**SPECIFICATION NO.
P-SPC-313**

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**STANDARD SPECIFICATION
FOR
SCRAPER TRAPS
(ONSHORE)**

P-SPC-313

0	03.01.2022	ISSUED AS STANDARD SPECIFICATION	RK	MD	AD	SK
Rev.	Date	Purpose	Prepared by	Reviewed by	Approved by	Approved by

ABBREVIATIONS

API	American Petroleum Institute
ASTM	American Society for Testing and Materials
ASME	American Society of Mechanical Engineers
BM	Base Metal
BHN	Brinell hardness number
CE	Carbon Equivalent
CVN	Charpy V-Notch
DN	Nominal Size
FBH	Flat Bottomed Holes
HAZ	Heat Affected Zone
ID	Inside Diameter
KvL	Charpy value in pipe longitudinal direction
KvT	Charpy value in pipe transversal direction
LC	Lock Close (valve locked in full close position)
LO	Lock Open (valve locked in full open position)
MSS-SP	Manufacturers Standardization Society - Standard Practice
MPQT	Manufacturing Procedure Qualification Tests
MPS	Manufacturing Procedure Specification
NDT	Non-Destructive Testing
NPS	Nominal Pipe Size
OD	Outside Diameter
OD/D	Outside Diameter, Specified
RJ	Ring Joint
QOEC	Quick Opening End Closure
SAW	Submerged Arc Welded
SAWL	Submerged Arc Longitudinal Welded
SMAW	Shielded Metal Arc Welding
SMYS	Specified Minimum Yield Strength
SSPC	The Society for Protective Coatings
s_r	Sizing ratio of the pipe
t	Wall Thickness, Specified
UT	Ultrasonic testing



STANDARD SPECIFICATION FOR SCRAPER TRAPS (ONSHORE)

SPECIFICATION NO.
P-SPC-313

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1.0 SCOPE

1.1 Coverage

This specification covers the minimum requirements for design, manufacture, testing and supply of scraper launching and receiving traps to be installed in onshore pipeline systems transporting non-sour hydrocarbons in liquid or gaseous phase including Liquefied Petroleum Gas (LPG).

2.0 REFERENCE DOCUMENTS

Reference has also been made in this specification to the latest edition (edition enforce at the time of issue of enquiry) of the following Codes, Standards and Specifications.

ASME B31.4	-	Pipeline Transportation Systems for Liquids and Slurries.
ASME B31.8	-	Gas Transmission and Distribution Piping Systems.
ASME B 16.5	-	Steel Pipe Flanges and Flanged Fittings.
ASME B 16.9	-	Factory made Wrought Steel Butt Welding Fittings.
ASME B 16.11	-	Forged Fittings, Socket- Welding and Threaded.
ASME B 16.25	-	Butt-welding Ends.
ASME B 16.47	-	Large Diameter Steel Flanges
API 1104	-	Specification for Welding Pipeline and Related Facilities.
MSS-SP-53	-	Quality Standard for Steel Castings and Forgings for Valves, Flanges and Fittings and other Piping Components — Magnetic Particle Examination Method.
MSS-SP-75	-	Specification for High Test Wrought Butt Welding Fittings.
MSS-SP-97	-	Integrally Reinforced Forged Branch outlet Fittings- Socket Welding, Threaded & Butt Welding Ends.
SSPC-VIS-I	-	Steel Structures Painting Council-Visual Standard.
ASME Sec VIII	-	Boiler and Pressure Vessel Code - Rules for Construction of Pressure Vessels
ASME Sec IX	-	Boiler and Pressure Vessel Code - Welding and Brazing Qualification
ASTM A 234	-	Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
ASTM A-370	-	Standard Test Methods and Definitions for Mechanical Testing of Steel Products.

2.3 In case of conflict between the requirements of this specification and the Codes, Standards and Specifications referred to in this specification, the requirements of this specification shall govern.

3.0 MATERIALS

3.1 Materials of main components used in manufacture of traps shall be as indicated in the Data Sheet. Other components shall be as per Manufacturer's Standard (suitable for the service conditions indicated in Data Sheet) and shall be subject to approval by Company. In addition, the material shall also meet the requirements specified hereinafter.

The SMYS of steel used for manufacture of Quick Opening End Closure (QOEC) shall be as indicated in data sheet.

3.2 Carbon Steel used in the manufacture of traps and end closures shall be fully killed.

3.3 Material of the ends to be field welded by Company shall have carbon equivalent less than or equal to 0.45, based on check analysis for each heat of steel, calculated according to the following formula::

$$CE(IIW) = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

- 3.4** Charpy V-notch test shall be conducted on each heat of steel used in the manufacture of pressure containing parts of Scraper Traps. The test procedure shall conform to ASTM A370. Unless specified otherwise, the Charpy V-notch test shall be conducted at 0°C. Results of Charpy test shall be recorded.

The average absorbed impact energy values of three full-sized specimens of base metal, weld metal and HAZ shall be 27 Joules, unless otherwise indicated in the Data Sheet. The minimum impact energy value of any one specimen of the three specimens analysed as above, shall not be less than 22 Joules.

When Low Temperature Carbon Steel (LTCS) materials are specified in Data Sheet or offered by Manufacturer, the Charpy V-notch test requirements of applicable material standard shall be complied with.

- 3.5** Hardness test shall be carried out as per ASTM A 370 for each heat of steel used in the manufacture of pressure containing parts of traps. A full thickness cross section shall be taken for this purpose and the maximum hardness of base metal, weld metal and HAZ of all the pressure containing parts shall not exceed 248 HV10. Hardness shall be recorded.

4.0 DESIGN AND CONSTRUCTION REQUIREMENTS

- 4.1** Scraper traps shall be designed and manufactured in accordance with the provisions of Codes, Standards and Specifications referred in clause 2.0 of this specification. In addition, design parameters indicated in the data sheets, shall be taken into account for design of scraper traps.

- 4.2** The scraper traps shall be suitable for handling scraper / cleaning / gauging / batching / instrumented pigs and shall conform to the minimum dimensions given in scraper trap data sheets. Dimensions not shown specifically in the Data Sheet shall be as per manufacturer's standard and shall be subject to approval by Company.

- 4.3** The cylindrical portion of the trap shall be designed as per design code and design factor indicated in the Data Sheet. Scraper trap shall be provided at the end with Quick Opening End Closure (QOEC) as indicated in Data Sheet. Quick end closure shall be designed, as per ASME Sec. VIII, Div. 1 with allowable stress level limits/design factor applicable for traps, for the design conditions indicated in the Data Sheet. A corrosion allowance, as indicated in the Data Sheet shall be considered in design of the traps and closures. Quality of welding shall be such that weld efficiency factor of 1.0 is achieved.

- 4.4** The trap body/neck diameter and minimum length shall be as indicated in the Data Sheets. Circumferential weld on scraper trap body and neck shall not be permitted.

- 4.5** Concentric or eccentric reducer used in the manufacture of traps shall be seamless type for sizes up to and including NPS 16 and welded type for sizes NPS 18 and above. Reducers shall conform to ASME B 16.9/ MSS-SP-75 as indicated in the data sheet. End thicknesses of reducer shall match with the adjoining body/ neck thickness.

- 4.6** Connections for vents and drains shall be provided on each trap. Sizes for vents and drains shall be as indicated in Data Sheet. The traps shall be provided with a suitable slope and the drain location shall be such that complete drainage of the trap is possible.

- 4.7** All branch connections shall be made by weldolet/ nippolet/ sockolet or by extrusion as indicated in Scraper Trap Data Sheet. All weldolets shall conform to MSS-SP-97 and all nippolet shall be as per Manufacturer's Standard. The extruded openings shall be adequately heat-treated and stress relieved. Stub-in or pipe-to-pipe connection shall not be used for making branch connections.

- 4.8** End connections of traps shall be flanged or butt-welded as indicated in data sheets.

- a) Flanged end, if specified, shall have flanges as per ASME B16.5 for sizes up to NB 600 mm (24") excluding NB 550 mm (22") and as per MSS-SP-44/ASME B16.47 Series A for sizes NB 550 mm (22")

and for NB 650 mm (26 inches) and above. Flange face shall be either raised face or ring joint type (RTJ) as indicated in Data Sheet. Flange face finish shall be serrated or smooth as indicated in Data Sheet. In case of RTJ flanges, the groove hardness shall be minimum 140 BHN.

- b) Butt weld ends, if specified, shall have ends prepared as per ASME B 16.25. However, end preparation for butt-welding ends having unequal thicknesses with respect to connecting pipe shall be as per ASME B31.4/ ASME B31.8, as applicable.

- 4.9** The quick opening end closure shall be of clamp ring/band-lock type or equivalent design and shall consist of a safety pressure release system allowing the opening only when there is no pressure in the trap. End closure shall be hand operated by a single lever operation and operable by one operator. End closures of size NB 600 (24") and above shall be fitted with worm gear operator for the opening of the closure. Hinge of the closure shall be so designed that the weight of the end closure is fully supported without sagging. Screwed type or plug-in type of end closures are not permitted.
- 4.10** Receiving traps shall be provided with a pig signaller at a location indicated in the Scraper Trap Data Sheet. Pig signaller shall be suitable for bi-directional operation and shall have visual flag and manual reset mechanism. The pig signaller shall also have provision for remote indication, when indicated in Pig Signaller Data Sheet. The pig signaller shall conform to the requirements of relevant pig signaller specification and data sheet.
- 4.11** The pig receiving traps shall be equipped with a half internal removable filtering basket consisting of a punched plate with at least five rows of drain holes. The filtering basket shall slide on guides/rails or wheels and in all cases the material of the parts being in contact with each other shall be of anti-spark type. The filtering basket shall be provided with suitable stops. Lock bracket shall be provided to such that the basket does not slide within the trap. Rear end of the basket shall be provided with suitable lug to enable retrieval of the basket by hooks. The handling system (for inserting and retracting the scraper and instrumented pigs from the trap) shall be complete with handling devices. In case any rails are required for sliding of the handling system, the same shall be provided by the scraper trap manufacturer.
- 4.12** Fabricated steel supports, minimum two numbers at suitable spacing shall be provided with traps for mounting on concrete blocks. These supports will not be subjected to pipeline anchorage forces and shall be free sliding supports. Support base plate shall not have any holes. No foundation bolts shall be supplied. The material of support shall be compatible with trap material for welding purposes. All welds shall be examined by magnetic particle method.
- 4.13** Completed assembly shall be stress relieved as per the provisions of applicable design codes.
- 4.14** All welds shall be made by welders and welding procedures qualified in accordance with the provisions of ASME Sec. IX. The procedure qualification shall also include impact test and hardness test when required as per Clause 3.4 and 3.5 of this specification and shall meet the requirements as specified therein.
- 4.15** Repair by welding on parent metal is not allowed. Repair of welds by welding shall be carried out only after specific approval by Company's Inspector for each repair. The repair welding shall be carried out by the welders and welding procedures duly qualified as per ASME Sec. IX and records for each repair shall be maintained. The repair welding procedure qualification shall also include impact test and hardness test when required as per Clause 3.4 and 3.5 of this specification and shall meet the requirements as specified therein. Radiography and heat treatment shall be repeated after the weld repair.

- 4.16** The tolerance on internal diameter and out of roundness at the ends for the welding end of the neck (at the end where connecting pipeline will be welded) shall be as per applicable connected pipe specification as indicated in the Data Sheet.

