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شرکت ملی گاز ایران
مدیریت پژوهش و فناوری
امور تدوین استانداردها

IGS

مشخصات فنی خرید

تجهیزات ارسال و دریافت پیگ

Pig Launcher & Receiver Trap System



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باسلام،

به استحضار می‌رساند در جلسه ۱۹۳۸ مورخ ۱۴۰۰/۰۶/۱۴ هیأت مدیره، نامه شماره گ ۶۸۷۹۶/۰۰۰/۹ مورخ ۱۴۰۰/۰۶/۰۶ آن مدیریت درمورد تصویب نهایی مقررات فنی شرکت ملی گاز ایران به شرح زیر مطرح و مورد تصویب قرار گرفت.

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رونوشت: مدیرعامل محترم شرکت ملی گاز ایران
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Foreword

This standard specification is intended to be mainly used by N.I.G.C. and contractors, and has been prepared base on interpretation of recognized standards and technical documents, as well as knowledge, backgrounds and experiences in gas industries at national and international levels.

Iranian Gas Specification (IGS) are prepared, reviewed and amended by technical standard committees within NIGC standardization division of research and technology management and submitted to "the standards council of NIGC" for approval.

IGSs are subjected to revision, amendment or withdrawal, if required, and thus the latest edition of IGS shall be checked / inquired by NIGC'S users.

This standard must not be modified or altered by NIGC employees or its contractors. Any deviation or conflicts between this specification and other applicable standards, codes, procedure or well-known manufacturer's specifications must be resolved in writing by the user or its representative through Manager, Engineering Department or standardization division of NIGC.

The technical standard committee welcomes comments and feedbacks from concerned or interested corporate and individuals about this standard, and may revise this document accordingly based on the received feedbacks.

General Definitions

Throughout this standard the following definitions, where applicable, should be followed:

- 1- "STANDARDIZATION DIV." is organized to deal with all aspects of industry standards in NIGC. Therefore, all enquiries for clarification or amendments are requested to be directed to mentioned division.
- 2- "COMPANY": refers to National Iranian Gas Company (NIGC).
- 3- "SUPPLIER": refers to a firm who will supply the service, equipment or material to IGS specification whether as the prime producer or manufacturer or a trading firm.
- 4- "SHALL ": is used where a provision is mandatory.
- 5- "SHOULD": is used where a provision is advised only.
- 6- "MAY": is used where a provision is completely discretionary.

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1. SCOPE

This specification defines NIGC's mandatory requirements for the design, manufacturing, fabrication, material selection and relevant components of pig traps for pipeline sizes of 6 to 56 inches and for pressure classes up to 600 inclusive.

This standard specification covers launching and receiving traps for onshore pipeline of sweet natural gas.

2. REFERENCES

Throughout this specification, the following standards and codes are referred to. The edition of these standards and codes those are in effect at the time of issuing of this standard specification are noted in the references. Applicability of any changes in the standards and codes that may occur after issuing the current specification shall be mutually agreed upon by the purchaser and supplier and/or manufacturer.

Scraper trap shall conform to ASME B31.8 and ASME sec VIII and shall be manufactured in accordance with the standards specified herein as supplemented in this standard specification.

ASME B31.8 (2014) "Gas Transmission and Distribution Piping System"

ASME Section VIII (2015) "Pressure Vessel Code"

ASME Section V (2015) "Non-Destructive Examination"

ASME Section IX (2015) "Qualification STD. for Welding and Brazing Procedure"

ASME Section II (2013) "Material Specification"

ASME B16.9 (2012) "Factory Made Wrought Butt Welding Fittings"

ASME B16.5 (2017) "Pipe Flanges and Flanged Fittings"

API 5L (2012) "Specification for Line Pipe"

ANSI B16.25 (2012) "Butt Welding Ends"

ASTM A 516 (2004) "Specification for Pressure Vessel Plate, Carbon Steel, for Moderate and Lower Temperature Service"

ASTM A 234 (2011) "Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service"

ASTM A 350 (2012) "Standard Specification for Carbon and Low Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components"

ASTM A 193 (2012) "Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service"

ASTM A194 (2015) "Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service or both"

ASTM A105 (2014) "Standard Specification for Carbon Steel Forgings for Piping Application"

ASTM A106 (2011) "Standard Specification for Seamless Carbon Steel High Temperature Service"

ASTM A283 (2003) "Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plate"

ASTM A694 (2003) "Standard Specification for Carbon and Alloy Steel Forgings for Pipe Flanges, Fittings, Valves, and Parts for High-Pressure Transmission Service"

MSS SP75 (2008) "Specification for High Test Wrought but Welding Fittings"

MSS SP97 (2001) "Integrally Reinforced Forged Branch Outlet Fittings-Socket Welding, Threaded, and Butt Welding Ends"

ISO 8501-1(2007) "Preparation of Steel Substrates before Application of Paints and Related Products-Visual Assessment of Surface Cleanliness"

IGS-M-PL-031(1) 2020 "Pig Signaler Specification"

IGS-M-PL-022-1 (2000) "Butt Welding End, Carbon Steel Fittings, Size 1/2 in. to 12 in."

