IGS-M-PL-031(1)	Sep. 2020
Approved	مصوب

شرکت ملی گاز ایران

مدیریت پژوهش و فنآوری

امور تدوین استانداردها

IGS

مشخصات فنی خرید

دستگاه نشانگر پیگ

Pig Signaler

دفترمدیرعامل

شرکت ملی گازایران

تاریخ : ۱۳۹۹/۱۰/۱۷

شماره : گ ۰/دب ۰/۵۷۲-۱۹۹۱۸

ابلاغ مصوبه هیأت مدیره

مدیر محترم پژوهش و فناوری

باسلام،

به استحضار می‌رساند در جلسه ۱۹۰۲ مورخ ۱۳۹۹/۰۹/۱۶ هیات مدیره، نامه شماره گ۹/۱۰۶۲۸۰/۰۰۰ مورخ ۱۳۹۹/۰۹/۰۳ آن مدیریت درمورد تصویب نهایی مقررات فنی به شرح زیر مطرح و مورد تصویب قرار گرفت.

۱-نشانگر پیک	IGS-M-PL-031(1)
۲-دستگاه جداکننده ذرات از گاز	IGS-M-PM-103(1)
۳-حمل، نصب و نگهداری کنتورهای آلتراسونیک	IGS-C-IN-107(0)
۴-اتصالات چدنی مالیبل / داکتیل	IGS-M-PL-037(3)
۵-اتصالات فولادی جوش لب به لب اندازه های ۰/۵ تا ۵۶ اینچ	IGS-M-PL-022(1)
۶-تجهیزات ارسال و دریافت پیگ	IGS-M-PL-028(3)
۷-شیرهای توپی جوشی و فلنجی اندازه ۲ تا ۵۶ اینچ کلاس ۱۵۰، ۳۰۰، ۶۰۰	IGS-M-PL-002-3(1)

این مصوبه در حکم مصوبه مجمع عمومی شرکت‌های تابعه محسوب و برای کلیه شرکت‌های تابعه لازم الاجرا می‌باشد .

الهام ملکی

دبیر هیات مدیره

رونوشت : مدیرعامل محترم شرکت ملی گاز ایران و رئیس هیات مدیره

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Foreword

This technical 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 committees within NIGC technical specification 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 technical specification 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 technical specification 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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Contents

1.Scope

This standard specification defines NIGC,S mandatory requirements for the design , fabrication , material selection , inspection and testing of 2 inches intrusive pig signaler installed on pig launcher/receiver traps with pressure class rating up to class 600 inclusive at a ambient temperature range of -29 to 600C.

2. References

Throughout this standard specification, the following standards & codes are referred to, the edition of these standards & codes those are in effect at the time of issuing of this standard specification.

The applicability of changes in standards & codes that occur after the date of standards that referred shall be mutually upon by the purchaser and supplier and / or manufacturer. Pig signaller shall conform to latest edition of ASME B.31.8 & ASME VIII and shall be manufactured in accordance with the standards specified herein as supplemented in this standard specification.

2.1. Normative references

ASME B.31.8 : 2014, " Gas transmission and distribution piping system" .

ASME VIII ,DIV.1&2 :2013, " Pressure vessel code".

ASME B.16.5:2017,"Pipe flanges and flanged fittings from NPS ½ through NPS 24" .

ASME B16.25 :2012, "Butt Welding Ends".

ASTM: A 105: 2014, "Specification for forgings, carbon steel for piping components".

ASTM A240:2006, " Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications".

ASTM A350:2012, " Standard Specification for Carbon and Low-Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components".

ASTM A 694: 2003, "Specification for forgings , carbon and alloy steel for pipe flanges, fitting ,valves and parts for high pressure transmission service.

ISO 8501:2007,"Preparation of steel substrate before application of paints and related products-visual assessment of surface cleanliness.

ISO 10474: 2013, "Steel and steel product inspection documents".

IEC-60529, "Degrees of Protection Provided by in closures" (IP Code).

IEC 60079-0~40, "Explosive Atmosphere ".

IGS-M-PL-028(2):2018, "Pig Receiver and Launcher Trap System".