5.0 INSPECTION AND TESTS

- 5.1** The manufacturer shall perform all inspection and tests as per the requirements of this specification and the relevant codes, standards and specifications, prior to shipment at his Works. Such inspections and tests shall be, but not limited to, the following:

- 5.1.1 All traps shall be visually inspected. The internal and external surfaces of the scraper traps shall be free from any strikes, gouges and other detrimental defects.
- 5.1.2 Dimensional check shall be carried out as per the Company approved drawings.
- 5.1.3 Chemical composition and mechanical properties shall be checked as per relevant material standards and this specification, for each heat of steel used.
- 5.1.4 Hydrostatic test shall be conducted for all scraper traps complete in all respects including QOEC, including mounting of pig indicators at a pressure equal to 1.25 & 1.5 times the design pressure for liquid & gas service respectively unless otherwise indicated in the data sheet. The test pressure shall be maintained and held for a minimum period of one hour.
- 5.1.5 All butt welds shall be 100% radiographically inspected. Procedure and acceptance criteria shall be as per API 1104.
- 5.1.6 Ultrasonic or magnetic particle inspection shall be carried out on all welds, which in Company Inspector's opinion cannot be radiographically inspected. Procedure and acceptance criteria shall be as per ASME Sec. VIII, Appendix U and Appendix VI respectively.
- 5.1.7 All finished wrought weld ends shall be 100% ultrasonically inspected for lamination type defects for a distance of 50mm from the end. Any laminations larger than (1/4") 6.35 mm shall not be acceptable.
- 5.1.8 All forgings shall be wet magnetic particle examined on 100% of the forged surfaces. Method and acceptance shall comply with MSS-SP-53.
- 5.1.9 A minimum of two closing and opening cycles shall be performed and correct operation of both quick opening closure and safety system shall be ascertained.

- 5.2** Company's Inspector reserves the right to perform stage wise inspection and witness tests, including hydrostatic test, as indicated in specification at Manufacturer's Works prior to shipment. Manufacturer shall give reasonable notice of time and shall provide without charge reasonable access and facilities required for inspection, to the Company's Inspector. Inspection and tests performed/witnessed by Company's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspections and tests and of specific integrity of the scraper traps.

6.0 TEST CERTIFICATES

Manufacturer shall furnish the following certificates:

- a) Test certificates relevant to the chemical and mechanical properties of the materials used for manufacture of trap as per relevant standards and this specification.
- b) Hydrostatic test certificates.
- c) Test Reports on radiography, ultrasonic inspection and magnetic particle examination.
- d) Test Reports on heat treatment carried out, if any.

e) Welding procedures and welders qualification reports.

The certificates shall be considered valid only when signed by Company's Inspector. Only those traps which have been inspected and certified by the Company's Inspector shall be dispatched from Manufacturer's works.

7.0 PAINTING, MARKING AND SHIPMENT

7.1 After all inspection and tests required have been carried out; all external surfaces shall be thoroughly cleaned to remove grease, dust and rust. Surface preparation shall be carried out by shot blasting to SP-10 in accordance with "Steel Structures Painting Council Visual Standard- SSPC-VIS-1". Machined parts shall be coated with anti-rust removable paint and nonmachined parts shall be applied with two coats of protective paint. Manufacturer shall indicate the type of paint used in the drawings submitted for approval.

7.2 Before shipment, traps shall be properly packed against damage during transportation. All machined surfaces subject to corrosion during transit shall be well protected by coat of grease or other suitable material. All traps shall be provided with suitable protectors, for flange faces, securely attached to the traps. Bevel ends shall be protected with metallic or high impact plastic bevel protectors.

7.3 Marking shall be done on a stainless steel plate and affixed to the trap body by means of corrosion resistant fasteners. Marking shall include the following:

- a) Manufacturer's Name
- b) Trap/Neck diameter, thickness
- c) Material
- d) ASME Class Rating
- e) Tag Number
- f) Design pressure
- g) Design Temperature
- h) Year of manufacture
- i) Empty weight of the trap assembly.

8.0 SPARES

8.1 Manufacturer shall recommend and quote separately the spares for traps required for two (2) years of normal operation with special attention to consumable items such as gaskets, seals, etc. for end closure.

8.2 Manufacturer shall recommend and quote unit price separately for the accessories and special tools required for operation & maintenance of the traps.

8.3 Manufacturer shall recommend and supply the spares for Scraper Traps required for start-up & commissioning. As a minimum, the same shall include 200% extra consumable spares viz. gasket/ O-rings etc. and price of all such spares shall be included in the quoted price.

9.0 DOCUMENTATION

Documentation to be submitted by Manufacturer to Company is summarized below. Number of Copies (Hard copies / soft copies etc.) shall be as indicated in CONTRACT document.

9.1 At the time of bidding, Manufacturer shall submit the following documents:

a) General arrangement drawing of scraper trap, quick opening end closure and pig signallars with overall dimensions and list of spares as per clause no. 8.0.

b) Reference list of similar supplies for the past five years including project, client, year of supply, client, location, size, rating, service and contact person.

9.2 After placement of order, the Manufacturer shall submit the following drawings, documents and specifications for company's information & review:

a) Trap assembly and sectional drawings showing all parts and accessories with materials and dimensions.

b) Support Assembly drawing. Hydrotest load on both the supports of the Scraper Trap.

c) Arrangement & details of foundation bolts for pig handling and lifting system, where applicable.

9.3 Prior to shipment, the Manufacturer shall submit the following:

a) Test certificates as listed in clause 6.0 of this specification.

b) Manual for installation, erection instructions, maintenance and operations instructions including a list of recommended spares for the scraper traps.

9.4 Final drawings/ documents as indicated in clause no. 9.2 above shall be submitted in soft format also.

9.5 All documents shall be in English Language only.



STANDARD SPECIFICATION
FOR
INTRUSIVE TYPE PIG SIGNALLERS
(ONSHORE)

P-SPC-314

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ABBREVIATIONS

ANSI	:	American National Standards Institute
API	:	American Petroleum Institute
ASME	:	American Society of Mechanical Engineers
ASTM	:	American Society of Testing and Materials
BHN	:	Brinell Hardness Number
CE	:	Carbon Equivalent
DN	:	Nominal Size
ENP	:	Electroless Nickel Plating
HAZ	:	Heat Affected Zone
LC	:	Lock Close (valve locked in full close position)
LO	:	Lock Open (valve locked in full open position)
LPG	:	Liquefied Petroleum Gas
LTCS	:	Low Temperature Carbon Steel
MSS-SP	:	Manufacturers Standardization Society — Standard Practice
NB	:	Nominal Bore
NDT	:	Non Destructive Testing
NPS	:	Nominal Pipe Size
NPT	:	National Pipe Thread Taper
OD	:	Outside Diameter
OLAC	:	Online Accelerated Cooling
RJ	:	Ring Joint
SSPC	:	Steel Structures Painting Council
SAW	:	Submerged Arc Welded
SMYS	:	Specified Minimum Yield Strength
TMCP	:	Thermo Mechanical Control Process



STANDARD SPECIFICATION FOR INTRUSIVE TYPE PIG SIGNALLERS (ONSHORE)

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1.0 SCOPE

This specification covers the minimum requirements for the design, manufacture, testing and supply of Intrusive Type Pig Signallers, used for the detection of passage of scraper and instrumented gauging pigs, to be installed in onshore pipelines transporting non-sour hydrocarbons in liquid or gaseous phase including Liquefied Petroleum Gas (LPG).

2.0 REFERENCE DOCUMENTS

Reference has also been made in this specification to the latest edition (edition enforce at the time of issue of enquiry) of the following Codes, Standards and Specifications.

- a) ASME B 31.4 : Pipeline Transportation Systems for Liquids and Slurries.
- b) ASME B 31.8 : Gas Transmission and Distribution Piping Systems
- c) MSS-SP-75 : Specification for High Test Wrought Welding Fittings
- d) ASTM A 370 : Standard Test Methods and Definitions for Mechanical Testing Steel Products
- e) ASME SecVIII-DIV. 1: Boiler and Pressure Vessel Code - Rules for Construction of Pressure Vessels.
- f) ASME Sec IX : Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators

In case of conflict between the requirements of this specification and the Codes, Standards and Specifications referred above, the requirements of this specification shall govern.

3.0 MATERIAL

3.1 Material for major components of the pig signallers shall be as indicated in Pig Signaller Data Sheet. Other components shall be as per Manufacturer's Standard suitable for the service conditions indicated in Data Sheet, which will be subject to approval by Company. In addition, the material shall also meet the requirements specified hereinafter.

3.2 Carbon Steel used in the manufacture of Pig Signallers shall be fully killed.

3.3 Scarfed welding base shall have Carbon Equivalent (CE) not greater than 0.45 on check analysis, calculated as per the following formula:

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

4.0 DESIGN AND CONSTRUCTION REQUIREMENT

4.1 Pig signallers shall be designed and manufactured in accordance with the provisions of Codes, Standards and Specifications referred in clause 2.0 of this specification. In addition, design parameters indicated in the data sheets, shall be taken into account for design of pig signallers.

4.2 Pig signallers shall be bi-directional type, having tumbler mechanism and laminated trigger blades. Plunger type pig-signallers are not acceptable. The trigger shall not obstruct or damage a passing pig and the trigger shall not be damaged by a passing pig. The penetration of the trigger into the main pipe shall be kept to a minimum to avoid unnecessary obstruction of the fluid flow. The trigger shall be of SS316 steel.

- 4.3** Design of pig signallers shall be such that any possibility of signaller being operated by line pressure is eliminated. Design of pig signallers shall also be such that repair and installation of internal/accessories are possible under pressure, without removing the unit from the line.
- 4.4** Pig signallers shall be provided with a visual indicator to indicate the passage of pigs, by means of spring loaded metal shaft. The arm shall lock in down position when manually reset.
- 4.5** When specified in Data Sheet, pig signallers shall be fitted with sealed, weather proof and explosion proof microswitch for remote signal indication. The area classification and rating of microswitch shall be as indicated in Data Sheet.
- 4.6** All welds shall be made by welders and welding procedures qualified in accordance with the provisions of ASME Section IX.
- 4.7** When specified in the Data Sheet, pig signallers shall be provided with extension, suitable for installation on underground pipeline.

5.0 INSPECTION AND TESTS

- 5.1** The Manufacturer shall perform all inspections and tests as per the requirements of this specification and the relevant codes, standards and specifications, prior to shipment at his Works. Such inspections and tests shall be, but not limited to, the following:
- 5.1.1** All pig signallers shall be visually inspected. The internal and external surfaces shall be free from any strikes, gouges and other detrimental defects. The surfaces shall be thoroughly cleaned and free from dirt, rust and scales.
- 5.1.2** Hydrostatic test shall be conducted at a pressure equal to 1.25/ 1.5 times the design pressure for liquid / gas service as indicated in data sheet. Hydrotest duration shall be 15 minutes.
- 5.1.3** All weld joints shall be non-destructively examined by ultrasonic method for butt welded joints and by ultrasonic method/ magnetic particle method for Socket welded joints. The acceptance criteria shall be as per ASME Section VIII Division 1, Appendix 12 (for ultrasonic method) & Appendix 6 (for magnetic particle method).
- 5.1.4** The welding end up to 50 mm shall be inspected ultrasonically over the entire circumference for lamination type defects. Laminations shall not be acceptable. The Bevel shall be examined for detection of Crack by Ultrasonic Test/ Magnetic Particle Test/ Die Penetrant Test. Crack is not acceptable.
- 5.1.5** All forgings shall be wet magnetic particle examined on 100% of the forged surfaces. Method and acceptance shall comply with MSS-SP-53.
- 5.1.6** Manufacturers shall perform functional tests to establish satisfactory performance of both manual and electrical indications.
- 5.2** Company's Inspector reserves the right to perform stage wise inspection and witness tests, including hydrostatic test, as indicated in specification, at Manufacturer's Works prior to shipment. Manufacturer shall give reasonable notice of time and shall provide without charge reasonable access and facilities required for inspection, to the Company's Inspector.
- Inspection and tests performed/witnessed by Company's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and tests.

6.0 TEST CERTIFICATES

Manufacturer shall submit the following test certificates:

6.1 Test certificates for material compliance as per relevant material standards.

6.2 Test certificates of hydrostatic and functional tests.

6.3 Test reports of ultrasonic/magnetic particle/ Die Penetrant inspection.

7.0 PAINTING, MARKING AND SHIPMENT

7.1 After all inspection and tests required have been carried out, the exterior surface of the pig signaller shall be thoroughly cleaned, freed from rust and grease and applied with sufficient coats of corrosion resistant paint. In case of pig signallers with extension, the buried portion shall be painted with 100% solid high build epoxy with a minimum dry film thickness of 800 microns or 1.5 mm thick Polyurethane coating. Manufacturer shall indicate the type and corrosion resistant paint used in the drawings submitted for approval.

7.2 A corrosion resistant metal tag shall be permanently attached with each unit, with the following marking:

i) Manufacturer's name.

ii) Suitable for installation in mm dia. pipeline

iii) ANSI Rating

iv) Tag No.

