



شرکت ملی گاز ایران  
مدیریت پژوهش و فناوری  
امور تدوین استانداردها

IGS

مشخصات فنی خرید

تجهیزات ارسال و دریافت پیگ

Pig Receiver & Luncher Trap



تاریخ: ۱۳۹۵/۸/۲۴

شماره: گ.دب/۰-۲۲۵-۱۷۷۶۱



شرکت ملی گاز ایران

دفتر مدیر عامل



## ابلاغ مصوبه هیأت مدیره

مدیر محترم پژوهش و فناوری

باسلام،

به استحضار می‌رساند در جلسه ۱۷۰۳ مورخ ۱۳۹۵/۷/۲۵ هیأت مدیره، نامه شماره گ.۹۸۵۴۸/۰۰۰/۹ مورخ ۹۵/۰۷/۱۹ مدیر پژوهش و فناوری در مورد تصویب نهایی استانداردهای زیر مطرح و با عنایت به اخذ تاییدیه شورای استاندارد مورد تصویب قرار گرفت.

این مصوبه برای کلیه شرکت‌های فرعی لازم الاجرا می‌باشد.

۱. استاندارد تحت عنوان "دستورالعمل ارزیابی آزمایشگاهی ضد کف‌های سیلیکونی مورداستفاده در واحدهای شیرین سازی گاز طبیعی" به شماره استاندارد (IGS-M-CH-059(0))
۲. استاندارد تحت عنوان "مشخصات فنی خرید اتصال سه راهی انشعاب گرم" به شماره استاندارد (IGS-M-PL-033(1)).
۳. استاندارد تحت عنوان "مشخصات فنی خرید تجهیزات ارسال و دریافت پیگ" به شماره استاندارد (IGS-M-PL-028(1)).
۴. استاندارد تحت عنوان "مشخصات فنی خرید آلومینای فعال بعنوان جاذب در کاربردهای نم زدایی" به شماره استاندارد (IGS-M-CH-020(1)).

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## **FOREWORD**

This standard specification cancels and replaces IGS-M-PL-028(0), which has been technically revised, and up dated, it intended to be mainly used by all divisions of N.I.G.C., and has been prepared on interpretation of recognized standards, technical documents, knowledge, backgrounds and experiences in gas industries at national and international levels.

Iranian Gas Standards (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" of approval.

Iranian Gas Standards (IGS) are subjected to revision, amendment or withdrawal, if required, thus the latest edition of IGS shall be checked / inquired by NIGC'S users.

Any comments from concerned parties or individuals in IGS'S are welcomed.

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## 1. SCOPE

This standard specification defines NIGC'S mandatory requirements for the design, manufacture fabrication, material selection and relevant components of scraper traps for pipeline size 6 inches to 56 inches and for pressure class rating up to class rating 600 inclusive.

This standard specification covers launching and receiving trap for sweet natural gas onshore pipelines.

## 2. REFERENCES

Throughout this standard 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. The applicability of changes in standards and codes that occur after the date of standards that referred shall be mutually agreed upon by the purchaser and supplier and/or manufacturer.

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

**ASME B31.8 (2010) "Gas Transmission and Distribution Piping System"**

**ASME Section VIII (2010) "Pressure Vessel Code"**

**ASME Section V (2010) "Non-Destructive Examination"**

**ASME Section IX (2010) "Qualification STD. for Welding and Brazing Procedure"**

**ASME Section II (2010) "Material Specification"**

**ASME B16.9 (2003) "Factory Made Wrought Butt Welding Fittings"**

**ASME B16.5 (2013) "Pipe Flanges and Flanged Fittings"**

**API 5L (2008) "Specification for Line Pipe"**

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

**ASTM A 516 (2001)** "Specification for Pressure Vessel Plate, Carbon Steel, for Moderate and Lower Temperature Service"

**ASTM A 234 (2002)** "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 (2001)** "Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service"

**ASTM A194 (2001)** "Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service or both"

**ASTM A105 (2012)** "Standard Specification for Carbon Steel Forgings for Piping Application"

**ASTM A106 (1999)** "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(1988)** "Preparation of Steel Substrates before Application of Paints and Related Products-Visual Assessment of Surface Cleanliness"

**MIL-C-83286 B (1973)** "Coating Urethane, Aliphatic Isocyanate for Aerospace Applications"

**SSPC-Paint 22 (2004)** "Epoxy Polyamide Paints "Primer, Intermediate, Top Coat"

**IGS-E-PL-031 (2012)** "Pig Signaler Specification"

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

**IGS-M-TP-027 (2013)** "External Liquid Epoxy Coating for Rehabilitation and Repair of Buried Steel Pipe Line, Bends, Field Joints, Valves and Fittings"

### **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 section VIII of ASME code.

#### **Company**

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

#### **Drain**

Small – bore line used to drain fluid from the barrel

#### **Kicker line**

Piping from the major barrel to the bypass line used to control the launch or receipt 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 elastomeric polymer.