IGS-O-CH-042(0) (1385) "Painting Procedure for Gas Industry Installation"

3. DEFINITIONS

Balance line/ Pressurizer

Small – bore line which allows pressurization of the barrel on both sides of a pig at the same time.

Barrel

Enlarged pipe section of a pig trap used for loading or retrieval of pigs

Bayonet Type Closure

Bayonet type quick opening closure consists of two main components, hub and door that a couple of the cams have involved together. Door open or close as turning of door inside the hub (Appendix E – Picture E.1)

Bypass line

Piping between the pipeline and associated plant or facility through which fluid flows under normal operational conditions

Closure

A removable part or assembly, which provides quick and easy access to the barrel when open and seals the bore when closed, designed in accordance with Sec VIII of ASME code.

Company

Natural Iranian Gas Company (N.I.G.C.)

Drain

The system of pipes, opening in the bottom of barrel that used for carrying away waste materials and waters.

Dry Film Thickness (DFT)

The thickness of a coating as measured above the substrate after the coating dries.

Kicker line

Piping from the barrel to the bypass line used to control the launch or receive of a pig.

Mechanical Interlock safety system

An interlock with unique key which will not allow operator to open closure before depressurizing the trap.

Pig

Device which can be propelled through a pipeline by fluid flow and is normally used for various internal activities such as separating fluids, cleaning and inspecting the pipeline.

Pig launcher

Pig trap for launching pigs.

Pig receiver

Pig trap for receiving pigs.

Pig signaler

Device set onto or into a pipe, which gives an indication of the passage of a pig.

Quick Opening Closure

Quick –actuating or quick – opening closures are those that permit substantially faster access to the contents space of a pig trap.

Ring lock type closure

Ring lock Type quick opening closure mechanism is a duplex stainless steel conical trust ring that fitted between the door and hub, transmitting the pressure load uniformly around the full 360° circumferential of hub. (Appendix E –picture E.2)

Spool

Pipe section of a pig trap between the reducer and the pig trap valve, of the same diameter as the pipeline

Viton

Fluorinated

4. SYMBOLS AND ABBREVIATED TERMS

- **QCP:** Quality Control Plan
- **WPS:** Welding Procedure Specification
- **PQR:** Procedure Qualification Report
- **WQT:** Welder Qualification Test
- **WPQ:** Welder Performance Qualification
- **NDT:** Non-Destructive Test
- **NDE:** Non-Destructive Examination
- **NBR:** Nitrile butyl rubber
- **NPS:** Nominal Pipe Size in inches
- **CE_{IW}:** Carbon: Equivalent, based upon the international institute of welding equation

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

HFW pipe

Tubular product having one longitudinal / straight seam produced with a welding current frequency equal to or greater than 150 kHz.

SAWH pipe

Tubular product having one Helical / Spiral seam produced by double submerged-arc welding

**SAWL pipe**

Tubular product having one longitudinal / straight seam produced by double submerged-arc welding

5. BASIC DESIGN, CONSTRUCTION AND RATING**5.1 General**

Onshore scraper traps are generally considered within the scope of the transportation piping code, ASME B31.8 and ASME Sec VIII.

5.2 Design Calculations

Stresses and wall thickness calculations of all components (including the closure) shall be based on pipeline design pressure with design factor (f) of 0.5 calculated as per ASME B31.8 plus corrosion allowance equal to 1.6mm (otherwise specified by purchaser). Dimensions shall be at least in accordance with Appendix D.

5.3 PIG Trap System Component**5.3.1. Barrel and spool**

Cylindrical sections shall be made of seamless pipe (SMLS) or SAWL pipe, PSL2 as per API 5L or from steel plate which rolled with one submerge arc straight weld seam (no intermediate girth weld). SAWH / HFW pipes are not accepted.

5.3.1.1. The barrel shall be designed in accordance with ANSI B 31.8 and has a sufficient length as per Appendix D.

5.3.1.2. The spool piece shall have the same nominal size as the main line with beveled end as per ASME B 31.8. its length shall be as per Appendix D.

5.3.2 Reducers

The reducer shall be eccentric for launcher and concentric for receiver in accordance with ASME B16.9 or MSS-SP 75 and shall have a nominal wall thickness at least equal to the wall thickness of the barrel (with the equal strength).