7.3 Each unit shall be suitably protected to avoid any damage during transit. Care shall be exercised during packing to prevent any damage to the welding ends. All machined surfaces subject to corrosion shall be well protected by a coat of grease or other suitable materials.

8.0 SPARES AND ACCESSORIES

8.1 Manufacturer shall furnish list of recommended spares and accessories for pig signallers required during start-up and commissioning and supply of such spares shall be included in the price quoted by Manufacturer.

8.2 Manufacturer shall furnish list of recommended spares and accessories (including jacketing bracket) required for two years of normal operation and maintenance of pig signallers and price for such spares shall be quoted separately.

9.0 DOCUMENTATION

Documentation (Hard copies / soft copies etc.) to be submitted by Manufacturer to Company is summarized below.

9.1 At the time of bidding, Manufacturer shall submit the following documents:

a) General arrangement drawings with overall dimensions and cross-sectional drawings.

b) Reference list of similar supplies of pig signaller shall be furnished including Project, Year of supply, Client, Size, Rating and Service for the last Seven years.

9.2 After placement of order, the Manufacturer shall submit the following drawings, documents and specifications for company's information & review.

a) Sectional arrangement drawings showing all parts with reference numbers and material specification including mounting details of pig signallers on the pipeline/ traps & painting/coating details.

b) Assembly drawing with overall dimensions

c) Cable connection details and cable specification.

9.3 Prior to shipment, Manufacturer shall submit to Company the following:

a) Test Certificates as per clause 6.0 of this specification.

b) Manual for installation, erection instructions, maintenance and operation instructions.

9.4 Final drawings/ documents as indicated in clause no. 9.2 above shall be submitted in soft format also.

9.5 All documents shall be in English language



STANDARD SPECIFICATION FOR PAINTING

SPECIFICATION NO.
P-SPC-410

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STANDARD SPECIFICATION FOR PAINTING

P-SPC-410

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1.0 GENERAL

- 1.1 This technical specification shall be applicable for the work covered by the contract, and without prejudice to the provisions of various codes of practice, standard specifications etc. It is understood that contractor shall carry out the work in all respects with the best quality of materials and workmanship and in accordance with the best engineering practice and instructions of Engineer-In-Charge.

Wherever it is stated in the specification that a specific material is to be supplied or a specific work is to be done, it shall be deemed that the same shall be supplied or carried out by the contractor. Any deviation from this standard without written deviation permit from appropriate authority will result in rejection of job.

1.2 SCOPE

- 1.2.1 Scope of work covered in the specification shall include, without being limited to the following.

- 1.2.2 This specification defines the requirements for surface preparation, selection and application of primers and paints on external surfaces of equipment, vessels, machinery, piping, ducts, steel structures, external & internal protection of storage tanks for all services, MS Chimney without Refractory lining and Flare lines etc. The items listed in the heading of tables of paint systems is indicative only, however, the contractor is fully responsible for carrying out all the necessary painting, coating and lining on external and internal surfaces as per the tender requirement.

1.2.3 Extent of Work

- 1.2.3.1 The following surfaces and materials shall require shop, pre-erection and field painting:

- a. All un-insulated C.S. & A.S. equipment like columns, vessels, drums, storage tanks (both external & internal surfaces), heat exchangers, pumps, compressors, electrical panels and motors etc.
- b. All un-insulated carbon and low alloy piping, fittings and valves (including painting of identification marks), furnace ducts and stacks.
- c. All items contained in a package unit as necessary.
- d. All structural steel work, pipe, structural steel supports, walkways, handrails, ladders, platforms etc.
- e. Flare lines, external surfaces of MS chimney with or without refractory lining and internal surfaces of MS chimney without refractory lining.
- f. Identification colour bands on all piping as required including insulated aluminium clad, galvanised, SS and nonferrous piping.
- g. Identification lettering/numbering on all painted surfaces of equipment/piping insulated aluminium clad, galvanized, SS and non-ferrous piping.
- h. Marking / identification signs on painted surfaces of equipment/piping including hazardous service.

- i. Supply of all primers, paints and all other materials required for painting (other than Owner supplied materials)
- j. Over insulation surface of equipments and pipes wherever required.
- k. Painting under insulation for carbon steel, alloy steel and stainless steel as specified.
- l. Painting of pre-erection/fabrication and Shop primer.
- m. Repair work of damaged pre-erection/fabrication and shop primer and weld joints in the field/site before and after erection as required.
- n. All CS Piping, equipments, storage tanks and internal surfaces of RCC tanks in ETP plant.

1.2.3.2 The following surfaces and materials shall not require painting in general. However, if there is any specific requirement by the owner, the same shall be painted as per the relevant specifications:

- a. Un-insulated austenitic stainless steel.
- b. Plastic and/or plastic coated materials
- c. Non-ferrous materials like aluminum.

1.2.4 Documents

1.2.4.1 The contractor shall perform the work in accordance with the following documents issued to him for execution of work.

- a. Bill of quantities for piping, equipment, machinery and structures etc.
- b. Piping Line List.
- e. Painting specifications including special civil defence requirements.

1.2.5 Unless otherwise instructed, final painting on pre-erection/ shop primed pipes and equipments shall be painted in the field, only after the mechanical completion, testing on systems are completed as well as after completion of steam purging wherever required.

1.2.6 Changes and deviations required for any specific job due to clients requirement or otherwise shall be referred to PLECO for deviation permit.

2.0 CODES & STANDARDS

Without prejudice to the specifications of the contract, the following codes and standards shall be followed for the work covered by this contract.

IS: 5 Colors for ready mixed paints and enamels.

RAL DUTCH International Standard for colour shade (Dutch Standard)

IS: 101 Methods of test for ready mixed paints and enamels,

IS: 161 Heat resistant paints.

- IS: 2074 Specifications for ready mixed paint, red oxide zinc chrome priming.
- IS: 2379 Color code for identification of pipelines.
- IS: 2932 Specification for enamel, synthetic, exterior (a) undercoating. (b) Finishing.

3.0 CONDITIONS OF DELIVERY

Packaging

Every recipient will be fitted with a hermetically-sealed lid with an opening that is sufficiently large to allow the contents to be stirred: the outside and inside are protected against oxidation, and, the lid, are marked with a strip of color identical to the contents.

4.0 COMPOSITION OF THE PAINT PRODUCTS USED

a) Quality

The composition and quality of the products may not differ from batch to batch. A batch is all of the products of a specified manufacture. If the analyses of products bring to light that the composition does not conform to the specifications of the paint manufacturer, the OWNER may refuse to use this batch of products. The paint products must comply with the following conditions

- They must have the viscosity necessary for the described use and the established condition: use of the brush - paint roller (spray gun only for special cases and in the workshop)

b) Quality control - Sampling

While the works are in progress on the construction site, the OWNER may carry out sampling on the paint being used for the purpose of checking conformity. The paint products must be made available free of charge to the laboratory or the approved supervisory body in sufficient quantities so that all the tests can be carried out on the same batch.

If analyses reveal a non-conformity in the composition of the products used (tolerance of $\pm 3\%$ of the dosage of every component), the OWNER may refuse application of the product under consideration, halt the work and have the nonconforming product already applied removed.

Before proceeding the work, a product that does conform will be required. The only Purpose of the analysis is to reveal any nonconformity of the composition of the products. Their purpose is therefore not to assess the quality of the different components. The analyses concerned are not acceptance tests of the products supplied and in no way affect the obligations of the contractor specified in the contract towards the OWNER.

5.0 IDENTIFICATION

Every recipient will bear the following information:

- Name of the manufacturer
- Date and number of manufacture
- Name of the product type
- Batch no
- Net weight of the produced or the contents of the recipient
- Date of the expiry.

At the time of delivery, this packaging must bear labels in conformity with the legal stipulations in force.

Leaving the site after work

After completion of a job a general clean-up shall be carried out by the Contractor to remove all debris, materials or irregularities that his work has brought to the site so that it is left tidy:

The restoration work includes among other things:

- The removal of abrasives.
- The removal of the different protective coverings.
- The Contractor will make the required repairs to any damage after refitting the supports.
- The removal of paint and cleaning of the stains on the floor.

6.0 SURFACE PREPARATION STANDARDS

Following latest edition of standards shall be followed for surface preparations:

1. Swedish Standard Institution- SIS-05 5900-1967/ISO 8501-1
2. Steel Structures Painting Council, U.S.A. (Surface Preparation Specifications (SSPC-SP)
3. British Standards Institution (Surface Finish of Blast-cleaned for Painting) BS-4232.
4. National Association of Corrosion Engineers. U.S.A. (NACE).
5. IS-1477-1971 (Part-1) - Code of Practice for Painting of Ferrous metals in Buildings. (Part 1, Pre-treatment)
 - a) The contractor shall arrange, at his own cost to keep a set of latest edition of above standards and codes at site.
 - b) The paint manufacturer's instruction shall be followed as far as practicable at all times. Particular attention shall be paid to the following:

- Proper storage to avoid exposure as well as extremes of temperature.
 - Surface preparation prior to painting.
 - Mixing and thinning.
 - Application of paints and the recommended limit on time intervals between coats.
- c) Any painting work (including surface preparation) on piping or equipment shall be commenced only after the system tests have been completed and clearance for taking up painting work is given by the OWNER, who may, however, at his discretion authorize in writing, the taking up of surface preparation or painting work in any specific location, even prior to completion of system test.

7.0 PREPARATION OF THE SURFACES

7.1 General Specifications

The cases that occur in practice on building sites, with regard to painted surfaces, can be broken down as follows:

- Material of which the oxide content disappears by natural oxidation.
- Material that has already been covered with a layer of paint in the workshop.
- Material that is covered with old paint layers that show different degrees of weathering.

Good preparation of surface is the best guarantee for good anti-corrosion protection.

Paintwork may never begin until the surface to be treated is dry and is independent of the base coat and cleared of dirt, dust, rust, scale, grease, salt attack, cement powder, cement mud-scale, sand, oil, etc.

Based on the environmental conditions of coastal and saline nature, the Painting specification for station pipes defines the complete requirements like:

- Surface preparation standards like NACE etc.
- Sand blasting process
- Color Codes for piping
- Paint materials types and their DFT measurement.
- Selection and application of paints on external surfaces.

The pipeline passes through the coastal and marine environment, the **Table-4** of this specification to be followed for the painting works.

The method of preparation of the surface will be implemented in accordance with the preparation methods described below:

- Bright blast-cleaning
- Mechanical or Power tool cleaning
- Manual or hand tool cleaning

The Contractor should have the required material at his disposal to clean the surfaces to be coated thoroughly in accordance with the preparation methods regardless of the form or the condition of such surfaces. The cleaning devices that might be damaged during the surface preparation shall be screened off by the Contractor.

7.2 Air blast cleaning with abrasive

Before beginning cleaning by blasting, the person carrying out the work will take the following measures:

- Clear the steel surface of oil and/or grease;
- Ensure that each flange collar (section where the sealing is applied) is properly screened off against the blasting and the subsequent works;
- Check that no blasting grains can act into the pipes during this process. Any openings not sealed off must be screened off;
- Where there are valves, regulators and other devices, the manufacturer's identification plate will be dismantled so that all surfaces can be treated. The plate will then be put back again.
- Screen off all non-metal structures such as rubber where there is a filter;
- With valves, operators and other devices, care should be taken to ensure that no metal filings or paint get into the apparatus;
- The OWNER reserves the right to carry out part or all of these works himself.

To prevent rust forming quickly as the result of humidity on the blasted surface, cleaning by blasting may only be carried out when the temperature of the steel surface is at least 3°C higher than the dew-point of the ambient air.

Blasting may not be carried out if the relative degree of humidity exceeds 80%. The choice of the type of blasting medium used depends on local circumstances such as the possible presence of gas and the material to be blasted.

The abrasive to be used must conform to the local law i.e. it may contain no carbon and less than 1% free silicon dioxide. The Sa 3 will always be requested and must at least reach Sa 2½ during the initial stage of the paintwork. For blasting followed by metallization, the surface preparation degree to be achieved is always Sa 3. The degree of cleanliness to be obtained will be inspected in accordance with the Swedish standard SVENSK STANDARD ISO 8501-1-1988 SIS 05.5900.