**4. SYMBOLS AND ABBREVIATED TERMS**

- **QCP:** Quality Control Plan

- **WPS:** Welding Procedure Specification

- **PQR:** Performance Quality Report



- **WQT:** Welder Qualification Test
  
- **WPQ:** Welder Performance Qualification
  
- **NDT:** Non-Destructive Test
  
- **NDE:** Non-Destructive Examination
  
- **NBR:** Nitrile butyl rubber
  
- **CE<sub>IW</sub>: Carbon:** Equivalent, based upon the international institute of welding equation

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

## 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 section VIII.

### 5.2 Design Calculations

The stresses and wall thickness calculations of all components (include closure) shall be base on pipeline design pressure with design factor (f) 0.5 calculated as per ASME B31.8 plus corrosion allowance equal to 1.6mm (otherwise specify 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 single longitudinal seam pipe (SAWL), PSL2 as per API 5L or from rolled and seam welded steel plate (only one seam) with no intermediate girth weld. SAWH / HFW pipes are not accepted.

**5.3.1.1** The spool piece shall have the same nominal size as the main line size with beveled end as per ASME B 31.8, APPENDIX I.

**5.3.1.2** The barrel shall be designed in accordance with ANSI B 31.8 and has a sufficient length 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.

They shall have a nominal wall thickness at least equal to the wall thickness of the barrel (of 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 equal or smaller than 2 inches. Connections larger than 2 inches shall be extruded outlet or Sweep-O-Let.

### **5.3.4 Flanges**

Flanges shall be welding neck type, raised faced 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 a sliding type. The material of the pad welded to the barrel and spool shall be compatible grade according to applied standard.

**5.3.5.2.** For design calculations, the worst condition of a combination of the following loads shall be considered:

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

**5.3.5.3**The 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 mentioned on the drawings.

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

### **5.3.6 Quick opening closures**

All traps shall be provided with quick opening end closure to allow one man operation for both opening and closing in approximately one minute without use of additional device.

**5.3.6.1** The closure shall be designed in accordance with ASME section VIII division 1. The end closures should incorporate a mechanical interlocking vent to prevent the closure being opened before the release of pressure from the components.

**5.3.6.2.** The end closure shall be installed in the vertical plane. The type of closure shall be only Bayonet or Ring lock type as per Appendix E. The Closure door shall be equipped with an interlock safety device to prevent it being opened while the barrel is still under pressure more than 1 psi.

**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 shall be designed servo acting edged lip seal, self-energizing type. It shall be housed in the door to prevent operational damage.

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

### **5.3.7 Pig handling system**

Each Launcher / Receiver trap with pipeline size 20 inches and larger shall be provided with a suitable Pig Handling System. For pipelines with NPS 20 to NPS56, the system includes a jib type crane and trolley with rail.

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

- An Internal basket tray, for inside receiver trap.

- A devices for the pig inserting into the full length of launcher trap barrel and extracting the pig from the receiver trap barrel. 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, provided with non-sparking materials.

**5.3.7.2.** The jib type crane shall be manual operation, floor mounted with hand geared travelling chain hoist for the purpose of lifting or lowering of the pig. Design load and the height under the loading arm shall be as per Appendix D. The arm reach shall be 3 meters and rotation angle 270 such that the lifting and transferring of the pig to the trap barrel from the transporting vehicle is facilitated. Supplier shall provide all bolts and nuts for launcher & receiver and jib crane foundation.

**5.3.7.3.** The trolley shall include provision for elevating and traverse adjustments necessary for alignment of pig to scraper trap barrel and adequate locking and jacking facilities to ensure stability during loading and unloading operation.

**5.3.7.4.** Bearings shall be Self-lubricated, adequate and easily accessible lubricators shall be provided, if it is not possible.

**5.3.7.5** Where launching and receiving traps are in close proximity, same size. The supplier shall choose a trolley with adequate length on the basis of launching and receiving traps locations as shown on plot plane in Appendix 6.