5.3.3 Branch connections

5.3.3.1 The trap shall be completed with the connections as shown in Appendix D. Weld-o-let and Thread-o-let are only allowed for connections less than or equal to 2 inches' in

diameter. Connections greater than 2 inches in diameter shall use extruded out let type or sweepolet.

5.3.4 Flanges

Flanges shall be of the welding neck type, raised face and serrated finish, in accordance with ANSI B 16.5, class rating 600.

5.3.5 Supports

5.3.5.1. The supports for scraper traps shall be of the sliding type. Material of the pad welded to the barrel and the spool shall be of compatible grade according to the applied standard.

5.3.5.2. Worst loading condition consists of a combination of the following loads shall be considered for the design calculations:

- Trap filled with water.
- Wind speed as per data sheet.
- Earthquake zone as per data sheet.

5.3.5.3 Height of the bottom line of the barrel from foundation level shall be 600 mm for launcher and 800 mm for receiver.

5.3.5.4 All the applied forces and moments on the saddles shall be calculated by the manufacturer and noted on the documentation.

5.3.5.5 Supports should be positioned such that all valves can be removed for maintenance or replacement without removal of the barrel.

5.3.6 Quick opening closures **5.3.6.1** The closure shall be designed in accordance with ASME Sec VIII division 1, UG-35.2. The safe operation of the end closures shall be ensured by the integration of mechanical interlocking device and pressure warning

screw. The mechanized interlocking system shall prevent the closure being opened while the barrel is still under pressure greater than 1 psi.

5.3.6.2. All traps shall be provided with a quick opening, half/ quarter turn handle end closure to allow one-man operation for both opening and closing in approximately one minute without use of any additional devices.

5.3.6.3. The end closure shall be installed in the vertical plane. The type of closure shall be only either Bayonet or Ring lock type as per Appendix E .

5.3.6.3 The design of the end closure shall be suitable for permanent location in open environment.

5.3.6.4 Closure seals should be housed on door to prevent operational damage.

Manufacturer shall supply at least six spare seals for commissioning and recommended quantity for two years of operation.

5.3.7 Pig handling system

Each Launcher / Receiver trap with pipeline sizes of 20 inches and larger shall be provided with a suitable pig handling system. For pipelines with NPS 20 to NPS56, the system shall include a jib type crane and a trolley with rail.

In addition, for pipelines with $NPS \geq 30$, the system shall be equipped with:

- An internal basket tray, for inside the receiver trap.
- A device for inserting the full length of the pig in to the barrel of the launcher trap and extracting the pig from the barrel of the receiver trap. The type and design of the system shall be approved by purchaser.

5.3.7.1. The internal basket tray shall be mounted on wheel, made of non-sparking materials.

5.3.7.2. The jib crane shall be manual operation, floor mounted with hand geared travelling chain hoist for the purpose of lifting or lowering of the pig. Its design load and height under the loading arm shall be as per Appendix D. The crane shall have the working span of minimum 3 meters with the minimum rotation angle of 270 degrees such that lifting and transferring the pig to the barrel from the transporting vehicle is facilitated.

Supplier shall provide all the bolts and nuts for launcher & receiver and jib crane foundation.

5.3.7.3. The trolley shall include mechanism for elevation and traverse adjustments needed for alignment of pig to scraper trap barrel. It shall also have suitable locking and jacking facilities to ensure stability during loading and unloading

operations. Bearings shall be self-lubricated, fully and easily accessible lubricators shall be provided, if it is not possible.

5.3.8 Pig Signaler

A flange type branch 2 inches shall be installed at receiver spool for pig signaler. The pig signaler specification shall be in accordance with latest edition of IGS-M-PL-031.

6. MATERIAL

6.1 The supplied materials for piping components or structural attachments shall conform to the requirements of the applicable codes in this standard specification and shall be traceable by the mill certificates.

6.2 Pipe Material

The pipe used for barrel or spool shall be seamless (SMLS) or single longitudinal double submerge arc weld (SAWL), as per API 5L, grade B, PSL2 and X grades through x70, or ASTM A 106 grade B.

Welding of pipes with different grades is acceptable, provided the differences of wall thickness shall not exceed 0.5 times.

6.3 Closure, Hub and Hinge

These material shall be according to ASTM A 105 (normalized), ASTM A 694 or ASTM A 350 with max $CE_{IIW} = 0.43$.