- Sa 3: surface blasted down to the bare metal; when the surface is inspected with a magnifying glass, scale, rust and foreign bodies must be completely removed and it should be possible to raise a metallic -shine on the treated surface.
- Sa 2 1/2: blasted very carefully. Scale, rust and foreign bodies must be removed in such a way that anything left behind will only be visible as nuances (shading) or strips.

The blast-cleaning will be carried out by means of compressed air free of water and oil.

After the blasting and before painting, the surface should be completely cleaned of blasting material and so forth with a soft brush, a dry cloth or dry compressed air.

7.3 Mechanical or Power tool cleaning

If sandblasting is not permitted or if the metal structures are not easily accessible for blasting or blasting for one reason or other is technically unfeasible, mechanical de rusting can be used instead. With mechanical cleaning by means of chipping, rotating steel brushes and sanding discs, a degree of cleanliness St. 3 should be reached.

St 3: removal of the old paint layers of which the adhesion leaves something to be desired and/or of which the paint layer no longer fulfills the requirements.

If parts are present that are so corroded that St 3 is difficult to achieve, this should be notified to the OWNER representative prior to the start of the works.

N.B:

St. 3: means removal of every old paint layer. Retouching means local polishing with St. 3 or Sa 3 followed by application of the desired painting system.

After mechanical cleaning, the surface should be made dust-free with a cloth or a soft brush, washed with an organic solvent and thoroughly dried off with a dry cloth (e.g. with 1.1.1. Trichloroethane such as Solvethane, Chloroethene).

7.4 Manual or Hand tool cleaning

Manual derusting with the aid of scrapers, steel brushes, sandpaper etc. shall only be permitted in exceptional cases for local repairs. Any deviation there from must be requested from the OWNER/ OWNER 's Representative.

With manual derusting, a surface preparation degree St 3 must be obtained. The length of the handles of the equipment used may not exceed 50 cm.

7.5 Preparation of a surface covered with a layer of paint in the workshop.

This layer is in general applied by the manufacturer, for example, on valves, regulators etc. Layers of this kind will be checked for their proper adhesion in accordance with ASTM D 3359, method A (Standard Test Method for measuring adhesion by tape test). The adhesion should be at least.

If the paint layer shows less adhesion or is incompatible with the rest of the system it should be completely removed. If the paint layer is not removed, the Contractor accepts it in the state in which the coating is found and the guarantee remains in force. The adhesion does not have to be examined if system 63 has already been applied in the workshop on behalf of the OWNER.

The Contractor, who must provide for the protection on the construction site, must therefore obtain the information regarding the treatment of the surface and the quality of the paint that was used and must, moreover, examine the adhesion of the layer on the construction site, the percentage of damage and weathering as well as the value of the preparation of the surface in the workshop together with the thickness thereof that must be supplemented if necessary.

a) Galvanized surface

Galvanized surfaces, both old and new will be carefully roughened up. Every foreign body (concrete splatters, chalk marks, grease and oil stains, etc.) will be removed. Thereafter, rub the surfaces with abundant water and, if necessary, with cleaning products.

To this end, nylon brushes will be used for every kind of dirt as well as for removing zinc salt residue. Thereafter, the surfaces will be treated in accordance with system 21. Where the zinc layer is lacking, it will be derusted manually to a degree of cleanliness St 3, after which a primer coat will be applied in accordance with system 22.

b) Metallized surfaces treated with an impregnation layer

- Degrease with the desired degreasing product:
- Clean under high pressure or with a product prescribed by the paint supplier.

If the paint layer adheres well and is applied on a clean base, the painting system described may be continued. If the percentage of damage and weathering does not exceed 5 % m. retouching may be considered. These partial repairs will be carried out.

If on the other hand, the percentage of damage does exceed 5 %/m or if the layer applied in the workshop comes loose the Contractor must draw the attention of the OWNER to this and carry out the complete application system.

7.6 Preparation of surfaces covered with earlier paint layers that show different degrees of weathering.

If the surfaces do not show deep weathering limited to the spread of rust by small pitted areas or non-penetrative rust in spots, it will very often be sufficient to clean the surfaces with abrasives or with an abrasive disc, then to rub them down with steel wool, remove the dust and wash off. If thick rust appears, in spots, scale rust and active rust canker, this should be removed with needle hammers or stripped away directly by blasting, removing the dust and washing off.

7.7 Preparation of concrete or cement plaster surfaces

Remove unsound paint layers and loose components with scrapers, blades or rotating steel brushes. Thoroughly clean the entire surface with water containing ammonia. Thoroughly remove moss, algae and fungal growths. Where these growths have been removed, treat the area with a fungicide in accordance with the instructions for use.

Once the entire area is completely dry, brush off the dead residue of moss, algae and fungus with a hard brush. In the case of reinforcement steel that has been laid bare, remove as rust, dust and grease as possible and treat with a primer coat. When painting concrete surfaces, they must first be checked for cracks. Cracks larger than 0.3 mm must be repaired with an appropriate system in accordance with the type and extent of the repairs (e.g. injection with epoxy mortar). Repair damage such as cracks and bursts to concrete parts with a two-component mortar or preferably with micro-mortars. Finally check the alkalinity of the surface with the aid of litmus paper and neutralize it if necessary.

7.8 Use of solvents

It is sometimes necessary to use solvents when the surfaces to be painted are streaked with grease or oil. In this case a suitable organic solvent should be applied. The operation should be carried out with the aid of clean brushes or rags and clean solvent.

All the legal specifications in connection with solvents etc. must be adhered to. The OWNER/OWNER's Representative will be informed in advance of any toxicity or flammability. All measures must be taken to prevent any risk of fire and to nick out any possibility of poisoning (ventilation). The Contractor will provide drip collectors to keep the environment free of pollution.

7.9 Condition of the metal after stripping

The Contractor must call in a representative of the OWNER/OWNER's representative or of the Approved supervisory Body responsible for checking the condition of the metal during stripping and informing the OWNER/OWNER's representative immediately of any damage that he might have noticed.

- Deep corrosion of the plates - rivets - bolts
- Faulty welding
- Fittings that appear to be dangerous because of their age.

7.10 Removing coating from surface pipelines

The Contractor must have the equipment necessary for the removal of asphalt from the pipe without damaging the latter (scratching, impact, etc.). The Contractor undertakes to carry out the work in accordance with an approved procedure.

**TABLE-1 (FOR CLAUSE 7.0)
SURFACE PREPARATION STANDARDS**

SL. NO.	DESCRIPTION	VARIOUS INTERNATIONAL STANDARDS (EQUIVALENT)			REMARKS
		ISO 8501-1/ SIS-05 59 00	SSPC-SP, USA	NACE, USA	
1	Manual or hand tool cleaning Removal of loose rust, loose mill scale and loose paint, chipping, scrapping, standing and wire brushing. Surface should have a faint metallic sheen	ST.2	SSPC-SP-2	-	This method is applied when the surface is exposed to normal atmospheric conditions when other methods cannot be adopted and also for spot cleaning during maintenance painting.
2	Mechanical or power tool cleaning Removal of loose rust loose mill scale and loose paint to degree specified by power tool chipping, de-scaling, sanding, wire brushing and grinding, after removal of dust, surface should have a pronounced metallic sheen.	ST.3	SSPC-SP-3	-	
3	Dry abrasive Blast cleaning There are four common grades of blast cleaning				

3.1	<p>White metal</p> <p>Blast cleaning to white metal cleanliness. Removal of all visible rust. Mill scale, paint & foreign matter 100% cleanliness with desired surface profile.</p>	SA 3	SSPC-SP-5	NACE#1	Where extremely clean surface can be expected for prolong life of paint system.
3.2	<p>Near white metal</p> <p>Blast cleaning to near white metal cleanliness, until at least 95% of each element of surface area is free of all visible residues with desired surface profile.</p>	SA 2½	SSPC-SP-10	NACE#2	The minimum requirement for chemically resistant paint systems such as epoxy, vinyl, polyurethane based and inorganic zinc silicate paints, also for conventional paint systems used under fairly corrosive conditions to obtain desired life of paint system.
3.3	<p>Commercial Blast</p> <p>Blast cleaning until at least two-third of each element of surface area is free of all visible residues with desired surface profile.</p>	SA 2	SSPC-SP-6	NO.3	For steel required to be painted with conventional paints for exposure to mildly corrosive atmosphere for longer life of the paint systems.
3.4	<p>Brush-off Blast</p> <p>Blast cleaning to white metal cleanliness, removal of all visible rust, mill scale, paint & foreign matter. Surface profile is not so important.</p>	SA 1	SSPC-SP-7	NO.4	

8.0 METALLISATION

8.1 Applying the metallization

Metallization must be carried out in accordance with ISO 2063,

Metallization is carried out as rapidly as possible after blasting in order to limit corrosion of the pipes (max. 3 hours later). With metallization, a surface preparation degree Sa 3 is compulsory. The roughness of the blasted surfaces should be from 25 to 50µ R_{Max}.

- The metallizing is always carried out on dry parts in good weather conditions (maximum relative humidity 80 %);
- For metallization, a wire composed of 85 % zinc and 15 % aluminum with a minimum guaranteed degree of purity of 99.5 % is used (subject to other specifications). The application thereof is always carried out in accordance with the conditions of the manufacturer and may at all times be submitted to the OWNER's representative.
- The sealant should be applied maximum 3 hours after metallization.
- The sealant must be thinned and applied as per the present specifications. A visual inspection whereby the sealant completely covers the metallization will suffice here.
- When evaluating the metallization, a negative deviation from the minimum coating thickness, to 80 μ for 20% of the measurements will be permitted.

9.0 COATING PROCEDURE AND APPLICATION

9.1 Conditions for carrying out paintwork

Painting may not be carried out in unsuitable conditions.

All preparatory work and painting may only be carried out in dry weather and at a minimum temperature of 10°C, except for special cases requested by the OWNER's Representative.

Unless otherwise stipulated in the specifications of the paint supplier, application of the paint is forbidden if it is forecast that the temperature will fall to below 0°C before the paint is dry. The temperature of the surface to be painted must be at least 3°C higher than the dew point of the ambient air. Application of the paint is also not permitted if there is a danger that the coat of paint will not be dry before dew or condensation sets in.

The work must be stopped:

- If the temperature of the surface to be painted is higher than that described by the supplier.
- In rain, snow, mist or fog or when the relative humidity is higher than 80 %.

Coats that have not yet dried and have been exposed to frost, mist, snow or rain and might thereby be damaged must be removed after drying and the surfaces must be repainted at the expense of the Contractor.

Working in direct sunlight or in hot weather must be avoided,

The first coat of paint must be applied maximum 3 hours after the preparation of the surface if the relative humidity of the air is between 50% and 80%. This time span may be increased to 6 hours if the relative humidity is less than 50%. In all cases, the preparation of the surface must exhibit degree Sa 3 and at the very least the appearance of degree Sa 2 ½ at the time of painting.

The coats of paint may only be applied on carefully cleaned surfaces that must be dry and free of grease and dust.

9.2 Special conditions

Painting may be carried out when the Contractor can be sure that the instructions of the paint supplier have been scrupulously followed with regard to the parameters in the following (non-exhaustive) list:

- Ambient temperature.
- Surface temperature.
- Relative humidity.
- Dew point.
- Drying times.

The Contractor must in this respect be able to produce the instructions for the paint on the site. The OWNER/CONSULTANT will guarantee 100% supervision in this regard during the execution of the work.

In addition, the paintwork may only be carried out to a minimum ambient temperature of 5°C and/or to a maximum relative degree of humidity of 85 %. Application of the paint is also not permitted if there is a danger that the coat of paint will not be dry before dew or condensation sets in.