### **5.3.8 Pig Signaler**

A flange type branch with NPS 2, shall be installed at spool for pig signaler. The pig signaler specification shall be in accordance with IGS-E-PL-031(0).

## **6. MATERIAL**

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

### **6.2 Pipe Material**

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

Welding of pipes with different grades are acceptable, provided the differences of wall thickness shall not exceed 0.5 time

### **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  $CE_{IIW} = \%43$ .

### **6.4 Seal Material**

The seals shall be made of NBR or Viton which have anti explosive decompression-resistant.

### **6.5 Plate Material**

Plate material for barrel/spool/reducer shall be according to ASTM A 516 grade 60/70 or API grade.

### **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**

The 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**

The structural steel used for non-pressure containing parts shall be according to ASTM A 283 or equivalent.

## **6.10 Studs and Nuts**

Studs and nuts shall be aluminum coated or electro less nickel plated. The standards materials are ASTM A 193/A 193M grade B7 and ASTM A 194/A 194M grade 2H.

## **7. FABRICATION**

**7.1** The trap shall be of welded construction throughout.

**7.2.** If pipe is chosen for, there should not be any intermediate girth weld between closure door and reducer.

**7.3** The longitudinal weld shall not interfere nor coincide with outlets or fittings welded to the trap.

**7.4** Before welding, edges shall be verified so as to make sure no flaking, irregularities or defects are present.

**7.5** The inside of the trap shall be free of obstructions which could prevent the traveling freely of pigs.

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## **8. WELDING**

**8.1** The manufacturer shall be responsible for the quality of the welding done by his organization and shall carry out tests to determine its suitability to ensure welds and welding procedure meets all the requirements of the relevant standard.

**8.2** Welding shall not be commenced until the WPS has been qualified.

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

As minimum 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**

**8.4.1** ASME sec.VIII , div.1 shall be the applicable code for heat treatment.

**8.4.2** Post weld heat treatment shall be done after accomplishment of all welding on trap body as per requirements of design code. No welding or thermal cutting is permitted on stress relieved traps after accomplishment of final post weld heat treatment

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

## **8.5 Repair by welding**

Repairs by welding on parent metal are not permitted. Repairs of weld shall be carried out only after specific approval by purchaser's representative for each repair. The repair welding shall be carried out by the welders and welding procedures only qualified as per ASME Section-IX and records for each repair shall be maintained. No individual repair can be attempted more than twice.

## **9. INSPECTION AND ACCEPTANCE CRITERIA**

**9.1** Inspection and testing shall be performed before painting.

**9.2** All components shall be visually examined in accordance with ASME VIII div. 1, part UG93 before NDE and hydro testing.

**9.3** For the end closure, hub and door material shall be ultrasonic tested according to ASME VIII div. 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 Sec.VIII, div. 1.

**9.5** All other welds shall be inspected by magnetic particle testing (MT) in accordance with the requirements of ASME sec VIII div1, Appendix 6.

**9.6** Shop hydrostatic test pressure shall be 1.5 times of design pressure for not less than 4 hours (before installation of pig signaler and safety relief valve).

**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 device shall be air leak tested with 6bar, 30minutes

## **10. SURFACE PREPARATION AND COATING**

### **10.1 General**

The surface shall be shot or grit blasted (sand blasting 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 shipping 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 covered over with heavy duty plastic flange protectors, bolted or steel-strapped wood, or metal cover.

No internal coating is required, but rust inhibitor to prevent corrosion during transport, storage, handling and hydrostatic test is to be applied on internal surface.

### **10.2 Painting**

All external surfaces of pig trap shall be painted with either:

- A primer epoxy polyamide coat, in accordance with SSPC paint 22, with minimum thickness (DFT) of 70 µm

-an intermediate epoxy polyamide coat, in accordance with SSPC paint 22, with minimum thickness (DFT) of 140 µm

-and two-component aliphatic polyurethane top coat, in accordance with MIL-C-83286B, with minimum thickness (DFT) of 70 µm, (white color -RAL9010).

#### **Notes:**

1- The coating application shall be carried out in strict accordance with the coating material manufacturer's recommendations.



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 as approved by purchaser and shall make available for the purchaser's review a written description or check list which explains what documents and what procedures will be used to produce items to meet this IGS standard.

Manufacturer shall provide all steps for controlling elements refer to in clause 15, Appendix A (scope of inspection).