Size and Material quality of the closure shall be compatible with the barrel to be connected, according to the following Table:

Closure Materials	Barrel Materials
ASTM A105/ A350 LF2	API 5L GR. B/ Equivalent ASTM Material
ASTM A105/ A350 LF2/ A694 F42	API 5L GR. X42/ Equivalent ASTM Material
ASTM A694 F52/60	API 5L GR. X52/ Equivalent ASTM Material
ASTM A694 F52/60	API 5L GR. X60/ Equivalent ASTM Material
ASTM A694 F65/70	API 5L GR. X65/ Equivalent ASTM Material
ASTM A694 F65/70	API 5L GR. X70/ Equivalent ASTM Material

When less than grade of closure materials (according to the Table) are selected, a welding procedure shall be re-established as a new welding procedure specification and shall be completely re-qualified (PQR). Also when the minimum yield strength of hub portion is less than that specified for the barrel to be matched, the minimum thickness of the hub at the welding end (T_{hub}) shall be such that the product of its thickness times its yield strength (at welding end) shall at least equal the product of the specified nominal wall thickness of the barrel (T_{barrel}) and minimum specified yield strength of the barrel to be matched¹ provided the deference of the wall thicknesses shall not exceed 0.5 ². Inside/outside diameter of the hub at the end may be prepared in accordance with ASME B16.25

$$^1: T_{hub} \times SMYS_{hub} \geq T_{barrel} \times SMYS_{barrel}$$

$$^2: T_{hub} \leq 1.5 \times T_{barrel}$$

6.4 Seal Material

The seals shall be made of NBR or Viton with anti- explosive decompression-resistant properties.

6.5 Plate Material

Plate material for barrel/spool/reducer shall be according to ASTM A 516 grades 60, 65 & 70 or API grades.

6.6 Butt Welding Ends Fitting

Butt welding ends fittings shall be in accordance with ASME B16.9 or MSS SP-75.

6.7 Forged Fittings

Forged fittings shall meet the requirements of Appendix C.

6.8 Flanges

Flanges material shall be in accordance with ASTM A 105 (normalized), ASTM A 694 or ASTM A 350.

6.9 Structural Steel

Structural steels used for non-pressure containing parts shall be according to ASTM A 283 or its equivalent.

6.10 Studs and Nuts

Materials of the studs and nuts shall be in accordance with ASTM A 193/A 193M grade B7 or ASTM A 194/A 194M grade 2H and shall be either aluminum coated or electro less nickel plated.

7. FABRICATION

7.1 The trap shall be fully welded construction.

7.2. Barrel shall be a one piece part. The intermediate girth weld is not permitted on barrel except for barrel size 64 inches. The main barrels 64 inches shall have maximum two intermediate girth welds.

7.3 The longitudinal weld shall not interfere with or pass through the outlets or fittings welded to the trap.

7.4 The trap shall be checked before welding to make sure that there is no lamination or any kind of defects on the edges.

7.5 Inside the trap shall be free of any obstructions which could prevent free traveling of pigs.

8. WELDING

8.1 The manufacturer shall be fully responsible for quality of the welding and therefore shall carry out all the tests needed to ensure that the welding procedure and the welds meet all the requirements of the relevant standards.

8.2 Welding shall not be commenced until the WPS has been qualified by relevant PQR.

8.3 Welder and welding operator shall be qualified in accordance with ASME Sec IX.

As a minimum requirement, NDE operators shall be certified to ASNT-TC-1A, Level II with interpretation by supervisors certified to Level III or an approved equivalent. All acceptance NDE shall be carried out after PWHT where required.

8.4 Post Weld Heat Treatment (PWHT)

8.4.1 ASME Sec VIII , div.1 is the applicable code for heat treatment.

8.4.2 PWHT shall be done after accomplishment of all the welding on trap body as per requirements of the design code. No welding or thermal cutting is permitted on stress relieved traps after final PWHT.

8.4.3 All flanges facings and threaded connections must be protected against oxidizing during heat treatment.

8.5 Repair by welding

Repairs by welding on parent metal are not permitted. Repair welds shall be carried out only after specific approval by purchaser's representative for each repair. Repair welding shall be carried out only by welders and welding procedures qualified as per ASME section IX .Records of all the repairs shall be maintained for five years. No individual repair can be attempted more than twice. Back to back weld repair is not accepted.

9. INSPECTION AND ACCEPTANCE CRITERIA

9.1 All inspection and testing shall be performed before painting.

9.2 All components shall be visually examined in accordance with ASME section VIII division1, part UG93 before NDE and hydro testing.

9.3 For the end closure, hub and door material shall be tested by ultrasonic method according to ASME section VIII, division 2.

9.4 All butt welds shall be 100% radio graphed in accordance with the requirements of ASME SEC VIII div.1, appendix 4. If radiography is not possible, Use of ultrasonic examination as an alternative is accepted subject to written agreement of the purchaser and compliance with Appendix 12 of ASME section VIII, division1.