10.0 PAINT MATERIAL

Manufacturers shall furnish the characteristics of all paints indicating the suitability for the required service conditions. Primer and finish coats shall be of class-I quality and shall conform to the following:

a) Primer (P-1)

Red oxide Zinc Chromate Primer

Type and Composition	Single pack, Modified phenolic alkyd medium pigmented with red oxide and zinc chromate.
Volume solids	30 - 35% (min)
DFT	25 microns/coat (min)
Covering capacity	12 - 13 M ² /Lit/coat

b) Primer (P-2)

High build chlorinated rubber zinc phosphate primer

Type and Composition	Single pack, Air Drying Chlorinated rubber medium Plasticized with unsaponifiable plasticiser pigmented with zinc phosphate
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	Volume solids	35 - 40% (min)
	DFT	30 - 40 microns/coat (min)
	Covering capacity	7 - 8 M ² /Lit/Coat
c)	Primer (P-3)	
	High build zinc phosphate primer	
	Type and Composition	Single Pack, Synthetic medium, pigmented with zinc phosphate.
	Volume solids	40 - 45% (min)
	DFT	35 - 50 microns/coat (min)
	Covering capacity	10 - 12 M ² /Lit/coat
	Heat resistance Upto 80 °C (dry)	
d)	Primer (P-4)	
	Etch Primer / Wash Primer	
	Type and Composition	Two pack Poly vinyl butyral resin medium cured with phosphoric acid solution pigmented with zinc tetroxy chromate.
	Volume solids	7 - 8% (min)
	DFT	8 - 10 microns/coat (min)
	Covering capacity	7 - 8 M ² /lit/coat
e)	Primer (P-5)	
	Epoxy Zinc Chromate Primer	
	Type and Composition	Two packs, Polyamide cured epoxy resin medium pigmented with zinc chromate.
	Volume solids	40 % (min)
	DFT	35 microns/coat (min)
	Covering capacity	11 - 12 M ² /lit/Coat
f)	Primer (P-6)	
	Epoxy Zinc Phosphate Primer	
	Type and Composition	Two packs, Polyamide cured Epoxy resin medium pigmented with zinc phosphate.
	Volume solids	40% (min)

	DFT	35 - 50 microns/coat (min)
	Covering capacity	11 - 12 M ² /lit/coat
g)	Primer (P-7)	
	Epoxy high build M10 Paint (Intermediate Coat)	
	Type and composition	two pack Poly Polyamide cured epoxy resin medium pigmented with micaceous iron oxide. Volume solids 7- 8%
	Volume Solids	50% (min)
	DFT	100 microns/coat (min)
	Covering capacity	5.0 M ² /lit/coat
h)	Primer (P-8)	
	Epoxy Red Oxide zinc phosphate primer	
	Type and Composition	two pack. Polyamine cured epoxy resin pigmented with Red oxide and Zinc phosphate.
	Volume solids	42% (min)
	DFT	30 microns/coat (min)
	Covering capacity	13 - 14 M ² /lit/coat
i)	Primer (P-9)	
	Epoxy based tie coat (suitable for conventional alkyd based coating prior to application of acrylic polyurethane epoxy finishing coat)	
	Type and Composition	Two packs, Polyamide cured epoxy resin medium suitably pigmented.
	Volume solids	50 - 60% (min)
	DFT	50 microns/coat (min)
	Covering capacity	10 - 12 M ² /Lit/Coat
j)	Finish Coats (F-1)	
	Synthetic Enamel	
	Type and Composition	Single pack, Alkyd medium pigmented with superior quality water and weather resistant pigments
	Volume solids	30 - 40% (min)
	DFT	20 - 25 microns/coat
	Covering capacity	16 - 18 M ² /lit/Coat
k)	Finish coat (F-2)	

Acrylic Polyurethane paint

Type and Composition	Two pack, Acrylic resin and iso-cyanate hardener suitably pigmented.
Volume Solids	40% (min)
DFT	30 - 40 microns / coat
Covering Capacity	10 - 12 M ² /lit/ coat

l) Finish Coat (F-3)

Chlorinated Rubber Paint

Type and Composition	Single pack, Plasticised chlorinated rubber medium with chemical & weather resistant pigments.
Volume solids	40% (min)
DFT	30 - 40 microns/coat (min)
Covering capacity	8 - 10 M ² /lit /coat

m) Finish Coat (F-4)

High build chlorinated rubber M10 paint.

Type and Composition	Single pack Chlorinated rubber based high build pigmented with micaceous iron oxide.
Volume solids	40 - 50% (min)
DFT	65 - 75 microns/coat
Covering capacity	6.0 - 7.0 M ² /lit/coat

n) Finish coat (F-5)

Chemical Resistant Phenolic based Enamel

Type and Composition	Single pack phenolic medium suitably pigmented.
Volume solids	35 - 40% (min)
DFT	25 microns/ coat
Covering capacity	15.0 M ² /lit/coat

o) Finish Coat (F-6)

Epoxy High Building Coating

Type and Composition	Two pack. Polyamide-amine cured epoxy resin medium suitably pigmented.
Volume solids	60 - 65% (min)

	DFT	100 microns/coat (min)
	Covering capacity	6.0 - 6.5 M ² /lit/coat
p)	Finish Coat (F-7)	
	High build Coal Tar Epoxy	
	Type and Composition	Two pack, Polyamine cured epoxy resin blended with Coal Tar.
	Volume solids	65% (min)
	DFT	100 - 125 microns/coat
	Covering capacity	6.0 - 6.5 M ² /lit/coat
q)	Finish Coat (F-8)	
	Self-priming epoxy high build coating (complete rust control coating)	
	Type and Composition	Two packs. Polyamide-amine cured epoxy resin suitably pigmented. Capable of adhering to manually prepared surface and old coatings.
	Volume solids	65 - 80% (min)
	DFT	125 - 150 microns/coat
	Covering capacity	4 - 5 M ² /lit/coat
r)	Finish Coat (F-9)	
	Inorganic Zinc Silicate coating	
	Type and Composition	Two packs, self-cured solvent based inorganic zinc silicate coating.
	Volume solids	60% (min)
	DFT	65 - 75 microns/coat
	Covering capacity	8 - 9 M ² /lit/coat
s)	Finish coat (F-10)	
	High build Black	
	Type and Composition	Single pack. Reinforced bituminous composition phenol based resin.
	Volume solids	55 - 60% (min)
	DFT	100 microns/coat (min)
	Covering capacity	5.5 - 6.0 M ² /lit/coat

t) Finish Coat (F-11)

Heat Resistant Aluminium Paint Suitable up to 250°C.

Type and Composition	Dual container (paste & medium). Heat resistant spec varnish medium combined with aluminium flakes.
Volume solids	20 - 25% (min)
DFT	20 microns/coat (min)
Covering capacity	10 - 12 M ² /lit/coat

u) Finish Coat (F-12)

Heat Resistant Silicon Paint suitable up to 400° C.

Type and Composition	Single pack Silicone resin based with aluminium flakes.
Volume solids	20 - 25% (min)
DFT	20 microns/coat (min)
Covering capacity	10 - 12 M ² /lit/coat

v) Finish Coat (F-13)

Synthetic Rubber Based Aluminium Paint Suitable up to 150°C.

Type and Composition	Single Pack, Synthetic medium rubber medium combined with leafing Aluminium,
DFT	25 microns/coat (min)
Covering capacity	9.5 M ² /lit/coat

Notes:

- 1 Covering capacity and DFT depends on method of application. Covering capacity specified above is theoretical. Allowing the losses during application, min specified DFT should be maintained.
2. All paints shall be applied in accordance with manufacturer's instructions for surface preparation, intervals, curing and application. The surface preparation quality and workmanship should be ensured.
3. Selected chlorinated rubber paint should have resistance to corrosive atmosphere and suitable for marine environment,
- 4 All primers and finish coats should be cold cured and air-drying unless otherwise specified.
5. Technical data sheets for all paints shall be supplied at the time of submission of quotations.

6. In case of use of epoxy tie coat, manufacturer should demonstrate satisfactory test for inter coat adhesion. In case of limited availability of epoxy tie coat (P-9) alternate system may be used taking into the service requirement of the system.

7. In case of F-6, F-9, F-1 1 & F-1 2 Finish Coats, No Primer are required.

11.0 MANUFACTURERS

The paints shall conform to the specifications given above and Class-I quality in their products range of any of the-following manufacturer or other approved vendors:

- i) Asian Paints (India) Ltd.
- ii) Bombay Paints
- iii) Berger Paints India Ltd.
- iv) Akzo Nobel
- v) Jenson & Nicholson
- vi) Shalimar Paints

STORAGE

All paints and painting material shall be stored only in rooms to be provided by contractor and approved by OWNER/ OWNER 's Representative for the purpose. All necessary precautions shall be taken to prevent fire. The storage building shall preferably be separate from adjacent, building.

A signboard bearing the words given below shall be clearly displayed outside:
PAINT STORAGE No NAKED LIGHT highly -inflammable

12.0 COLOR CODE FOR PIPING:

- i) For identification of pipelines, the color code as per Table -1 shall be used.
- ii) The color code scheme is intended for identification of the individual group of the pipeline. The system of color coding consists of a ground color and color bands superimposed on it.
- iii) Colors (Ground) as given in Table-2 shall be applied throughout the entire length of un insulated pipes, on the metal cladding & on surfaces. Ground color coating of minimum 2m length or of adequate length not to be mistaken as color band shall be applied at places requiring color bands. Color bands shall be applied as per approved procedure.
- iv) Line coating shall meet DIN 30670 standard for external coating and API 5L RP – 2 for internal coating.
- v) The thickness for the epoxy should be 180 microns, adhesive 200 microns and balance should be PE .
- vi) The minimum coating thickness on weld seam shall be 3.2 mm and minimum coating thickness on body should be 3.2.
- vii) Minimum thickness for liquid epoxy for internal coating should be 100 ± 20 microns.
Max design temperature for coating should be considered +80 °C.

COLOR CODE:

- A) Ball Valve (Above Ground) : Off White
- B) Globe Valve (Above Ground) : Oxford Blue-RAL 5005, IS-519941005

- C) Check Valve(Above Ground) : Oxford Blue-RAL 5005, IS-519941005
- D) Launcher / Receiver : Yellow Golden
- E) Jib Crane / Trolley : Yellow Golden
- F) All underground valves shall have epoxy base coating after surface finish of SA 2:5
- G) Valves and above ground pipes need to be properly blasted to achieve surface finish of Sa 2:5 before the application of paints.

Table 12.1 Colour Coding Scheme for Pipes and Equipment

Sl. No.	Description	Ground Color	First Color Band	Second Color Band
1	COMPRESSED AIR			
a)	Plant Air	Sky Blue	Silver Grey	-
b)	Instrument Air	Sea Green	Black	-
2	GASES			
a)	Charge Gas	Canary Yellow	Signal Red	Smoke Grey
b)	Regeneration Gas	Canary Yellow	White	Dark Violet
c)	Residue Gas	Canary Yellow	White	French Blue
d)	LPG	Canary Yellow	Brilliant Green	White
e)	Acetylene	Canary Yellow	Dark violet	-
	Flare Lines	Heat resistant aluminium		
f)	Fire water and Foam & Extinguisher	Post office red		
3	ALL EQUIPMENT			
a)	Vessels. Columns, exchangers, etc. containing non- hazardous fluids.	Light Grey		
b)	Base Frame/Structure	Black		
b)	All equipment containing hazardous fluids	Canary Yellow		

c)	Pipe carrying hazardous fluids	Bar is to be replaced by Hazardous Marking as per IS:2379 Clause 7.1C		
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IDENTIFICATION SIGN

- i) Colors of arrows shall be black or white and in contrast to the color on which they are superimposed.
- ii) Product names shall be marked at pump inlet, outlet and battery limit in a suitable size as approved by OWNER.
- iii) Size of arrow shall be either of the following:

- a) Color Bands

Minimum width of color band shall be as per approved procedure.

- b) Whenever it is required by the OWNER to indicate that a pipeline carries a hazardous material, a hazard marking of diagonal stripes of black and golden, yellow as per IS:2379 shall be painted on the ground color.

IDENTIFICATION OF EQUIPMENT

All equipment shall be stenciled in black or white on each vessels, column, equipment, and painting as per approved procedure.

INSPECTION AND TESTING

1. All painting materials including primers and thinners brought to site by contractor for application shall be procured directly from manufactures as per specifications and shall be accompanied by manufacturer's test certificates Paint formulations without certificates are not acceptable.
2. The painting work shall be subject to inspection by OWNER/ OWNER's Representative at all times. In particular, following stage wise inspection will be performed and contractor shall offer the work for inspection and approval at every stage before proceeding with the next stage.

In addition to above. record should include type of shop primer already applied on equipment e.g. Red oxide zinc chromate or zinc chromate or Red lead primer etc.

