MATERIAL AND EQUIPMENT STANDARD

FOR

PIG LAUNCHING AND RECEIVING TRAPS

FIRST EDITION

JUNE 2002

This standard specification is reviewed and updated by the relevant technical committee on Nov. 2014. The approved modifications are included in the present issue of IPS.

FOREWORD

The Iranian Petroleum Standards (IPS) reflect the views of the Iranian Ministry of Petroleum and are intended for use in the oil and gas production facilities, oil refineries, chemical and petrochemical plants, gas handling and processing installations and other such facilities.

IPS is based on internationally acceptable standards and includes selections from the items stipulated in the referenced standards. They are also supplemented by additional requirements and/or modifications based on the experience acquired by the Iranian Petroleum Industry and the local market availability. The options which are not specified in the text of the standards are itemized in data sheet/s, so that, the user can select his appropriate preferences therein

The IPS standards are therefore expected to be sufficiently flexible so that the users can adapt these standards to their requirements. However, they may not cover every requirement of each project. For such cases, an addendum to IPS Standard shall be prepared by the user which elaborates the particular requirements of the user. This addendum together with the relevant IPS shall form the job specification for the specific project or work.

The IPS is reviewed and up-dated approximately every five years. Each standards are subject to amendment or withdrawal, if required, thus the latest edition of IPS shall be applicable

The users of IPS are therefore requested to send their views and comments, including any addendum prepared for particular cases to the following address. These comments and recommendations will be reviewed by the relevant technical committee and in case of approval will be incorporated in the next revision of the standard.

Standards and Research department

No.17, Street14, North kheradmand

Karimkhan Avenue, Tehran, Iran.

Postal Code- 1585886851

Tel: 021-88810459-60 & 021-66153055

Fax: 021-88810462

Email: Standards@nioc.ir

GENERAL DEFINITIONS:

Throughout this Standard the following definitions shall apply.

COMPANY:

Refers to one of the related and/or affiliated companies of the Iranian Ministry of Petroleum such as National Iranian Oil Company, National Iranian Gas Company, National Petrochemical Company and National Iranian Oil Refinery And Distribution Company.

PURCHASER:

Means the “Company” where this standard is a part of direct purchaser order by the “Company”, and the “Contractor” where this Standard is a part of contract documents.

VENDOR AND SUPPLIER:

Refers to firm or person who will supply and/or fabricate the equipment or material.

CONTRACTOR:

Refers to the persons, firm or company whose tender has been accepted by the company.

EXECUTOR:

Executor is the party which carries out all or part of construction and/or commissioning for the project.

INSPECTOR:

The Inspector referred to in this Standard is a person/persons or a body appointed in writing by the company for the inspection of fabrication and installation work.

SHALL:

Is used where a provision is mandatory.

SHOULD:

Is used where a provision is advisory only.

WILL:

Is normally used in connection with the action by the “Company” rather than by a contractor, supplier or vendor.

MAY:

Is used where a provision is completely discretionary.

CONTENTS: PAGE No.

1. SCOPE

1.1 This Standard covers minimum technical requirements for design, manufacture, quality control, testing and finishing of pig launching and receiving traps which shall be installed in oil, gas and petrochemical industries under the service conditions stated in Clause 4 of this Standard Specification.

Note 1: This first (1) edition, which is a new revision of the "IPS" of the same title and number, has been technically revised, cancels and replaces the original (0) edition dated May 1993.

Note 2:

This standard specification is reviewed and updated by the relevant technical committee on Nov. 2014. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 433 on Nov. 2014. These modifications are included in the present issue of IPS.

1.3 Conflicting Requirements

In the case of conflict between documents relating to the enquiry or order, the following priority of documents shall apply.

First priority : Purchase order and variations thereto.

Second priority : This standard.

All conflicting requirements shall be referred to the purchaser in writing. The purchaser will ISSUE confirmation document if needed for clarification.

2. REFERENCES

Throughout this Standard the following dated and undated standards/codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this standard. For dated references, the edition cited applies. The applicability of changes in dated references that occur after the cited date shall be mutually agreed upon by the Company and the Vendor. For undated references, the latest edition of the referenced documents (including any supplements and amendments) applies.