9.5 All welds other than the paragraphs 9.3 and 9.4 shall be inspected by magnetic particle testing (MT) in accordance with the requirements of ASME section VIII, division1, Appendix 6.

9.5.1. Spool bevel ends shall be inspected by MT

9.6 Shop hydrostatic test pressure shall be 1.5 times the design pressure for not less than 4 hours .It will be done before installation of the pig signaler and the safety relief valves.

9.7 Chemical analysis, mechanical properties and impact tests are required for the barrel, reducer and spool in accordance with the design codes.

9.8. Closure door, pig signaler and safety interlocking devices shall be tested for air leakage with 6bar for 30minutes

10. SURFACE PREPARATION AND COATING

10.1 General

The surface shall be shot or grit blasted (sand blast is not acceptable) with cleanliness degree of SA 2 1/2 in accordance with ISO 8501-1. All sharp surface protrusions and all weld splatters shall be removed (flushed) prior to blasting and painting. Manufacturer/Supplier shall ensure that flange finishes are protected from damage during shipment and storage. Machined surfaces shall be coated with an anti-rust compound, easily removable by hydrocarbon solvents, and the entire gasket surface of the flanges shall then be protected using heavy duty plastic flange protectors, bolted or steel-strapped wood, or a metal cover.

No internal coating is required, but rust inhibitor shall be applied on internal surfaces to prevent corrosion during transportation, storage, handling and the hydrostatic test.

10.2 Painting

All external surfaces of the pig trap shall be painted in accordance with the requirements of IGS-O-CH-042.

Note 1: The coating shall be applied in strict accordance with the instruction and specifications recommended by manufacture of the coating material.

Note 2- All unpainted surfaces, e.g. flange surfaces, shall be properly protected against corrosion with anti-rust compound, easily removable by hydrocarbon solvents.

11. QUALITY REQUIREMENTS

11.1 The manufacturer shall maintain a quality program approved by purchaser and shall prepare a written description or check list explaining the documents and procedures being used to produce items in order to meet this IGS standard. The documents and procedures shall be available for purchaser's review prior to the application in production.

Manufacturer shall provide all referred to in clause15, Appendix A.

11.2 The items manufactured according to this IGS standard are subject to verification by the purchaser's inspection representative in accordance with the referred standards as normative references in the clause 2, Appendix A.

12. MARKING

- A name plate of 1.5 mm thickness of stainless steel sheet shall be attached securely by fasteners of the same material as the plate in a visible location on pig trap.

- Name plate shall be marked by die stamping and included the following information as minimum:

a- Vessel manufacturer's name

b- Serial No.

c- Order No.

d- Year of manufacture

e- Applicable design code and standard

f- Size

g- Design pressure

h- Design temperature

i- Hydrostatic test pressure

j- Total weight

k- Post weld heat treatment

l- Maximum allowable working pressure

m- Corrosion allowance

Note: For $NPS \geq 24$, a stainless steel plate shall be fitted to the end closure with permanent marking stating the instruction that operator shall follow for the safe operation of the closure.

13. DOCUMENTATION

13.1 The manufacturer shall submit all calculation and drawing for purchaser's approval at least two weeks prior to the fabrication of the scraper trap to confirm its compliance with this IGS standard.

All correspondence, literature, drawings, etc., shall be in English. Documents in other languages shall not be considered unless the official translation in to English is provided as well.

13.2 Required Final Documents

The manufacturer shall submit three sets of the following documents to purchaser as a part of the order at the time of delivery:

- Certified drawing(s).
- All calculations and stress analyses.
- Works certificate.
- WPS, PQR, WQT/ Welding documentation with weld procedure for all welding performed on pig trap and Welder qualification certificates
- NDE records

- PWHT report and graph
- Installation, operation and maintenance manuals/ Assembly and commissioning instruction
- Inspection certificate issued by purchaser's authorized inspector

The reports shall include, where applicable, the following:

- Ultrasonic testing (UT) results
- Radiography testing (RT) results
- Visual Inspection (VT) reports
- Magnetic Particle testing (MT) results
- Weld repair reports
- A Copy of Hydrostatic Test Charts.
- Material test certificates showing the chemical and mechanical properties of each item of the materials used in manufacturing the pig trap in accordance with EN 10204
- Recommended spare parts for two years of operation
- Warranty by the manufacturer or supplier to provide required closure seals for a period of five years after delivery

14. PACKING AND SHIPMENT

Only those pig traps (include closure and accessories) which have been inspected and certified by purchaser's inspector shall be shipped .All parts shall be thoroughly cleaned and all testing liquids shall be removed before packing. All flanged opening, as well as the beveled or screwed ends shall be protected. The packing shall be appropriate for storage without cover on site for up to three months prior to installation. Indent number and the specific item number shall be clearly identified on each package.