Any defect noticed during the various stages of inspection shall be rectified by the contractor to the entire satisfaction of OWNER/ OWNER's Representative before proceeding further. Irrespective of the inspection, repair and approval at intermediate stages of work. Contractor shall be responsible for

making good any defects found during final inspection/guarantee period/defect liability period as defined in general condition of contract. Dry film thickness (DFT) shall be checked and recorded after application of each coat and extra coat of paint should be applied to make-up the DFT specified without any extra cost to OWNER.

PRIMER APPLICATION

- i. The contractor shall provide standard thickness measurement instrument with appropriate range(s) for measuring.

Dry film thickness of each coat, surface profile gauge for checking of surface profile in case of sand blasting. Holiday detectors and pinhole detector and protector whenever required for checking in case of immerse conditions.

- ii. At the discretion of OWNER/ OWNER's Representative, contractor has to provide the paint manufacturers expert technical service at site as and when required. For this service, there should not be any extra cost to the OWNER.
- iii. Final Inspection shall include measurement of paint dry film thickness, check of finish and workmanship. The thickness should be measured at as many points/ locations as decided by OWNER/ OWNER's Representative and shall be within +10% of the dry film thickness.
- iv. The contractor shall produce test reports from manufacturer regarding the quality of the particular batch of paint supplied. The OWNER shall have the right to test wet samples of paint at random for quality of same. Batch test reports of the manufacturer's for each batch of paints supplied shall be made available by the contractor.

18.0 PAINT SYSTEMS

The paint system should vary, with type of environment envisaged in and around the plants. The types of environment as given below are considered for selection of paint system. The paint system is also given for specific requirements.

- a) Normal Industrial Environment, Table 18.2.
- b) Corrosive industrial Environment, Table 18.3
- c) Coastal & Marine Environment, Table 18.4

Notes 1. Primers and finish coats for any particular paint systems shall be from same manufacturer in order to ensure compatibility.

TABLE 18.1: LIST OF PRIMERS & FINISH PAINTS

PRIMERS	
P-1	Red oxide Zinc chromate Primer
P-2	Chlorinated rubber zinc Phosphate Primer
P-3	High build Zinc phosphate Primer
P-4	Etch Primer/Wash Primer
P-5	Epoxy Zinc Chromate Primer

P-6	Two component Epoxy Zinc Phosphate Primer cured with polyamine hardener
P-8	Epoxy red oxide zinc phosphate primer
<u>FINISH COATS / PAINTS</u>	
F-1	Synthetic Enamel
F-2	Two component Acrylic – Polyurethane finish paint
F-3	Chlorinated Rubber finish paint
F-5	Chemical resistant phenolic based enamel
F-6	High Build Epoxy finish coating cured with polyamide hardener
F-7	High build Coal Tar Epoxy coating cured with polyamine hardener
F-8	Self priming surface Tolerant High Build epoxy coating. cured with polyamine hardener
F-9	Two component Inorganic Zinc Silicate coating
F-10	High build Reinforced bituminous composition phenol based resin.
F-11	Heat resistant synthetic medium based Aluminium paint suitable for 250 deg C
F-12	Two component Heat resistant Silicone Aluminium paint. suitable for 400 deg C
F-13	Synthetic based aluminium Paint suitable for 150 deg C

Table – 18.2: Painting System for Normal Industrial Environment for Piping and Equipment (Above Ground)

Sl. No.	Temp. Range	Surface Preparation	Primer	Finish Coat	Total DFT	Remarks
1	-10 to 20	SSPC-SP-3	One coat P-2 50 microns / coat (min)	One coat F-4 65 microns/ coat (min) Two coats F-3, 30 Microns/coat (min)	175	Primer and Finish coat can be applied at ambient temp.
2	21 to 60	SSPC-SP-6	Two coats P-1, 25 microns/ coat (min.)	Two coats of F-1, 20 microns/coat (min)	90	-
3	61 to 80	SSPC-SP-6	Two coats P-3, 50 microns/ coat (min)	Two coats of F-13, 25 microns/coat (min)	150	-
4	81 to 250	SSPC-SP-6	-	Three coats of F-11, 20 microns/ coat (min)	60	Paint application at ambient temp. curing at elevated temp. during start-up.
5	251 to 400	SSPC-SP-10	-	Three coats of F-12, 20 microns/ coat (min)	60	-do-

Table – 18.3: Painting System for Corrosive Industrial Environment for Piping and Equipment (Above Ground)

Sl. No.	Temp. Range	Surface preparation	Primer	Finish Coat	Total DFT	Remarks
1	-14 to 80	SSPC-SP-10	Two coats P-6, 35 microns / coat (min.)	One coats F- 6, 100 microns coat (min.) and one coats F- 2 40 microns coat (min.)	210	Paint application at ambient temp.

2	81 to 250	SSPC-SP-10	-	Three coats F-11, 20 Microns / coat (min.)	60	Paint application at ambient temp. and curing at 250°C for 4 hours
3	81 to 400	SSPC-SP-10	-	Three coats F-12, 20 Microns / coat (min.)	60	Paint application at ambient temp. and curing at 250°C for 4 hours

Table – 18.4 : Painting System for Coastal and Marine Environment for Piping and Equipment (Above Ground)

Sl. No.	Temp. Range	Surface Preparation	Primer	Finish Coat	Total DFT	Remarks
1	-14 to 80	SSPC-SP-10	Two coats P-6. 35 Microns. coat (Min.)	Two coats F-6, 100 microns /coat (min.) and one coats F-2 40 Microns /coat (min.)	310	Primer and Finish coat application at Ambient temp.
2	81 to 400	SSPC-SP-10	-	- Three coats F- 12, 20 Microns / coat (min.)	60	Paint application. at ambient temp, and curing at 250°C for 4 hours
3	401 to 550	SSPC-SP- 10	-	Three coats F- 12, 20 Microns / coat (min.)	60	Paint application. at ambient temp, and curing at 250°C for 4 hours

Table – 18.5 : Painting System for External Side of Underground Tanks in all areas.

Sl. No.	Temp. Range	Surface Preparation	Primer	Finish Coat	Total DFT	Remarks
External side of un-insulated underground storage tanks:						

1	-40 to 80	SSPC-SP-10	1 coat of F-9 @ 65-75 μ DFT/ coat	3 coats of F-7 @ 100 μ DFT/coat (3x100=300)	365-375	
---	-----------	------------	--	---	---------	--

18.2 Precautions to be taken

Neither the environment of the site nor the marking labels of devices may be covered with paint nor must they be kept free of paint splashes. To this end, it is advisable to use removable masking tape.

Paint splashes, leaks, etc. on any adjacent installations such as measuring apparatus, valves, pipes. Sources of light, insulation, heat insulators, walls, concrete, etc, must immediately be wiped up and the damage repaired before the paint is dry.

Otherwise, the OWNER will be obliged to have the cleaning carried out at the expense of the Contractor. The paint recipient will only be opened at the time of use (unless otherwise specified by the manufacturer).

The product will be mixed in the recipient with the aid of suitable tools and thus homogenized.

18.3 Method of application

Normally, three methods of application will be used on the construction site for the paint products. i.e. with a brush, with a roller or with a spray gun.

- The brush method makes it possible to obtain good penetration of the paint over irregularities in the metal.
- Only this method will be used for application of the base coats, for retouching and for protrusions, welded areas, riveted joints or bolted joints:
- The roller method may be used on large flat surfaces for the intermediate and topcoats.
- The spray gun method must be used in accordance with the instructions of the manufacturer and carried out by qualified personnel.

The Contractor must guarantee that all safety measures have been taken for such work. The spray gun method may only be used on site for places that are difficult to reach with the brush. In this case, a request must be made to the OWNER/ OWNER's Representative for a deviation.

All paintwork will be carried out with good brushes or rollers that are suitable for the type of paint being used and for the form of the material to be painted and fitted with short handles. The maximum length of the brush and roller handles will be 50 cm; longer handles may only be used for places that are absolutely inaccessible. The maximum width of a brush will be 13 cm.

18.4 Application of the coating

Application of the paint will be carried out in accordance with best practice in order to obtain a homogeneous and continuous layer. The OWNER or the Approved Supervisory body demands that

painting of a layer will only be started after acceptance by them of the surface preparation or of the previous layer of paint.

The layers of paint must have a uniform thickness. They must be spread in such a way that all concave parts are dried out and that the surface is completely covered and has a glossy appearance without leaving brush marks and without exhibiting bubbles, foam, wrinkles, drips, craters, skins or gums that arise from weathered paint,

Each layer must have the color stipulated in the tables of the present specifications, which clearly differs from the previous layer, taking account of the Color of the top layer, all of which for the purpose of being able to identify the number of coats and their order of sequence. If the color of the coats is not mentioned in the tables the color difference in consecutive coats must, if possible, be at least 100 RAL. The color of the top layer is given in the table.

The coating power should be such that the underlying layer is not visible. Only 1 layer per day may be applied, unless otherwise specified by the OWNER or the Approved Supervisory Body.

The drying times prescribed by the paint manufacturer must be strictly observed in relation to the environmental conditions before proceeding with the application of the next layer.

The dry coating thickness indicated in the description of the paint systems are minimum thickness. In this connection, the Contractor is obliged to contact the paint manufacturer and conform to his guidelines. The Contractor must respect the thickness specified by the supplier.

18.5 Transporting treated items

In the case of works being carried out in a workshop, the metal structures will be surrounded by ventilated contraction film that prevents damage during transportation. This film may only be applied after complete polymerization of the paint.

19.0 GROUND-LEVEL TRANSITION POINT

19.1 Polyester protection system

The Contractor will provide system 02 over the entire length of the pipes above ground and below ground and up to a height of 20 cm and a depth of 40 cm. perpendicular to the ground level mark. In each case, he must ensure that the jointing below the asphalt is in good condition and assures' faultless adhesion. He will apply the following products over the entire surface area, prepared in accordance with is Sa 3:

- 1) The primer of system 01.
- 2) Reinforced polyester \pm 20 cm above the ground level marker and \pm 5 cm on the asphalt cleaned beforehand (application of reinforced polyester is carried out in accordance with the work method prescribed by the manufacturer). Moreover, in the case of PE, in contrast to asphalt, he will apply a polygon primer to PE immediately before applying the reinforced polyester.
- 3) He will then apply the other coats of system 01a to the surface section and thus cover the reinforced polyester with about 5 cm.

- 4) For new constructions, the polygon primer will be applied to PE and then subsequently processed as described under point 2.

20.0 USE OF SCAFFOLDING

Mounting, maintenance and dismantling of scaffolding for carrying out adaptation and/or paintwork to surface gas pipes or gas transport installations in use;

- The Contractor will specify the cost of scaffolding in the price list.
- The supplementary rental price for delays attributable to the Contractor will be charged to him:
- In his price quotation the Contractor should present the OWNER with diagrams of the scaffolding that he intends to install for carrying out the works of the OWNER.

21.0 QUALITY CONTROLS AND GUARANTEE

- 21.1 The Contractor is responsible for checking the weather conditions to ascertain whether the paintwork can be carried out within the technical specifications.

The Contractor should have the required calibrated monitoring apparatus for this purpose on site (with calibration certificates). The personnel who will have to use this apparatus should have the training for this purpose.

The OWNER or his representative and possibly the approved supervisory body indicated by the OWNER will maintain supervision during the works and inspect the works with random checks. A daily report will be drawn up in relation to the department that maintains supervision of these works.

The supplementary inspection and the supervision by the OWNER or the approved supervisory body do not diminish in any way the liability of the Contractor. The proper execution of the work and the materials used may be checked at any time.

- 21.2 Reference Surfaces

At the start of the works. The OWNER or the approved supervisory body will indicate a few surfaces that the Contractor will prepare and cover in accordance with the recognized method of operation under the inspection and to the satisfaction of all parties; the OWNER or his representative, the approved supervisory body, the contractor and possibly the paint manufacturer. These reference surfaces will serve as a point of comparison for the good adhesion of the paint on the installations as a whole. The parties will together work out a system for the identification of these surfaces in order to be able to monitor the conditions of the coatings over time. If the paintwork on a section of the installations is in a worse condition than the reference surfaces, the Contractor may be obliged to treat these parts again.