3. Symbols and Definitions

Approval Agency

Authorized certifying body which approved by technical inspection division.

Subsidiaries of National Iranian Gas Company in order to identify these companies should refer to the URL (http://inspect.nigc.ir) for list of qualified companies in this field of use

Carbon equivalent

The carbon equivalent (CE) calculated in accordance with the following equation:

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

DN

Numerical designation of size in millimeters that is common to components in piping systems.

DFT (Dry Film Thickness)

The thickness of a coating remaining on the surface when the coating has hardened

Pig

A device that can be propelled through a pipeline by fluid flow and is normally used for cleaning, batching, inspection or other activities.

Pig signaler

A device installed on a pipeline or pig trap to give an indication of the passage of a pig.

a) Intrusive type: a pig signaler with a trigger penetrating into the bore of the pipeline and into which the transported fluid will enter and pressurize the housing of the pig signaler.

b) Non-intrusive type: a pig signaler that is externally mounted on the pipeline and therefore not exposed to the transported fluid or the internal pressure in the pipeline.

Pig trap

An 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.

Pig traps are further described in IGS-M-PL-028.

NBR: Nitrile Butyl Rubber

Viton: Fluoro Elastomers Materials

Jacking bracket device

A specialized tool for pig signaler used for safe lifting of the transfer mechanism.

4. Pig signaler specification

Pig signaler is used to indicate the passage of a pig (bi- directional movement capability) . This type of pig signaler shall be installed permanently on pig launcher/receiver traps.

Except as supplemented or amended by this specification pig signalers shall be designed, manufactured and supplied in accordance with ASME section VIII DIV. 1 .

Pig signaler shall be suitable for the same class rating of related equipment but at least a minimum of pressure class rating 600 is required .

4.1. Requirements

4.1.1. The pig signaler shall consist of the following components:

4.1.1.1. A trigger penetrating into the main bore of the pipe or pig trap, The trigger shall activate the mechanical indicator when pig passes in any direction.

4.1.1.2. A transfer mechanism to transfer the movement of the trigger to signaling mechanism immediately

4.1.1.3. A 2 inches welded type base connection pressure housing for installation on pipe or pig trap.

4.1.1.4. The pressure housing contains the transfer mechanism connected with the trigger and A flanged body ball valve for isolating the whole pig signaler from linepipe whenever any repair is required.

4.1.1.5. A mechanical and/or electrical indicator mounted externally on the pressure housing.

4.1.2. The mechanical flag signals shall be normally set in the horizontal position for "pig not passed" and vertical for "pig passed" condition. The flag position shall be clearly visible.

The internal mechanism shall reset automatically to the defined position.

Resetting of the mechanical signal indicators shall be done manually but resetting of the electrical switch shall be accomplished automatically.

4.1.3. Electrical components shall be suitable for use in hazardous areas(IP65,EEX IIB,T6) and shall have following features :

Type : Micro switch.

Rating : 24 V-DC ,2 AMPS.

Load : Relay (inductive).
Housing : Weather, dust and explosion proof:
Cable entry : ET with compression gland for PVE/LC/DWA cable.
Electric signal : Auto reset

4.1.4. Pig signaler shall have trigger penetration adjustment facility to set for variation in line pressure thickness and flanges in any direction(bi- directional). The trigger shall not make obstruct, or be damaged as pig passing. The mechanical signal flag or electrical switch shall not be triggered, by the flow or internal pressure of the pipeline.

4.1.5. All weld connections shall be suitably beveled as per ASME B31.8 /ASME B16.25.

4.1.6. Portable Jacking bracket device for safe lifting of the transfer mechanism, complete with the trigger through the isolating valve under operating condition shall be provided by manufacturer. An operation manual shall be established by manufacturer.

4.1.7. For installation of pig signaller on buried pipelines, it may be ordered with extended shaft.The extended shaft length shall be specified by purchaser in requisition sheet

4.1. 8. Two years spare parts shall be recommended by manufacturer.