Appendix A

Scope of Inspection

A.1 Review purchase order specification, relevant standards, manufacturer's obligation, approved drawing and all clarification communication and finally check conformity of the goods to this IGS standard specification.

A.2 Review and verify tests certificates of the raw materials for their chemical and mechanical properties, versus the purchase order requirement.

A.3 Review the agreed "QCP" and follow the inspection activities accordingly.

A.4 Review and verify the "WPS" and "PQR" and "WQT/WPQ", in conformity with ASME codes.

A.5 Review and verify the "NDT" reports.

A.6 Review and verify heat treatment method and procedure (if applicable) and Check the related documents.

A.7 Check and verify dimensions of the launcher and receiver traps and the related accessories versus the end user approved drawing.

A.8 Review and verify hydrostatic test procedure and witness its accuracy accordingly.

A.9 Check the type and operation of the quick opening closure in accordance with this IGS standard and the issued purchase order (to be leak proof and equipped with safety device).

A.10 Check pig signaler and its performance according to purchase order requirement, its approved drawings and this IGS standard specification.

A.11 Review documentation of surface preparation prior to coating as per requirements of the purchase order and this IGS standard specification.

A.12 Verify the quality of liquid epoxy as per this IGS standard specification.

A.13 Check the scanned soft copy of all final documentation.

A.14 Check marking as per requirements of this IGS standard specification, after completion of inspection, providing overall results were found satisfactory, and therefore the product shall be certified.

A.15 Check the manufacturer's instruction for adjustment of the quick opening door.

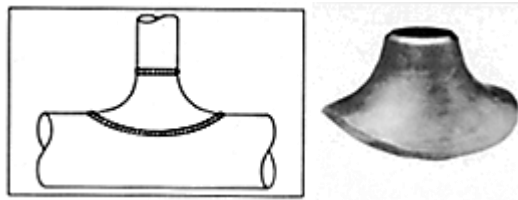
A.16 Check and verify the recommended spare parts.

APPENDIX B

O-Let Specification

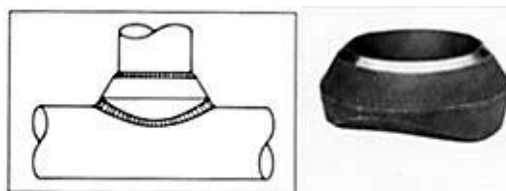
B.1 Sweep-O-Let Specification

Sweep-o-let is a contoured, integrally reinforced, butt-weld branch fitting with a low stress intensification factor for low stresses and long fatigue life. Resembling a saddle, this fitting is strong enough to support the branch line being butt welded to it. The sweep-o-let complies with the requirements of MSS-SP97. Outlet dimensions shall be according to ANSI B.16.9. The fitting class shall be recommended by manufacturer and approved by purchaser.



B.2. Weld-O-Let Specification

Weld-o-let, forged carbon steel, at least in accordance with ASTM A 105 (normalized) or ASTM A 694. Dimensions, finishing, tolerances, testing and marking all shall be in accordance with MSS-SP97. Outlet dimensions shall be according to ANSI B.16.9. The fitting class (STD, XS, or SCH 160) shall be recommended by manufacturer and to be approved by end user.