**11.2** The items manufactured to this IGS standard are subject to verification by the purchaser inspection representative in accordance with referred standards as normative references in clause 2.

## **12. MARKING**

- A name plate of 1.5 mm thickness of stainless steel shall be attached with fastener of same material as plate and securely to be attached in a visible location of pig trap.

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

- 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(y/n)
- 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 that the operator shall refer to the manufacturer's instructions 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 2 weeks prior to fabrication of the scraper trap to indicate compliance with this IGS standard.

All correspondence, literature, drawings, etc., shall be in English. Documents in other languages shall not be considered unless legally translated to English.

**13.2 Require Final Documents**

The manufacturer shall submit to the purchaser as part of the order three set of the following documents 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
- Post weld heat treatment report and graph
- Installation, operation and maintenance manuals/ Assembly and commissioning instruction
- Inspection certificate issued by the purchaser nominated inspector

The reports shall contain, where applicable, the following:

- Ultrasonic Testing Results

- Radiography Results
  - Visual Inspection Reports
  - Magnetic Particle Inspection Reports
  - Weld Repair Reports
  - A Copy of Hydrostatic Test Charts.
- 
- Material test certificates showing the chemical and physical properties of each item of material used to manufacture the pig trap in accordance with EN 10204
  - Recommended spare parts for two years of operation
  - Guarantee of the manufacturer/supplier to provide required closure seal 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, 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 goods as per this IGS standard specification.

**A.2** Review and verify raw materials tests certificates for chemical and mechanical properties, used for goods and related parts versus purchase order requirement.

**A.3** Review agreed "QCP" (quality control plan) and follow inspection activities accordingly.

**A.4** Review and verify "WPS" (welding procedure specification) "PQR" (performance qualification report), "WQT/WPQ" (welder qualification test/welder performance qualification) , in conformity with ASME codes.

**A.5** Review and verify "NDT" (non-destructive test) reports.

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

**A.7** Check and verify dimensions for launcher and receiver trap and related accessories versus end user approved drawing.

**A.8** Review and verify hydrostatic test procedure and witness it's accordingly.

**A.9** Check type and operation of quick opening closure in accordance with this IGS standard and 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, related approved drawing and this IGS standard specification.

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

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

**A.13** Check scanned software of all final documentation.

**A.14** Check marking as per requirement of this IGS standard specification, after completion of inspection, providing overall results were found satisfactory, and then good shall be certified.

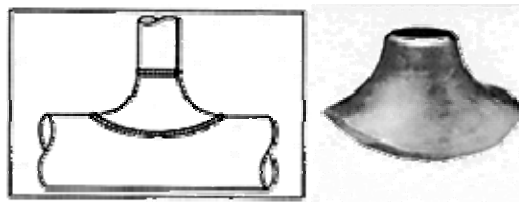
**A.15** Check the manufacturer's instruction for adjustment of quick opening door.

**A.16** Check and verify the recommended spare parts.

## APPENDIX B O-Let Specification

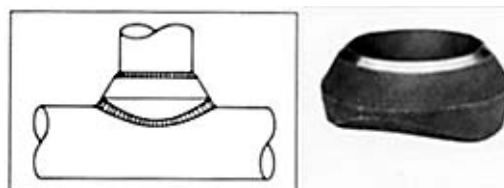
### B.1 Sweep-O-Let Specification

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 dimension 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, finish, tolerances, testing and marking all shall be in accordance with MSS-SP97. Outlet dimension 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