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERS)

ANSI (AMERICAN NATIONAL STANDARD INSTITUTE)

Section II "Material Specification"

Section V "Non-Destructive Examination"

Section VIII "Rules for Construction of Pressure Vessels"

Section IX "Qualification STD. for Welding and Brazing Procedures"

B16.25 "Butt Welding Ends"

B16.47 "Large Diameter Steel Flanges"

B16.5 "Pipe Flanges and Flanged Fittings"

B 16.9	"Factory-Made Wrought Buttwelding Fittings"
B 16.11	"Forged Fittings, Socket-Welding and Threaded"
B31.4	"Pipeline Transportation Systems for Liquids and Slurries"
B31.8	"Gas Transmission and Distribution Piping Systems"

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIAL)

A193 /A193M	"Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Services"
A194 /A194M	"Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service"
E92	"Test Method for Vickers Hardness of Metallic Materials"

API (AMERICAN PETROLEUM INSTITUTE)

5L	"Specification for Line Pipe"
1104	"Welding of Pipelines and Related Facilities"

BSI (BRITISH STANDARD INSTITUTION)

BS 5500	"Specification for Unfired Fusion Welded Pressure Vessel"
BS 1133	"Packaging Code"

IP (INSTITUTE OF PETROLEUM)

Part 15	"Model Code of Safe Practice Electrical Part 1"

MSS (MANUFACTURERS STANDARDIZATION SOCIETY)

SP-97	"Integrally Reinforced Forged Branch Outlet Fittings-Socket Welding, Threaded, and Buttwelding Ends"

NACE (NATIONAL ASSOCIATION OF CORROSION ENGINEERS)

MR-0175	"Sulphide Stress Cracking Resistant Metallic Materials for Oil Field Equipment"

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-GN-100	"Engineering Standard for Units"
IPS-E-TP-100	"Engineering Standard for Painting"
IPS-C-TP-102	"Construction Standard for Painting"
IPS-M-PI-190	"Material Standard for Line Pipe"
IPS-M-PI-150	"Material Standard for Flanges and Fittings"

3. UNITS

This Standard is based on International System of Units (SI), as per IPS-E-GN-100 except otherwise specified.

4. DEFINITIONS

End closure: fitting, including a removable part or assembly, which provides quick and easy access to the major barrel when open and seals the bore when closed.

Kicker line (or bridle line): piping from the major barrel to the bypass line used to control the launch or receipt of a pig.

Main line: major portion of a pipeline, between pig traps.

Major barrel: enlarged pipe section of a pig trap used for loading or retrieval of pigs.

Minor barrel: pipe section of a pig trap between the reducer and the pig trap valve, of the same diameter as the pipeline

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. (A sphere is a spherically shaped pig).

Pig launcher: pig trap for launching pigs.

Pig receiver: pig trap for receiving pigs.

Pig signaller: device set onto or into a pipe, which gives an indication of the passage of a pig.

Pig trap: ancillary item of pipeline equipment, comprising a barrel, end closure and instruments, for introducing a pig into a pipeline or removing a pig from a pipeline.

Pressure safety device (or tell-tale vent): safety device provided as part of the end closure door locking mechanism to safeguard personnel during door opening.

5. SERVICE CONDITIONS

5.1 Fluid Properties and Environmental Conditions

See Appendices A&B.

5.2 End Closures

The end closures shall be Flameproof or explosion proof.

5.3 Location and Type of Control

The location and type of control shall be suitable for one or more of the requirements as indicated in Attachment 1.

6. BASIC DESIGN, CONSTRUCTION AND RATING

6.1 General

6.1.1 The following description is intended to indicate the general and minimum requirement of pig launching and receiving traps and does not relieve the supplier of his full responsibility for design, fabrication performance and safety of the equipment.

6.1.2 Trap assemblies shall be suitable for launching or receiving pigs for the purpose of gaging, cleaning and removing liquids from a pipeline which may contain water and/or liquid hydrocarbons and impurities such as sand and scale. Electronic and inspection pigs, batching corrosion inhibition service and special pigs may require different trap assemblies that should be checked with manufacturers before purchase or rental.

6.1.3 Pig traps with a nominal diameter of 20 inch and above should normally be provided with pig lifting facilities, such as runway beam, unless it can be easily accessed by cranes. Provision of a trolley with a push rod and pulling line should be considered to assist loading or removal of pigs from the trap. The use of these facilities, including the possible use of internal trays, shall be agreed with the company (See Drawings No. IPS-D-PI-111).