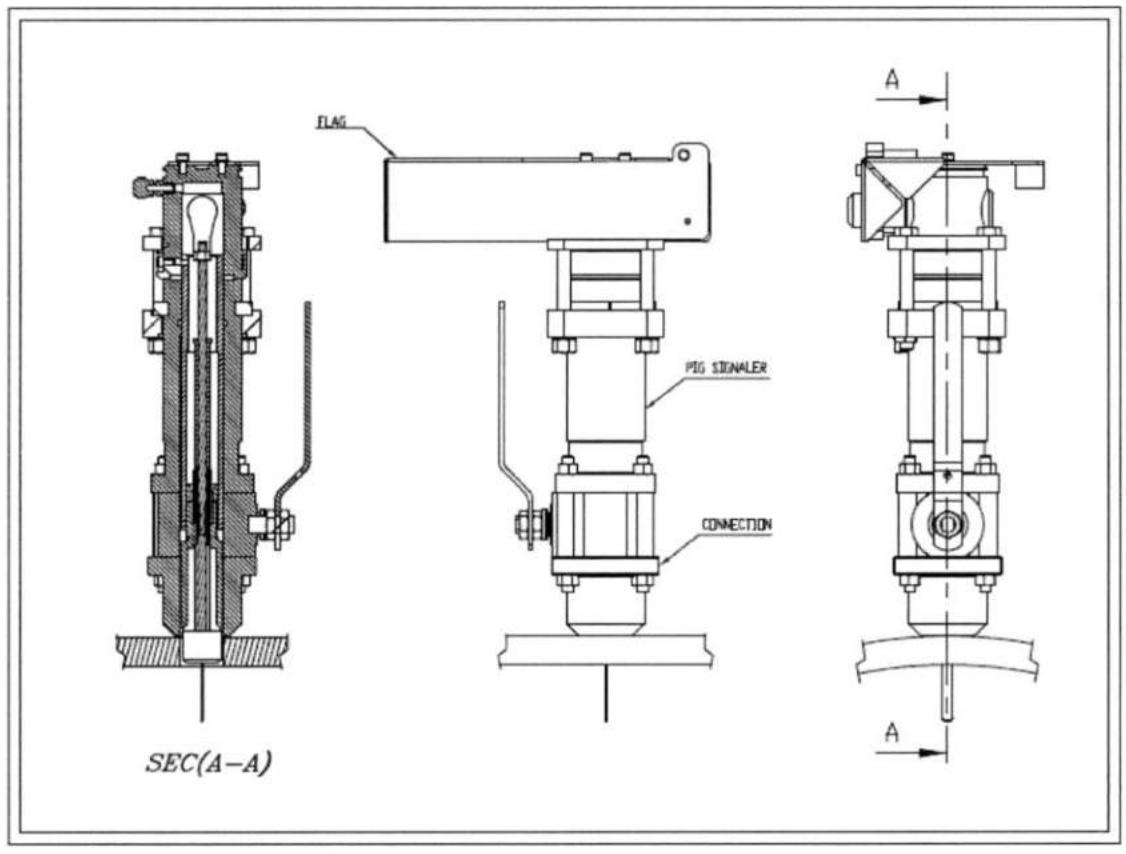

Figure 1- Schematic of Pig signaler components

5. Materials

5.1. The welding base/boss shall be made of hot worked forging carbon steel materials. Forging process shall be specified by manufacturer and approved by end user.

5.2. The carbon steel used for welding flanges and body shall have:

a) Carbon content ≤ 0.20%.

b) Sulfur content ≤ 0.010%

c) $CE_{IIW} \leq 0.42$.

5.3. The carbon steel used shall have tensile properties conforming to the requirements prescribed in Table1 and weldable to matching pipe/pig trap.

Table 1. Requirements for the result of Tensile Test

Standard	Grade	Yield point Min	Tensile strength Min	Elongation Min,%
		ksi	ksi	
ASTM A105		36	70	20
ASTM A350- LF2 (Class 1)		36	70	30
ASTM A694	F42	42	60	20
	F52	52	66	20
	F60	60	75	20
	F65	65	77	20
	F70	70	82	18

Note: Forging to other standard may be used if subjected to the purchaser approval.