- 21.3 Measures to be taken in the event of a dispute

If on delivery of the works no agreement can be reached between the Contractor and the OWNER regarding the conformity of the works to the requirements of these specifications, an Approved Supervisory Body will be Called in. The Approved Supervisory Body will then carry out inspections' on site whereby the following assessment criteria will be used:

- The Swedish standards ISO 8501-1 1988 SS 05.5900 concerning the degree of cleanliness of the areas derusted by blasting, by machine or by hand.
- The wet film thickness of the paint will be measured in accordance with ISO 2808 or ASTM DI 212;
- The dry layer thickness of the film will be measured electronically, will complete statistical information. in accordance will, ISO 2808 or ASTM D 1186.
- The thickness of each layer will be measured in accordance with ISO 2808. ASTM 4138 or DIN 50986.
-
- Adhesion tests will be carried out in accordance with ISO 2409. ASTM 3359 or DIN 53151.
- Traction tests will be carried out in conformity with ISO 4624 or ASTM D 4541.
- The rugosity will be measured electronically in accordance with DIN 4768;
- The non-porosity will be measured with a test tension depending on the type of coating, the layer thickness and after consultation with the Paint manufacturer.
- Any defects in the paint film may be inspected visually by means of a magnifying glass or microscope. If necessary a photographic report may be drawn up in accordance with ASTM Standard D 4121-82.

The final judgment of the Approved Supervisory Body is irrevocable and binding for the Contractor and the OWNER. In the event of non-conformity of the works with the criteria of these specifications, all costs arising from the inspection by the Approved Supervisory Body shall be borne by the Contractor.

21.4 Guarantee

a) General Principles

The Contractor declares that he is aware of:

- The maximum operating temperature of the surfaces to be covered.
- The maximum permitted degree of humidity of the bearing surface.
- The properties of the environment to which the surfaces to be covered are: subject.

b) Summary of the Guarantee.

The contractor fully guarantees the following without reservation:

- The observance of all stipulations of the specifications for paintwork regarding, among other things:

- The preparation of the surfaces.
 - The thickness of each layer.
 - The total thickness of the covering.
- The uniformity of the materials used.
- The repair of all defects before delivery of the works.

The Contractor will carry out the requested repair work as promptly as possible.



**INSPECTION AND TEST PLAN FOR
SCRAPER LAUNCHER/ RECEIVER
(ONSHORE)**

DOCUMENT NO.
PL-ITP-011
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**INSPECTION AND TEST PLAN
FOR
SCRAPER LAUNCHER/ RECEIVER (ONSHORE)**

0	04.01.22	ISSUED AS INSPECTION AND TEST PLAN	PNS	MD	AD	
Rev.	Date	Purpose	Prepared by	Reviewed by	Approved by	



INSPECTION AND TEST PLAN FOR SCRAPER LAUNCHER/ RECEIVER (ONSHORE)

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REVISION RECORD						
Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
	04.01.2022					
		PNS	MD	AD	SK	



INSPECTION AND TEST PLAN FOR SCRAPER LAUNCHER/ RECEIVER (ONSHORE)

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ABBREVIATIONS:

CE	Carbon Equivalent	NPSH	Net Positive Suction Head
DFT	Dry Film Thickness	PO	Purchase Order
DPT	Dye Penetrant Testing	PESO	Petroleum Explosive Safety Organization
DHT	De-hydrogen Heat Treatment	PQR	Procedure Qualification Record
ERTL	Electronics Regional Test Laboratory	PR	Purchase Requisition
FCRI	Fluid Control Research Institute	PMI	Positive Material Identification
HT	Heat Treatment	RT	Radiography Testing
HIC	Hydrogen Induced Cracking	SSCC	Sulphide Stress Corrosion Cracking
ITP	Inspection and Test Plan	TC	Test Certificate
IP	Ingress Protection	TPI or TPIA	Third Party Inspection Agency
IHT	Intermediate Heat Treatment	UT	Ultrasonic Testing
IC	Inspection Certificate	VDR	Vendor Data Requirement
IGC	Inter Granular Corrosion	WPS	Welding Procedure Specification
MRT	Mechanical Run Test	WPQ	Welders Performance Qualification
NDT	Non-Destructive Testing	MPT / MT	Magnetic Particle Testing



INSPECTION AND TEST PLAN FOR SCRAPER LAUNCHER/ RECEIVER (ONSHORE)

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1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of Scraper Launcher/ Receiver (Onshore).

2.0 REFERENCES

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

S.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	FORMAT OF REPORT	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	TPIA
1.0	PROCEDURES						
1.1	Hydro-test, Heat Treatment, NDT and other procedures (as applicable)	Documented Procedures	100%	Procedure Documents	-	H	R
1.2	WPS/ PQR /WPQ	Documented Procedures	100%	Procedure Documents	-	H	R-Existing W-New
2.0	MATERIAL INSPECTION						

INSPECTION AND TEST PLAN FOR SCRAPER LAUNCHER/ RECEIVER (ONSHORE)

S.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	FORMAT OF REPORT	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	TPIA
2.1	Plates, Pipes, Tubes, forgings, Fittings, Fasteners, Gaskets, etc.	Chemical, Physical and other properties as per purchase specification	100%	Mill Test Certificates	H	H	R
2.2	Welding Consumables	Chemical and Physical Properties as applicable	100%	Batch Certificates	W	R	R
3.0	IN PROCESS INSPECTION						
3.1	Material identification for Pressure Parts (Plates, Pipes)	Review of Test Certificates, Markings, Visual and Dimensional inspection, identity co-relation & Transfer of identification marks	100%	Material Clearance Record	-	H	H
3.2	Material identification for Pressure Parts (Forgings, Fittings, Fasteners, Gaskets, etc.)	Review of Test Certificates, Markings, identity co-relation	100%	Material Clearance Record	-	H	R

INSPECTION AND TEST PLAN FOR SCRAPER LAUNCHER/ RECEIVER (ONSHORE)

S.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	FORMAT OF REPORT	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	TPIA
3.3	Non-Pressure Parts (Supports, Internals, etc.)	Review of Test Certificates	100%	Material Test Certificates	-	W	-
3.4	Inspection of Formed Components	NDT of weld seam, as applicable	100%	NDT Report / RT Films	-	W	R
		NDT On knuckle portion after forming - inside & outside	100%	NDT Report	-	W	R
		HT (as applicable)	100%	HT Graph & record	-	W	R
		Test coupon, if applicable	100%	Test Report	-	W	W
		Visual & Dimensional Inspection (Min. Thickness, profile, ovality etc.)	100%	Test Report	-	H	W
3.5	Weld Edge & Set up of pressure parts	Visual & dimensional, Weld edge, root gap, offset, alignment, cleanliness etc.	100%	Inspection Report	-	W	-

INSPECTION AND TEST PLAN FOR SCRAPER LAUNCHER/ RECEIVER (ONSHORE)

S.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	FORMAT OF REPORT	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	TPIA
		NDT (as applicable)	100%	Inspection Report	-	W	-
3.6	Intermediate Inspection of Welds	Visual, Inter-pass temperature, DPT as applicable	100%	Inspection report	-	W	-
		Heat Treatment as applicable	100%	HT Graph & record	-	W	R
3.7	Inspection of finished welds	Visual inspection for reinforcement, undercuts, surface defects, etc.	100%	Inspection report	-	W	-
		Non-Destructive Testing	100%	NDT Report / RT Films	-	W	R
3.8	Visual and dimension check before PWHT (as applicable)	Dimensions, Surface defects, Completeness of equipment.	100%	Inspection report	-	H	R
3.9	Pneumatic Test of RF Pads	Leak Test	100%	Inspection report	-	H	R

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S.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	FORMAT OF REPORT	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	TPIA
3.10	PMI as applicable	PMI	Each Component & weld	Inspection report	H	W	R
4.0	FINAL INSPECTION						
4.1	Visual & Dimensional Inspection after PWHT	Dimensions, Surface defects, Completeness of equipment, Hardness etc.	100%	Inspection report	-	H	H
4.2	Hydrostatic Test	Leak Check	100%	Inspection report	-	H	H
5.0	Painting						
5.1	Final painting (As applicable)	Visual inspection (after surface preparation and final painting for workmanship, uniformity) DFT check	100%	Inspection report	-	H	-



INSPECTION AND TEST PLAN FOR SCRAPER LAUNCHER/ RECEIVER (ONSHORE)

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S.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	FORMAT OF REPORT	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	TPIA
6.0	Documentation & ICs						
6.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Manufacturer TC & IC	-	H	H
6.2	Final Document submission	Compilation of Inspection reports, drawings, etc as per VDR / PR	100%	Final data folder/ Completeness certificate	-	H	H

Legend: H- Hold (Do not proceed without approval), P-Perform, RW - Random Witness (As specified or 10% (min.1 no. of each size and type of Bulk item)), R-Review, W-Witness (Give due notice, work may proceed after scheduled date).

VC

NOTES (As applicable):

1. This document describes the generic test requirements. Any additional test or Inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/STANDARDS referred there in /Job Specification /Approved Documents.



INSPECTION AND TEST PLAN FOR PIG SIGNALLERS

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PL-ITP-012
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INSPECTION AND TEST PLAN FOR PIG SIGNALLERS

0	04.01.22	ISSUED AS INSPECTION AND TEST PLAN	PNS	MD	AD	
Rev.	Date	Purpose	Prepared by	Reviewed by	Approved by	



INSPECTION AND TEST PLAN FOR PIG SIGNALLERS

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REVISION RECORD						
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		PNS	MD	AD	SK	



INSPECTION AND TEST PLAN FOR PIG SIGNALLERS

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ABBREVIATIONS:

CE	Carbon Equivalent	NPSH	Net Positive Suction Head
DFT	Dry Film Thickness	PO	Purchase Order
DPT	Dye Penetrant Testing	PESO	Petroleum Explosive Safety Organization
DHT	De-hydrogen Heat Treatment	PQR	Procedure Qualification Record
ERTL	Electronics Regional Test Laboratory	PR	Purchase Requisition
FCRI	Fluid Control Research Institute	PMI	Positive Material Identification
HT	Heat Treatment	RT	Radiography Testing
HIC	Hydrogen Induced Cracking	SSCC	Sulphide Stress Corrosion Cracking
ITP	Inspection and Test Plan	TC	Test Certificate
IP	Ingress Protection	TPI or TPIA	Third Party Inspection Agency
IHT	Intermediate Heat Treatment	UT	Ultrasonic Testing
IC	Inspection Certificate	VDR	Vendor Data Requirement
IGC	Inter Granular Corrosion	WPS	Welding Procedure Specification
MRT	Mechanical Run Test	WPQ	Welders Performance Qualification
NDT	Non Destructive Testing	MPT / MT	Magnetic Particle Testing



INSPECTION AND TEST PLAN FOR PIG SIGNALLERS

DOCUMENT NO.
PL-ITP-012
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1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of Pig Signallers.

2.0 REFERENCES

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL. NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	PLECO/TPIA
1.0	Procedure						
1.1	Hydrostatic test & NDT and other procedures (as applicable)	Documented Procedures	100%	Procedure Documents	-	H	R



INSPECTION AND TEST PLAN FOR PIG SIGNALLERS

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1.2	WPS/ PQR/ WPQ	Documented Procedures	100%	Procedure Documents	-	H	R-Existing W-New
2.0	Material Inspection						
2.1	Plates, Pipes, Forgings for Trigger, Mounting Nozzle, Gaskets, Visual Indicator, Limit Switch, Fasteners etc.	<ul style="list-style-type: none"> Chemical Properties Tensile/Impact/Hardness/ HIC & other applicable tests NDT (As Applicable) 	As per Purchase Specification	Material Test Certificates/ Lab Test Reports	H	H	R
3.0	In Process Inspection						
3.1	Identification of Plates & Pipes for pressure parts	Review of test certificates & Co-relation of marking	100%	Inspection Report	-	H	-

INSPECTION AND TEST PLAN FOR PIG SIGNALLERS

3.2	Machining of Components	Visual & Dimensional	100%	HT Charts	-	H	-
3.3	Inspection of Welds	<ul style="list-style-type: none"> Visual Applicable NDT 	100%	Inspection Reports/ RT Film	-	H	R
3.4	Heat Treatment	Heat Treatment as applicable	100%	HT Chart/ Record	-	H	R
4.0	Final Inspection						
4.1	Functional Test	Satisfactory Performance	100%	Test Report	-	H	R
4.2	Hydrostatic Test	Leak Check	100%	Test Report	-	H	R
4.3	Visual & Dimensional Inspection	Dimensions & Completeness of Assembly	100%	Inspection Report	-	H	R



INSPECTION AND TEST PLAN FOR PIG SIGNALLERS

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5.0	Painting						
5.1	Corrosion Resistant Painting & / or Antifouling Coating (As Applicable)	<ul style="list-style-type: none">• Painting Scheme• Visual Check• Final DFT Check	100%	Inspection Report	-	H	-
6.0	Documentation & IC						
6.1	Documentation & IC	Issue of IC & Final document completeness certificates	As per PR	IC & Document completeness certificate	-	H	H

Legend: H – Hold (Do not proceed without approval), P – Perform, RW – Random Witness (As specified or 10% (min. 1 no. of each size and type of Bulk item), R – Review, W – Witness (Give due notice, work may proceed after scheduled date).