6.1.4 The corrosion allowance if specified, shall be as indicated on Appendix "A".

6.2 PIG Trap System Component

6.2.1 Barrel, reducer and spool

6.2.1.1 The spool piece shall have the same nominal size as the connecting pipeline, flanged or beveled end, as specified in requisition.

6.2.1.2 Unless otherwise specified, the barrel shall have a sufficient length to accommodate three pipeline cleaning pigs.

6.2.1.3 Barrels for use in gas transmission system shall be designed in accordance with ANSI B 31.8 and those for use in liquid hydrocarbon transmission shall be in accordance with ANSI B 31.4.

6.2.1.4 A thermal relief line shall be provided at locations where shut-in pressure of trapped fluid could exceed the design pressure.

6.2.1.5 The reducer should be eccentric for launcher and be concentric for receiver.

6.2.1.6 Schematic of typical horizontal pig trap system is shown in Attachment 2.

6.2.1.7 Schematic of minimum required pig trap facilities for horizontal launcher is shown in Attachment 3.

6.2.1.8 Schematic of minimum required pig trap facilities for receiver is shown in Attachment 4.

6.2.2 Supports

6.2.2.1 Permanent supports shall be used to support and restrain the pig traps and these shall be designed to carry the weight of the pig trap system filled with water (or other fluids if their density is greater than that of water) together with the weight of pigs. The support under the barrel should normally be of the sliding/clamp type to compensate for expansion of the unrestrained part of the pipeline. The frictional force should be reduced to minimum by appropriate means.

6.2.2.2 The height of the saddle should be such that the bottom of the barrel located 800 mm. above ground level.

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

6.2.2.4 Design of supports shall comply with the requirements of ASME Sec.VIII or BS-5500.

6.2.2.5 If specified by the purchaser, base plate, anchor bolts, etc. required for foundations should be supplied by the manufacturer and all the applied forces and moments on the saddles shall be specified by the manufacturer.

Note:

Where there would be a possibility of corrosion occurring under clamps then welded clamps should be used with no direct welding on to the pipeline except for circumferential welds.

6.2.3 Connections

6.2.3.1 The trap shall be completed with the connections.

6.2.3.2 Weldolet and Threadolet are only allowed for connections equal or smaller than 2 inch. Connections larger than 2 inch shall be extruded outlets or sweepolets.

6.2.4 End Closure

6.2.4.1 The end closure shall conform to the general requirements of ASME VIII division 1 section UG-35(b) (quick actuating closures). Attention is drawn to the requirements for a fail-safe design of the opening mechanism, specifically, the failure of any part of the opening mechanism shall leave the closure closed rather than open.

6.2.4.2 The end closure shall be of the quick acting type, lever or hand wheel operated, and hinged vertically.

6.2.4.3 The quick acting design should allow opening and closing by one man in approximately one minute, without the use of additional devices.

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

6.2.4.5 Closure 18" and larger shall be hand wheel operated.

6.2.4.6 The activation of the seals shall be such that the fluid within the pig trap at any pressure between 1 bar (abs) and the pig trap design pressure be sufficient for this purpose.

6.2.4.7 End closures with exposed screw expanders or captive ratchet braces should not be used, because of the high maintenance requirements and the non fail-safe aspects of some opening mechanism designs.

6.2.4.8 The end closure shall have the following safety devices:

- A pressure locking device to prevent opening of the door when the pig trap is pressurized.
- A safety bleeder that when released will alert the operator to a possible hazard unless pressure in the pig trap is relieved completely. Opening of the door shall not be possible unless the bleeder is released. Engaging the bleeder shall only be possible when the closure is closed. The bleeder shall be designed such that there is no risk of blockage. In very toxic service, the pressure safety device shall be non-venting.
- The necessity for interlocking shall be decided by the Client.

6.3 Materials

6.3.1 Pipe for barrel or spool should be in accordance with the line pipe specification IPS-M-PI-190.

6.3.2 Flanges shall be welding neck in accordance with IPS-M-PI-150.

6.3.3 Fittings shall be in accordance with IPS-M-PI-150.

6.3.4 The selected non-metallic material shall be suitable for the long-term exposure to the transported fluid at the design pressure and temperature conditions. Elastomeric material shall resist explosive decompression.

6.3.5 Studs and nuts shall be aluminum coated or electroless nickel plated. The preferred materials for standards applications are ASTM A193/A193M grade B7 and ASTM A194/A194M grade 2H for non sour service conditions, and ASTM A193/193M grade B7M and ASTM A194/A194M grade 2HM for sour service conditions.