APPENDIX C

Pipeline Details and Material Components

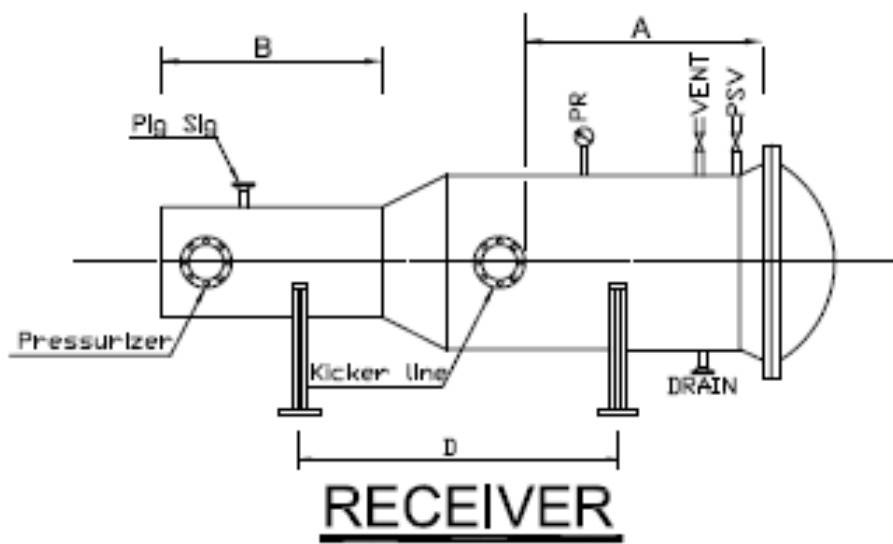
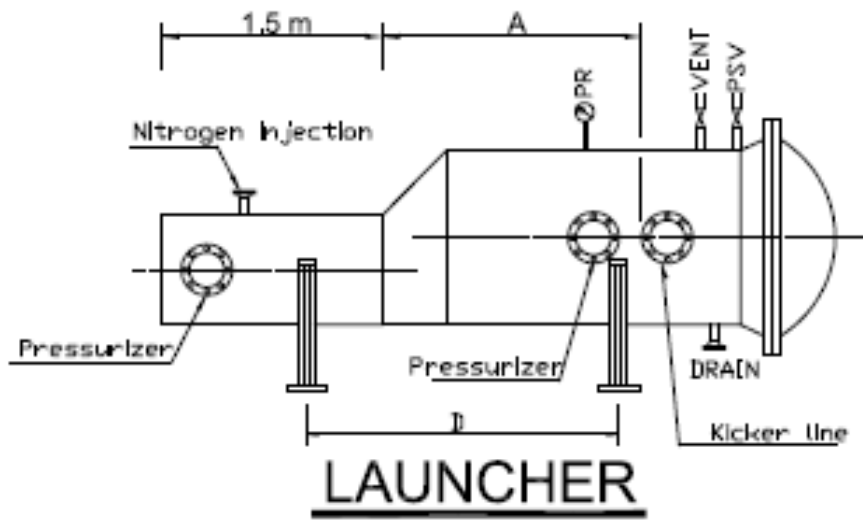
Pipeline Details		Material Components			
		No.	Component	Standard	Other
Material	API 5L	Barrel		API 5L/ASTM A 516, grade 70	
Diameter	in	Spool		API 5L/ASTM A 516, grade 70	
Wall Thickness	in	Reducer		IGS-M-PL-022/ MSS-SP 75	
Design Pressure	psi	Flange		ASTM A105/ ASTM A 694	
Media	Dry Sweet Natural Gas	Butt weld fitting		ASTM A 234 & ASME B16.9/ MSS-SP75	
Ambient Temperature Range	°C	Support		ASTM A 283	
		Support's pad		ASTM A 283	
Mechanical Design Data		Hub/Hinge/ Closure		ASTM A 694/ASTM A 105N/ASTM A 350	
Class Rating	ASME Class	Bolts		ASTM A 193, grade B7	

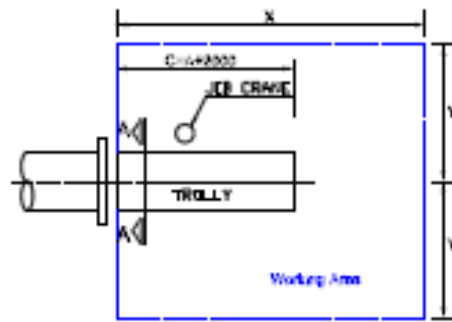
Design Code	ASME B31.8	Nuts		ASTM A 194, grade.2H		
Quick Opening Closure	Design: ASME VIII, Div.1 Type: <input type="checkbox"/> Bayonet <input type="checkbox"/> Ring lock	Closure seal: <input type="checkbox"/> on Door <input type="checkbox"/> on Hub		<input type="checkbox"/> NBR/ <input type="checkbox"/> Viton		
Design Factor	0.5 or Specify by End User	Climatic Conditions				
Wind Velocity:	<input type="checkbox"/> 130 km/h Other.....	Relative moisture:	Elevation from sea level:	Maximum ambient temperature:	Minimum ambient temperature:	
Earth quake zone:	<input type="checkbox"/> 4 Other.....					
Maximum Operating Pressurepsi	Pig Handling System				
Max Operating Temperature °C	Pipeline with NPS 20 to NPS 56		<input type="checkbox"/> Manually Jib Crane Capacity(tons): Height(meter) :		
Corrosion Allowance	<input type="checkbox"/> 1.6mm Other.....					
Hydrostatic Pressure (According to clause 9.6)				<input type="checkbox"/> Trolley with rail		