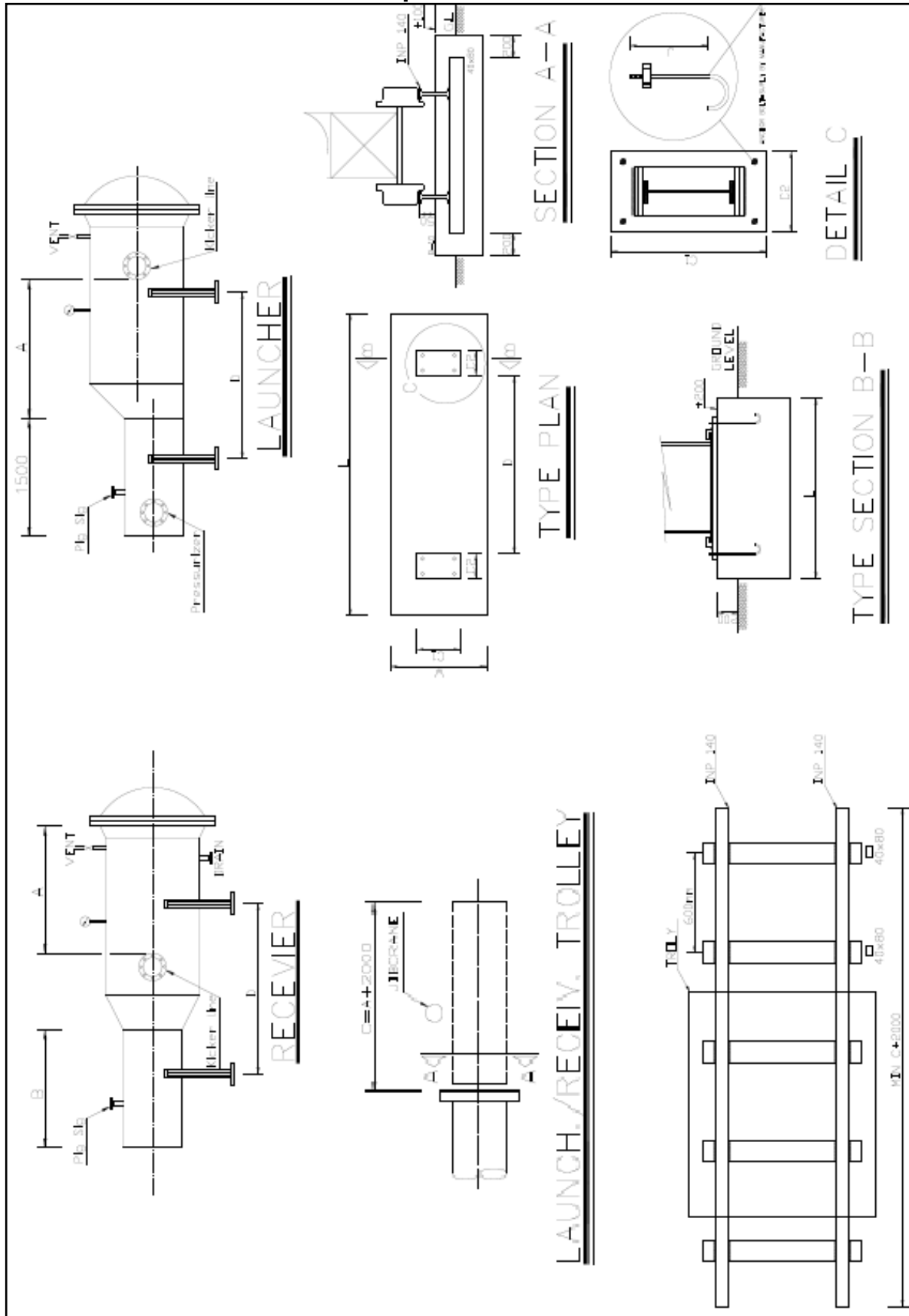
### Pipeline Details and Component's Material

| Pipeline Details              |   | Component's Material       |                              |  |                                    |
|-------------------------------|---|----------------------------|------------------------------|--|------------------------------------|
|                               |   | No.                        | Component                    | Standard   | Other                              |
| Material                      | API 5L  | Barrel                     |                              | API 5L/ASTM A 516,<br>grade 70                               |                                    |
| Diameter                      | In.   | Spool                      |                              | API 5L/ASTM A 516,<br>grade 70                               |                                    |
| Wall Thickness                | In.   | Reducer                    |                              | IGS-M-PL-022/<br>MSS-SP 75                                   |                                    |
| Design Pressure               | psi   | Flange                     |                              | ASTM A105/<br>ASTM A 694                                     |                                    |
| Media                         | Dry Sweet<br>Natural Gas                        | B.W. Fitting               |                              | ASTM A 234 &<br>ASME B16.9/<br>MSS-SP75                      |                                    |
| Ambient Temp.                 | ..... °C  | Support                    |                              | ASTM A 283   |                                    |
|                               |   | Support's pad              |                              | ASTM A 283   |                                    |
| <b>Mechanical Design Data</b> |   | Hub/Hinge/ Closure         |                              | ASTM A 694/ASTM<br>A 105N/ASTM A 350                         |                                    |
| Class Ratin                   | ASME Class                                      | Bolts                      |                              | ASTM A 193,<br>grade B7                                      |                                    |
| Design Code                   | ASME B31.8                                      | Nuts                       |                              | ASTM A 194,<br>grade.2H                                      |                                    |
| Quick Opening Closure         | ASME VIII, Div.1                                | Seal                       |                              | <input type="checkbox"/> NBR/ <input type="checkbox"/> Viton |                                    |
| Design Factor                 | 0.5 or Specify by<br>End User                   | <b>Climatic Conditions</b> |                              |  |                                    |
| Wind Velocity:                | <input type="checkbox"/> 130 km/h<br>Other..... | Relative<br>moisture:      | Elevation from<br>sea level: | Maximum<br>ambient<br>temperature:                           | Minimum<br>ambient<br>temperature: |