6.3.6 All components in sour service shall conform to the requirements of NACE MR 0175. In addition seamless pipe shall have a maximum sulphur content of 0.010 wt%. The base material and welds shall have a maximum hardness of 248 HV10.

6.3.7 Spool pipe shall be compatible with the line pipe with respect to weldability, wall thickness/material grade transitions and dimensions. Dimensional considerations include actual internal diameter, ovality and wall thickness transition taper angles.

6.4 Fabrication

6.4.1 Welding processes, welding procedures, welder qualifications, weld repairs, welding electrodes, thermal stress relief and heat treatment, etc. shall conform to ASME VIII Division 1 and ASME Section IX. Only welders and welding operators who are qualified in accordance with Section IX of ASME shall be employed in production.

6.4.2 Weld repairs if required, shall not be permitted after heat treatment without approval by the purchaser. Repaired welds shall be heat treated according to the codes stated above.

6.4.3 Welding shall be carried out using procedures and welders/welding operators qualified in accordance with ASME IX. Welding procedure qualification shall include hardness testing of the weld, HAZ and base metal. The hardness shall be measured in accordance with ASTM E 92. for pipe butt welds, the hardness traverses shall be carried out on Lines 2 mm from the pipe surfaces on a weld cross-section. Each traverse shall have at least three hardness measurements taken in each of the weld metal, the HAZ each side of the weld, and the base metal for each HAZ, one of the hardness measurements shall be within 0.5 mm. of weld fusion line. The hardness shall not exceed 325 HV10 under non-sour conditions and 248 HV10 under sour conditions.

6.4.4 All main seam welds shall be full penetration and where possible double sided. All nozzle to body welds shall be full penetrant.

6.4.5 The inside of the trap shall be free from obstructions which could prevent the free rolling of spheres, or travel of pigs or carriers.

6.4.6 Wall thickness transitions shall meet the welding configuration requirements as specified in the design code ANSI B31.4 and ANSI B31.8.

Notes:

1- tD, the maximum thickness for design pressure, shall not be greater than 1.5t, where t is the nominal thickness of thinner plate.

2- Pipe with a wall thickness less than 4.8 mm. shall not be used.

6.4.7 The seam welds of trap shall not interfere or coincide with outlets welded to it.

6.4.8 End profiles of the pipes to be butt-welded shall be in accordance with ANSI/ASME B16.25.

6.4.9 The requirement for heat treatment shall be determined in accordance with ASME VIII, division 1, subsection C. procedures to be applied shall be in accordance with ASME VIII, division 1, part UW-40.

6.5 Inspection and Testing

6.5.1 Inspection and testing shall be performed before any coating or paint is applied.

6.5.2 All components shall be visually examined in accordance with ASME VIII division 1, part UG93.

6.5.3 Each weld on the trap and pig signaler shall be examined by 100%radiography (RT). In addition, carbon steel welds shall receive 100% magnetic particle examination (MT) and stainless steel welds shall receive 100% liquid penetrant examination (PT).RT shall be in accordance with ASME V articles 2 and 22, with acceptance criteria in accordance with ASME VIII, division 1, part UW-51.MT shall be in accordance with ASME V, article 7 and 25, with acceptance criteria in accordance with ASME VIII, Appendix 6. PT shall be in accordance with ASME V, articles 6 and 24, with acceptance criteria in accordance with ASME VIII, Appendix 8.

6.5.4 Surface examination of the trap shall be by wet magnetic particles unless agreed otherwise by the Company.

6.5.5 For the end closure, all mating clamp and flange machined surfaces, door hinge, hinge attachments and locking mechanisms shall be subject to magnetic particle inspection. Any defects shall constitute a basis for rejection.

6.5.6 The trap shall be hydrostatically tested to 1.5 times the design pressure. The test pressure shall be held for a period of at least 4 hours. The acceptance criteria are no leakage or loss in pressure.

6.5.7 A functional test shall be performed to demonstrate that closure door, pig signaler, loading and unloading devices function satisfactorily.

6.5.8 Chemical analysis and mechanical and impact tests are required for the barrel, reducer and neck pipe (when furnished) for each trap in accordance with the design codes. These items shall be tested ultrasonically to the satisfaction of purchaser in accordance with Appendix 12 of ASME code Sec. VIII Div.1.