5.4. All internal moving parts shall be made from stainless- steel materials in accordance with ASTM A240 , Type 304 for sweet gas or Type 316L for sour gas services as a minimum requirement.

5.5. Seals shall be manufactured from N.B.R/Viton or PTFE. The non – metallic parts shall be suitable for long term exposure to the transferred fluid at specified design pressure & temperature.

5.6. Flag shall be made of aluminum or stainless steel materials .

5.7. The trigger shall be stainless steel, spring type at least type 302 .

5.8. The electrical switch shall be made of corrosion resistance material.

6. Inspection and Testing

Inspection & testing's shall be carried out before external anti- corrosion coating

Table 2- Inspection and Testing		
1	Visual inspection	- visual inspection method of all components shall be examined in accordance with ASME VIII , DIV. I , part UG-93 .
2	Functional test.	shall be carried out to demonstrate that, the trigger mechanism is capable to trip the mechanical indicator and the electrical switch.
3	Weld inspection	- All welds shall be visually inspected in accordance with ASME Sec.V, Article 9. - Any full penetration welds shall be ultrasonically examined on weldments in accordance with ASME Sec. V, Article4. - All other weld surface areas shall be penetrating tested in accordance with ASME, Sec.V, Article 6

4	Pressure housing.	The pressure housing of the pig signaler shall be stamped with the pressure . class rating of the valve as indicated on the data sheet
5	hydrostatic pressure test.	The proof test documents concerning the assembled pig signaler ,including isolation valve ,shall be submitted ,which has been issued by certifying body. The proof test pressure shall be 1.5 times of the related pipeline design pressure. The acceptance criteria is no leakage or loss of pressure.
6	Inspection certification	An inspection certification shall be submitted by manufacturer for all pressure rating components.

7. Surface preparation and Final coating

After completion of the hydrostatic pressure test, pig signaler shall be dried internally, also all surface shall be free from oil or grease. Carbon steel parts shall be blast cleaned according to ISO 8501-1 to Sa 2 ½ & externally coated with phenolic epoxy to a minimum DFT of 200 plus two –component aliphatic polyurethane to a minimum DFT of 70 as a top coat.

8.Marking

8.1. A nameplate of 0.5 mm thickness of stainless steel attached with fastener of same material to a visible location of pig signaler.

8.2. Name plate shall be marked by die stamping & included the following Information :

- Manufacture's name
- Date of manufacturer
- Applicable design code & standard
- Nominal size (2 inches/ DN 50).
- ASME pressure class rating

9.Documentation

Following documents shall be submitted by manufacturer/supplier :

- Original technical catalogue
- Technical manual of instruction and operational .
- Maintenance process include Jacking bracket operation.
- Manufacturing drawing and bill of material.
- Maintenance and operational manual.
- Isolating valve tests certificates
- All other components tests certificates.
- Recommended spare parts for two years operation.
- Prototype test certificate of assembled pig signaler ,issued by Approval Agency.

10. Data Sheet

General			Manufacturer's Remark
Signaler orientation	Vertical on horizontal pipe .□ Horizontal on vertical pipe. □ Other □		
Certification	BS EN 10204 3.1B/3.1. □ Other □		
Approval Agency (If applicable)			
Signaler type	Electrical □ Mechanical □ Electrical & mechanical □		
Design parameters			
Pressure class rating*	600 □ 900 □	bar/psi	
Hydrostatic test pressure*		bar/psi	
Design temperature*		C Min. C Max.	
Pipeline O.D./Pig Trap Size*		In./mm	
Pipeline /Pig trap wall thickness*		In/mm	
Operating pressure*		bar/psi (Min.) bar/psi (Max)	
Operating temperature*		C Min C Max.	
Extended shaft length*		Inches/mm	
Connection size	2 inches/DN 50		
Coating details	According to clause 8		
Jacking bracket device	Yes □ No □		

(*): These items shall be filled by Purchaser.
NOTE: The relevant elements of this data sheet shall be filled by manufacturer and to be signed by manufacturer's authorized person.