|                                    |                              |   |    |                                |  |   |  |
|------------------------------------|------------------------------|---|----|--------------------------------|--|---|--|
| Earth quake zone:                  |                              | <input type="checkbox"/> 4<br>Other.....  |    |                                |  |   |  |
| Maximum Operating Pressure         |                              | .....psi                                  |    | <b>Pig Handling System</b>     |  |   |  |
| Max Operating Temp.                |                              | .....°C                                   |    | Pipeline with NPS 20 to NPS 56 |  | <input type="checkbox"/> Manually Jib Crane<br>Capacity(tons):<br>Height(meter) : |  |
| Corrosion Allowance                |                              | <input type="checkbox"/> 1.6mm Other..... |    |                                |  |   |  |
| Hydrostatic Pressure, 1.5×D.P, 4hr |                              | .....psi                                  |    |                                |  | <input type="checkbox"/> Trolley with rail  |  |
| Air leak, 30 min                   |                              | .....psi                                  |    | Pipeline with NPS≥ 30          |  | <input type="checkbox"/> Manually Jib Crane<br>Capacity(tons):<br>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+140μm epoxy<br>+70μmPU(RAL 9010)                     |  |



**APPENDIX D  
Trap Dimensions**



**APPENDIX D-Con' d**

|                                  |         |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------------------------------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| PIPE LINE SIZE                   | (NPS)   | 6   | 8   | 10  | 12  | 16  | 20  | 24  | 30  | 36  | 40  | 42  | 48  | 56  |
| BARREL SIZE                      | (NPS)   | 10  | 12  | 16  | 16  | 20  | 24  | 30  | 36  | 42  | 48  | 48  | 56  | 64  |
| KICKER LINE SIZE                 | (NPS)   | 4   | 4   | 4   | 4   | 6   | 8   | 8   | 10  | 12  | 16  | 16  | 16  | 20  |
| DRAIN SIZE                       | (NPS)   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 6   | 6   | 6   | 6   | 6   |
| VENT SIZE                        | (NPS)   | 2   | 2   | 2   | 2   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   | 4   |
| PRESURISE SIZE                   | (NPS)   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   |
| PR. GAGE SIZE                    | (NPS)   | 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) | 3   | 3.9 | 4   | 4   | 4.3 | 3.4 | 3.4 | 3.6 | 3.7 | 3.7 | 3.7 | 3.9 | 3.9 |
| B                                | (METER) | 2.5 | 3.3 | 3.4 | 3.4 | 3.5 | 2.4 | 2.4 | 2.3 | 2.2 | 2   | 2   | 2   | 2   |
| PIG SIG BRANCH SIZE(FLANG TYPE)  | (NPS)   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   |
| TROLLEY                          |         | -   | -   | -   | -   | -   | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| RAIL                             |         | -   | -   | -   | -   | -   | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| INTERNAL BASKET                  |         | -   | -   | -   | -   | -   | -   | -   | Yes | Yes | Yes | Yes | Yes | Yes |
| PIG INSERTING&EXTRACTING DEVICES |         | -   | -   | -   | -   | -   | -   | -   | Yes | Yes | Yes | Yes | Yes | Yes |
| JIB CRAIN<br>CAPACITY (TON)      |         | -   | -   | -   | -   | -   | -   | -   | Yes | Yes | Yes | Yes | Yes | Yes |
|                                  |         | -   | -   | -   | -   | -   | 1   | 1   | 1   | 2   | 2   | 2   | 3   | 3   |
| PIG SIG                          |         | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| JIB CRANE HEIGHT                 | (METER) | -   | -   | -   | -   | -   | 2.9 | 3   | 3   | 3.1 | 3.3 | 3.5 | 3.6 | 3.8 |

## APPENDIX E Types of Closures



**E.1 – Bayonet type**



**E.2 – Ring lock type**

### APPENDIX F Back to Back Launcher-Receiver