6.6 Surface Preparation

After acceptance of hydrostatic test, all external surfaces shall be prepared and prime coated in accordance with IPS-C-TP-102 and IPS-E-TP-100. The suppliers' proposed method of surface preparation shall be approved by the purchaser.

6.7 Pipeline Pig Passage Detector

6.7.1 The signaler shall be intrusive type and mounted on the trap/pipeline via a DN 50 branch connection.

6.7.2 For pipelines which cannot be depressurized for pig signaler maintenance, the signalers shall be complete with a ball valve to isolate the pig signaler from the pipeline and a portable jacking tool for safe lifting of the transfer mechanism.

6.7.3 After the pig has passed the pig signaler, the internal mechanism shall be re-set automatically to the position required for indicating the passage of the next pig. The resetting of the signal mechanical indicator shall be undertaken manually only. Resetting of the electrical switch shall be automatic.

6.7.4 The mechanical signal flag or the electrical switch shall not triggered by the flow or pressure of the pipeline fluid.

6.7.5 The trigger shall not obstruct or damage a passing pig and the trigger shall not be damaged by a passing pig.

6.7.6 The penetration of the trigger into the main pipe shall be kept to a minimum to avoid unnecessary obstruction of fluid flow.

6.7.7 The design methodology as described in ASME VIII division 1 shall be used for the design calculation of the pig signaler pressure housing. The design pressure of the pig signaler pressure housing shall comply with the pressure/temperature rating classes for flanges as stated in ANSI/ASME B 16.5, based on material group 1.1 unless otherwise stated in the requisition, for limited temperature range of -20°C to +120°C.

6.7.8 The minimum wall thickness of the pig signaler pressure housing and any extension shall be 4.8 mm.

6.7.9 The indicator shall withstand all specified weather and climatic conditions and be of robust construction.

6.7.10 With the exception of mild steel mounting base, all metal parts shall be corrosion resistance material.

6.7.11 The indicator shall be bidirectional and function equally well in either direction.

6.7.12 Visual signals shall be clearly visible from a distance of 50 meters and should be manually reset table.

6.7.13 If carbon steel and stainless steel components are used in combination, the risk of galvanic corrosion at the contact areas shall be minimized.

6.8 Electrical Signals

6.8.1 Type: Micro switch, PDT (pig detector transmitter).

6.8.2 Rating: 24 V-DC, 2 Amps.

6.8.3 Load: Relay (inductive).

6.8.4 Housing: Weather Proof/Dust Proof/Explosion proof suitable for use in accordance with Institute of Petroleum Division 1 Group II, Gases and Vapors.

6.8.5 Cable entry: ET with compression gland for PVC/LC/SWA/PVC cable.

6.8.6 Mounting: Above ground non extended.

6.8.7 Pressure Rating: The same as pig trap rating.

6.8.8 Kind: Uni-directional.

6.8.9 Elec./Signal: Auto reset.

6.9 Nameplates and Labeling

6.9.1 Each pig launching and receiving trap shall be labeled with engraved stainless or non corrosive alloy nameplates together with non corrosive fixing materials, showing all data as called for in this standard including but not limited to, the followings;

a) Purchaser's name and order No.

b) The year of manufacture.

c) Manufacturer's name or trade mark.

d) Type of materials, size, serial number and designation making it possible to obtain relevant information from the manufacturer.

e) Flange pressure rating.

f) Design and test pressure.

g) Dimensions and physical properties including weight.

h) Tag number.

i) Design temperature.

6.9.2 The nameplate shall be legible and easily visible when fixed to non-removable part of the frame.

6.9.3 The nameplate shall be corrosion and moisture resistant and provided with indelible inscriptions.

6.9.4 The pressure housing of the pig signaler shall be stamped with the pressure class rating as indicated in the Requisition sheet.

6.9.5 If sour service conditions are specified, the nameplate or marking shall include "NACE MR 0175".

6.10 Tools and Testing Equipment

Special tools and equipment if required for erection, commissioning, maintenance and testing shall be shipped together with the assembly including sufficient washers, "O" rings, seals, lubricants and others.

6.11 Provision for Handling and Erection Equipment

Each unit shall be provided with hoisting facilities, bolts foundation clamps and small materials required for erection on site shall be packed inside the transport unit.

7. INSPECTION DURING MANUFACTURING

The purchaser or his nominee shall have free access to the manufacturing plant engaged in the construction of the equipment to carry out the necessary inspections at any stage of construction.