Notes (as applicable):

1. This document describes the generic test requirements. Any additional test or Inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon)
2. Acceptance Norms for all the activities shall as per PO/PR/STANDARDS referred therein/ Job Specification/ Approved Documents.



CHECKLIST - TECHNICAL

DOCUMENT NO.
P-STD-001

CHECKLIST – TECHNICAL

Bidder confirms following, as a minimum, has been enclosed in the offer.

S.NO.	Requirements	Compiled by Bidder(Tick)
1	Reference List of previous supply of Procured item	<input type="checkbox"/>
2	Filled – up Data Sheets, duly signed and stamped by bidder enclosed.	<input type="checkbox"/>
3	List of recommended commissioning spares and accessories for Procured item.	<input type="checkbox"/>
4	List of recommended spares and accessories for two year normal operation for procured item.	<input type="checkbox"/>
5	Compliance statement duly filled and stamped enclosed.	<input type="checkbox"/>
6	GA & assembly drawings, cross section drawings including part list & material list enclosed.	<input type="checkbox"/>
7	Other technical details & vendor's product catalogues enclosed.	<input type="checkbox"/>

0

04.01.2022

ISSUED AS STANDARD

PNS

MD

AD

REV

DATE

DESCRIPTION

PREP

CHK

APPR

COMPLIANCE STATEMENT

S.No	Requirement	Bidder's Confirmation
1	Bidder confirms that all materials proposed by the bidder are same/ superior to those specified in specification/ data sheets enclosed.	
2	Bidder confirms that the offer is in total compliance with the Technical requirements of the Material Requisition. Bidder confirms that deviation expressed or implied anywhere else in the offer shall not be considered valid.	
3	Bidder confirms that all spares and accessories required for two years of normal operation have been quoted separately.	
4	Bidder confirms that prices for start-up/commissioning spares and accessories have been included in the quoted items.	
5	Bidder confirms that in the event of securing order for the requisitioned item(s), good for manufacturing drawings of ordered item(s) shall have complete details with dimensions, part list and material list including back-up calculations in the first submission, failing which the vendor shall be solely responsible for any likely delay in delivery of item(s).	

Bidder's Signature with Stamp

0	04.01.2022	ISSUED AS STANDARD	PNS	MD	AD
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0	04.01.2022	ISSUED AS STANDARDS	PNS	MD	AD
REV	DATE	DESCRIPTION	PREP	CHK	APPR



DRAWINGS & DOCUMENTS

DOCUMENT NO.
P-STD-005

INFORMATION/ DOCUMENTS / DRAWINGS TO BE SUBMITTED BY SUCCESSFUL BIDDER

Successful Bidder shall submit four copies unless noted otherwise, each of the following:

1. Inspection & test reports for all mandatory tests as per the applicable code as well as test reports for any supplementary tests, in nicely bound volumes.
2. Filled in Quality Assurance Plan (QAP) for Purchaser's/ Consultant's approval. These QAPs shall be submitted in two copies within 15 days from LOI/ FOI.
3. Detailed completion schedule activity wise (Bar Chart), within one week of placement of order.

NOTE:- All drawings, instructions, catalogues, etc., shall be in English language and all dimensions shall be metric units.

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INSTRUCTION TO BIDDER

DOCUMENT NO.
P-STD-006

INSTRUCTION TO BIDDERS

1. Bidder to note that no correspondence shall be entered into or entertained after the bid submission.
2. Bidder shall furnish quotation only in case he can supply material strictly as per this Material Requisition and specification/data sheet forming part of Material Requisition.
3. If the offer contains any technical deviations or clarifications or stipulates any technical specifications (even if in line with MR requirements) and does not include complete scope & technical/ performance data required to be submitted with the offer, the offer shall be liable for rejection.
4. Bidder must submit all documents as listed in checklist with his offer.
5. Supplier must note that stage wise inspection for complete fabrication, testing including the raw material inspected to be carried out.
6. Vendors for bought out items to be restricted to the approved vendor list attached with bid document. Approval of additional vendor if required, for all critical bought out items shall be obtained by the supplier from the purchaser before placement of order. Credentials/PTR of the additional vendor proposed to be submitted by supplier for review and approval of Purchaser/ Purchaser's representative

0	04.01.2022	ISSUED AS STANDARDS	PNS	MD	AD
REV	DATE	DESCRIPTION	PREP	CHK	APPR



REFERENCE LIST

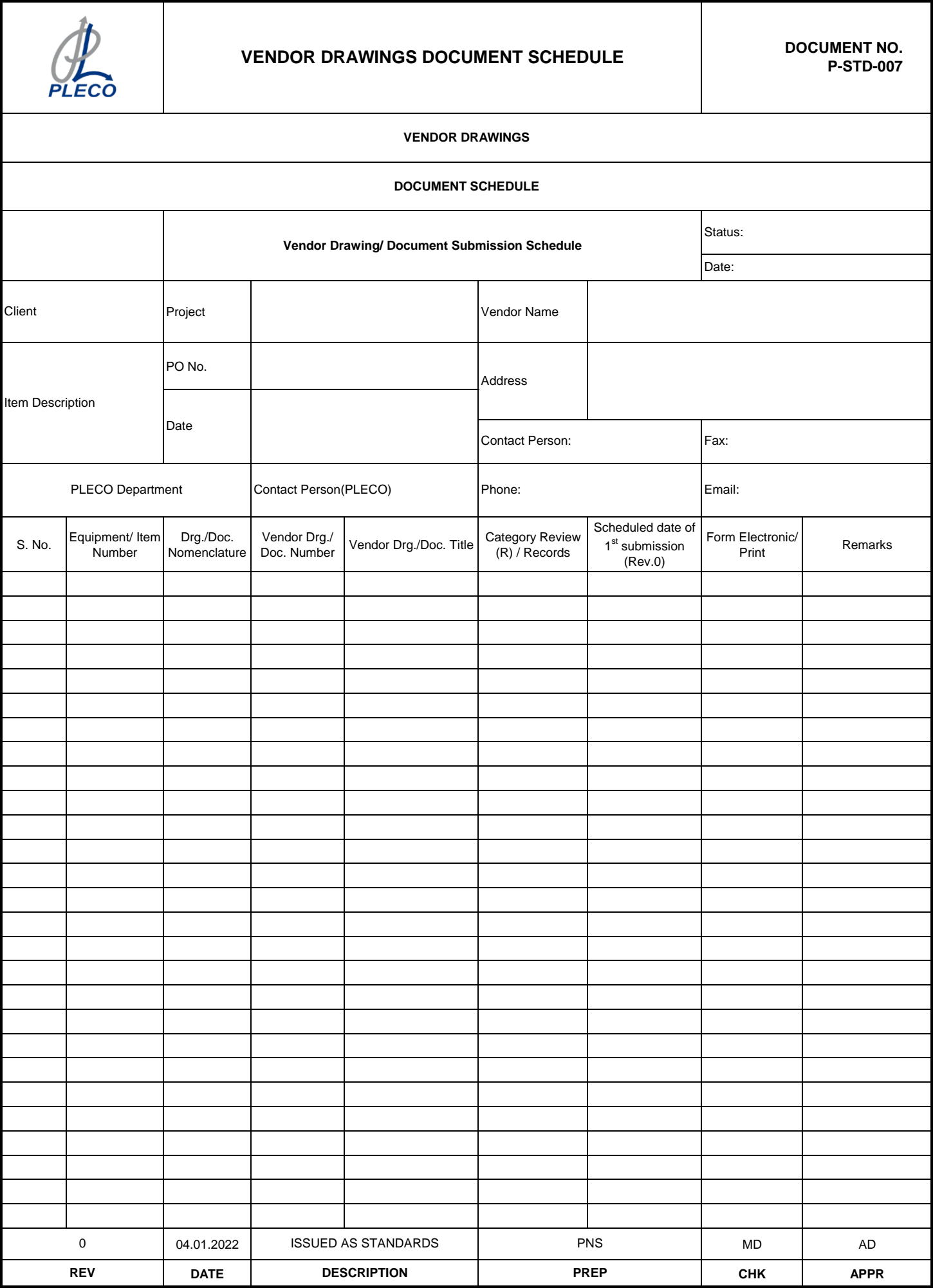
DOCUMENT NO.
P-STD-002

REFERENCE LIST

SI No.	Project	Year of Supply	Client , Address and Contact No.	Email	Size and Rating/ thk	Service

Bidder's Signature with stamp

0	04.01.2022	ISSUED AS STANDARDS	PNS	MD	AD
REV	DATE	DESCRIPTION	PREP	CHK	APPR



	LIST OF RECOMMENDED THIRD PARTY INSPECTION AGENCY (TPIA)			
	CONSULTANT:	Pipeline Engineering Consultants Private Limited (PLECO)		
SL. NO	NAME OF TPI	ADDRESS	PHONE NO	FAX NO
1	Tata Projects Ltd.	22,Sarvodaya Society,Nizampura,Baroda-390002	0265-2392863	0265-2785952
2	Bax counsel Inspection Bureau Pvt. Ltd.	303, Madhava,Bandra Kurla Complex, Bandra(E),Mumbai-400051	022-26591526,022-26590236	022-26591526
3	Germanischer Lloyd	4th Floor, Dakshna Building, Sec-11, Plot NO.2, CBD Belapur, Navi Mumbai 400 614	022-4078 1000	022-4024 2935
4	ABS Industrial Verification Ltd., Mumbai	404,Mayuresh Chambers,Sector-11,CBD Belapur(E),Navi Mumbai-400614	022-27578780 /1 /2	022-27578784 / 5
5	Certification Engineers International Ltd.	EIL Bhavan,5th floor,1,Bhikaji Camma Place, New Delhi-110066	011-26167539,26102121	011-26101419
6	Dalal Mott MacDonald	501, Sakar -II, Ellisbridge,Ahmedabad-380006	079-26575550	079-6575558
7	International Certification Systems	E-7,Chand Society, Juhu Road, Juhu, Mumbai-400049	022-26245747	022-226248167
8	SGS	SGS India Pvt. Ltd.,SGS House,4B,A.S.Marg,Vikhroli(W),Mumbai-400083	022-25798421 to 28	022-25798431 to 33
9	Intertek Moody	9th Floor, Kanchenjunga Building, 18-Barakhamba Road, New Delhi-110001	011-4713 3900	011-4713 3999
10	TUV SUD South Asia	C-153/1, Okhla Industrial Ara, Phase-1, New Delhi-110020	011-3088 9611/9797	011-3088 9598
11	TUV Rheinland (India) Pvt. Ltd.	F-51, Kailash Complex GF, Veer Savarkar Marg, Vikhroli Park Site, Vikhroli(W), Mumbai-400079	022-4215 5435	022-4215 5434
12	Vincott International India Assessment Service Pvt. Ltd.	C-301, Mangalya Premises Cooperative Soc. Ltd, Off. Marol Maroshi Road, Andheri(E), Mumbai-400959	022-4247 4100	022-4247 4101
13	Meenar Global Consultants	Mr. Nitin Taneja (Project Manager)	M: +91-9711212783 T: +91-129-4072836	Web : www.meenaar.in Email : nitin.taneja@meenaar.in
14	VCS Quality Services Pvt. Ltd.	505, 5th floor, 360 Degree Business Park, Next to R-Mall, L.B.S. Marg, Mulund West, Mumbai 400080	Tel: 91 22 21649720	091 22 21646392