Air leak, (According to clause 9.7)				Pipeline with NPS≥ 30	<input type="checkbox"/> Manually Jib Crane Capacity(tons): Height(meter) :
Stress Relived	Yes <input type="checkbox"/>	No <input type="checkbox"/>	°C		<input type="checkbox"/> Trolley with rail
Radiography	Yes <input type="checkbox"/>	No <input type="checkbox"/>	%		<input type="checkbox"/> Internal basket for receiver
U.T Inspection	Yes <input type="checkbox"/>	No <input type="checkbox"/>	%		<input type="checkbox"/> Pig inserting & extracting devices
Barrel Slope	Yes <input type="checkbox"/>	No <input type="checkbox"/>	%	External Coating	<input type="checkbox"/> 70μ+140μ epoxy +70μmPU(RAL 9010)

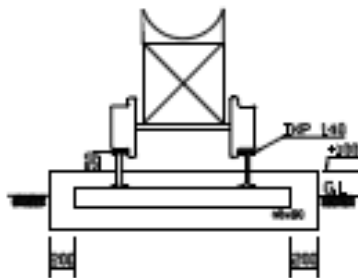
APPENDIX D

Scraper Dimensions

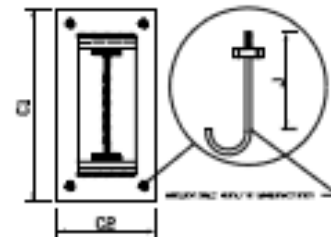




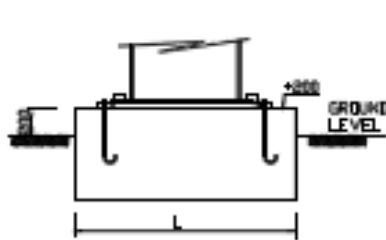
TROLLEY & WORKING AREA



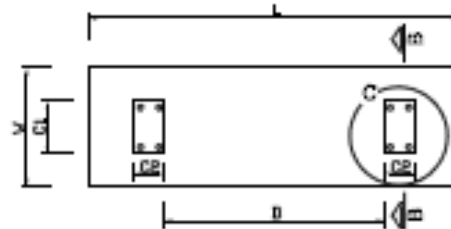
SECTION A-A



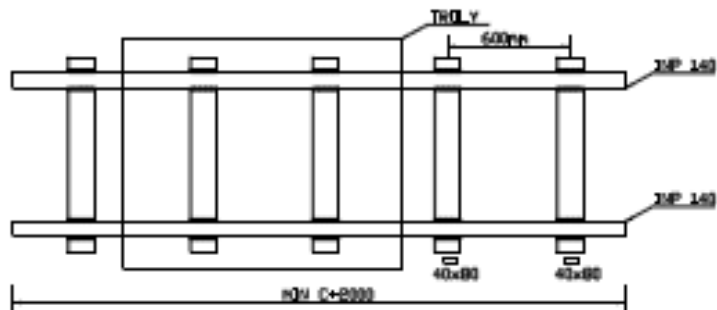
DETAIL C



TYPE SECTION B-B



TYPE PLAN



LINE SIZE	(INCH)	6	8	10	12	16	20	24	30	36	40	42	48	56
BARREL SIZE	(INCH)	10	12	16	16	20	24	30	36	42	48	48	56	64
KICKER LINE	(INCH)	4	4	4	4	6	8	8	10	12	16	16	16	20
DRAIN SIZE (INCH)	Receiver	4	4	4	4	4	4	4	4	6	6	6	6	6
	Launcher	-	-	-	-	-	-	-	-	-	2	2	2	2
VENT	(INCH)	2	2	2	2	4	4	4	4	4	4	4	4	4
PRESURISE	(INCH)	2	2	2	2	2	2	2	2	2	2	2	2	2
PR. GAGE SIZE	(INCH)	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
A	(METER)	2.8	3.9	4.3	4.3	4.3	4.3	4.3	5	5	5	5.6	6	6
B	(METER)	2.8	3.9	4.3	4.3	4.3	4.3	4.3	4	4.5	5	5	5	5
PIG SIG BRANCH	(INCH)	2	2	2	2	2	2	2	2	2	2	2	2	2
TROLLY		-	-	-	-	-	YES	YES	YES	YES	YES	YES	YES	YES
INTERNAL BASKET		-	-	-	-	-	-	-	YES	YES	YES	YES	YES	YES
JIB CRANE	ARM (METER)	-	-	-	-	-	2.5	3	3	3	3.5	3.5	4	4
	CAPACITY (TON)	-	-	-	-	-	1	1	1	2	2	2	3	3
	HEIGHT (METER)	-	-	-	-	-	2.9	3	3	3.1	3.3	3.5	3.6	3.8
Working Area	X (metre)	3.8	4.9	5.3	5.3	6.1	6.1	6.7	7.6	7.6	7.6	7.6	7.6	7.6
	Y (metre)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	3	3	3	3	3

APPENDIX E

Acceptable Types of Closures



E1-Bayonet type



E2-Ring lock type