The supplier shall place at the disposal of purchaser, free of charge, such instruments as are required at the inspection point to enable the purchaser carry out his inspection of equipment efficiently in this respect. Such inspections in no way relieve the supplier of his responsibilities under the terms of this standard specification and or other applicable relevant documents.

8. TESTS AND CERTIFICATES

8.1 The specific requirements for test is described in section 5.5 of this standard.

8.2 The general requirement for test is described but not limited to the followings:

8.2.1 The test procedure as proposed by the supplier should be agreed and approved by the purchaser before tests are carried out.

8.2.2 Purchaser may require witnessed tests to be carried out in the presence of its nominated representative who should be informed at least 4 weeks in advance of the date of conducting the tests and confirmed 10 days before the test.

8.2.3 All the test equipment, labor, consumables and other expenses shall be provided by the supplier at no extra cost to the purchaser.

8.2.4 Test certificates should refer the serial number of the equipment tested and must bear the purchaser's name and manufacturer's name and seal; the certificate should be approved by the purchaser before shipment instructions are given.

8.2.5 The certificates shall specify the chemical and mechanical properties of material, destructive and non destructive tests, heat treatment, design codes and hydrostatic test.

9. FINISH

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

9.2 The pig launching and receiving trap including pig loading and unloading devices and also pig signaler shall be cleaned and shall be painted with two layers of anti-rust undercoat. A final layer of paint suitable for the specified environment shall be applied on the purchaser request.

9.3 The color of final layer shall be as specified in requisition.

9.4 All unpainted surfaces (internal and external) shall have a coat of moisture and fungus resistance varnish.

10. INFORMATION FOR MANUFACTURER/SUPPLIER

Further to the information included in other parts of this specification, relevant data sheets shall be completed and furnished with the requisition as a part of Appendices of this standard specification.

11. REJECT CLAUSE

The equipment may be rejected if measurements and inspection reveal any discrepancies between quoted figures resulting in requisition and those measured actually.

12. PACKING AND SHIPMENT

The equipment shall be suitably packed and protected against all damages or defects which may occur during handling, sea shipment to the port and rough road haulage to site and extended tropical open air storage. All items shall properly be packed to comply with the requirements of BS-1133.

13. GUARANTEES AND WARRANTIES

The supplier shall guarantee his equipment during commissioning and for one year operation starting from the date of completion of commissioning against the following defects:

a) All operational defects.

b) All material defects.

c) All fabrication and design defects.

d) All defective parts shall be replaced by the supplier in the shortest possible time, free of charge, inclusive of dismantling, reassembly at site and all transportation costs.

The supplier shall guarantee the provision of spare parts to the purchaser for a minimum period of 8 years from the date of dispatch. In the event the supplier can not supply the required spares (whether of his own manufacturer or other's) within the period of time, the costs of complete replacement units will be borne by the supplier.

14. SPARE PARTS

All spare parts shall comply with the same standards, specifications and tests of the original equipment and shall be fully interchangeable with the original parts without any modifications at the site. They shall be correctly marked in accordance with the spare parts lists and interchangeability record and be prescribed to prevent deterioration during shipment and storage in humid tropical climate.

15. LANGUAGE

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

16. DOCUMENTATION LITERATURE TO BE SUBMITTED BY MANUFACTURER/SUPPLIER (INFORMATIVE)

16.1 At the quotation stage the supplier should submit 4 sets of the following documents.

a) Report of experience background, major clients and annual sale for the similar equipment.

b) Reference list showing the successful operation of similar equipment for at least two years, and the locations of equipment for at least two years, and the locations of equipment offered in major oil industries.

c) Typical type test certificate of similar equipment.

d) Declaration of confirmation with the set standards, and or clear indication of deviations from the standards and specification.

e) Spare parts and special tools requirements.

f) List of recommended commissioning spare parts with the price.

g) List of recommended spare parts for three years of operation.

h) List of special tools, testing devices and instruments.

i) Shipping dimensions (length, width and height) and weight, with shipping schedule.

Note:

The quotation will be rejected as incomplete if the above mentioned required information are not included.

16.2 At ordering stage the supplier should submit 5 sets of the following documents.

a) Outline drawings floor plan, elevation and end view, giving complete sizes and dimensions, various connections to outside equipment and recommended installation details for purchaser's approval.

b) Design calculations and proposed test procedure for purchaser's approval.

c) Reproducibles (1 set only) of above mentioned drawings after approval duly certified by the supplier.

d) Prints of certified drawings as well as agreed and approved test procedure.

e) The purchaser's comments or approval shall be given within 21 days of the receipt of the relevant documents.

16.3 Before shipment of equipment the supplier should submit 15 sets of the following documents, according to the following time table, to be received by the company.

a) Codes and standards compliance certificates, 8 weeks min.

b) Installation, operation and maintenance manuals, four weeks min.

c) Final factory test certificates, including test data and calculated results, three weeks min.

d) Inspection certificate issued by the purchaser nominated inspector, two weeks min.

e) Final revision of illustrated and numbered part list and 3 year running spare parts list, two weeks min.

Note:

All technical documentation and design engineering documentation submitted to purchaser shall be considered the property of the purchaser and supplier shall have no claims thereto after their submission.

APPENDICES

APPENDIX A

MAJOR PHYSICAL PROPERTIES

Flowing Contents				
Specific Gravity	@15 °C			
	@4 °C			
Kinematic Viscosity (St)	@15 °C			
	@4 °C			
Pour point (°C)	Winter			
	Summer			
Coefficient of Expansion (1/°C)				
Min. Flash Point (°C)				

Note:

Further to above mentioned information the following properties shall be included:

1) Design pressure.

2) Design temperature.

3) Chemical composition of flowing content.

4) Design factor.

5) Corrosion allowance (if required)

APPENDIX B

AMBIENT CONDITIONS

Maximum sun temperature (for calculating the maximum temperature ……

rise of the equipment) .....

Minimum ambient temperature .....

Maximum recorded velocity of prevailing wind .....

ATTACHMENTS

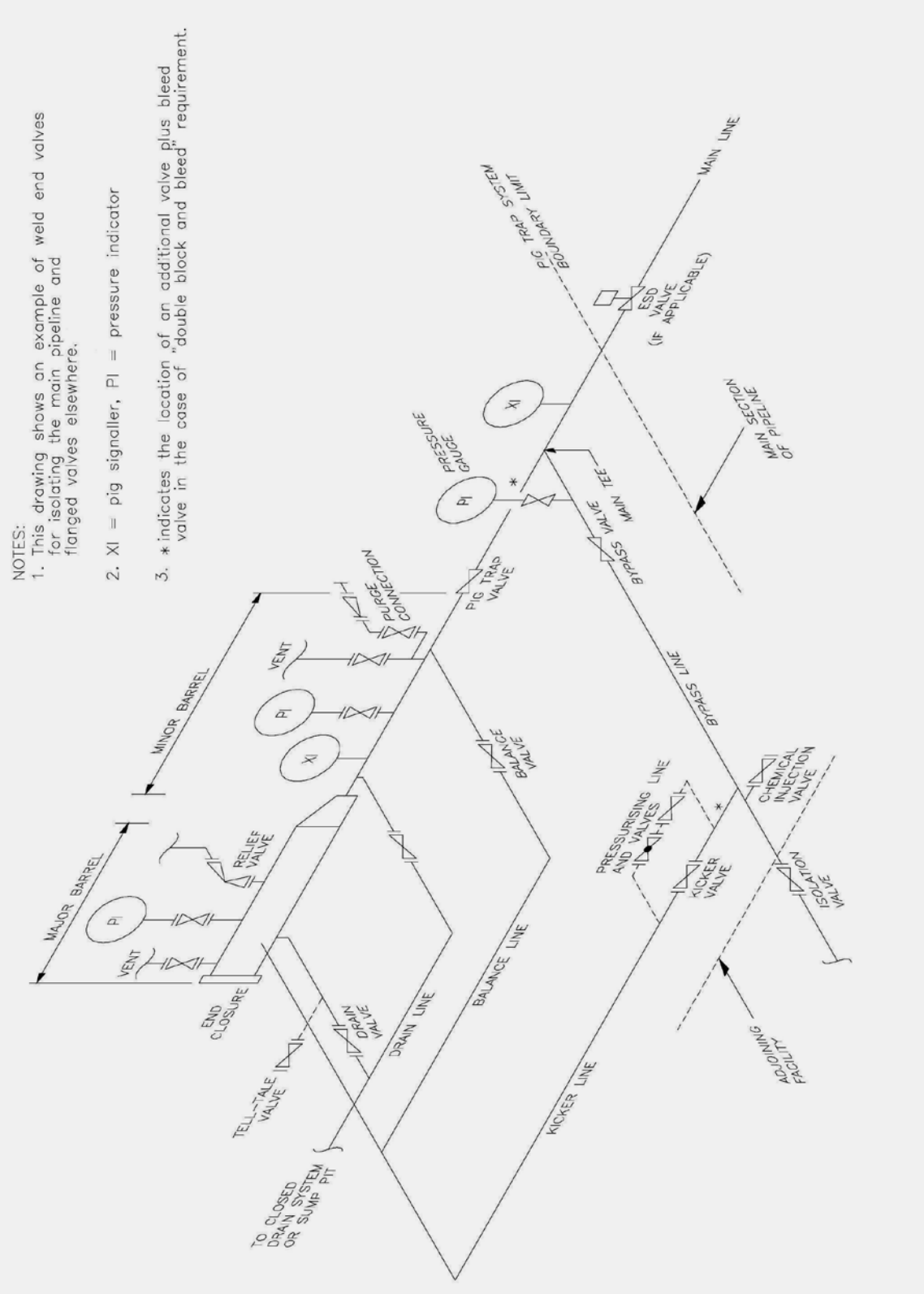
ATTACHMENT 1

LOCATION AND TYPE OF CONTROL

Local (manual)	- with controls on or near controlled equipment.
Panel (manual)	- with controls on Station Control Panel.
Panel (automatic)	- with controls on Station Control Panel.
Dispatch (automatic)	- with controls in Dispatching Center.

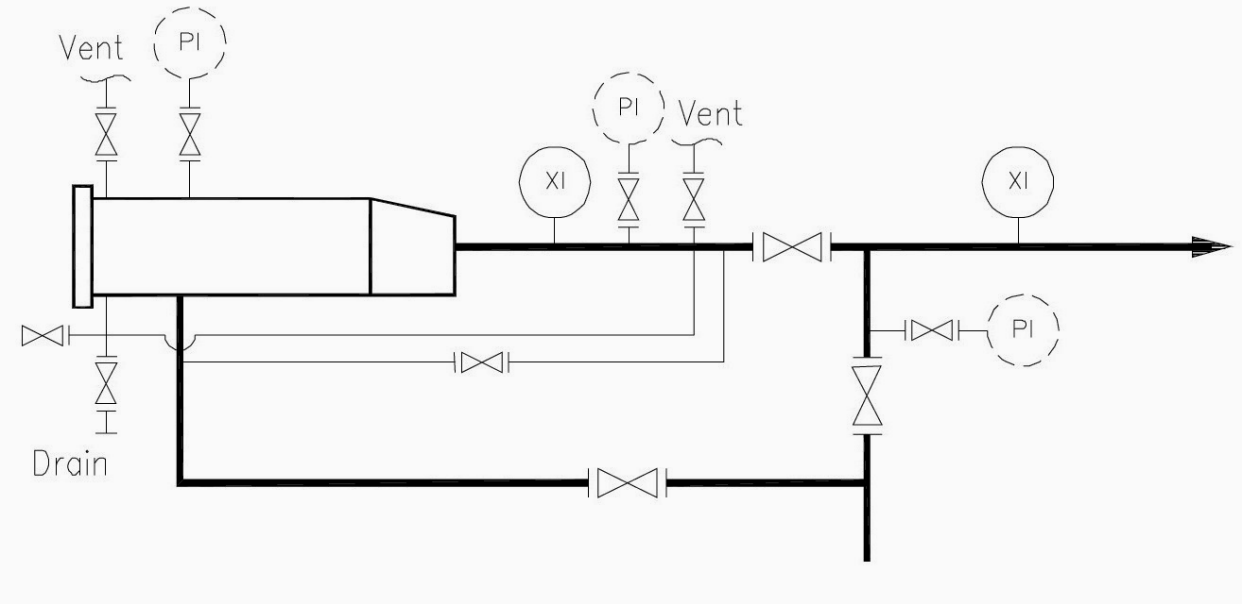
ATTACHMENT 2

SCHEMATIC OF TYPICAL HORIZONTAL PIG TRAP SYSTEM



ATTACHMENT 3

SCHEMATIC OF MINIMUM REQUIRED PIG TRAP FACILITIES FOR HORIZONTAL LAUNCHER



ATTACHMENT 4

SCHEMATIC OF MINIMUM REQUIRED PIG TRAP FACILITIES FOR RECEIVER