

APPROVED



شرکت ملی گاز ایران - مدیریت پژوهش و فناوری

امور تدوین استانداردها

IGS

Iranian Gas Standards

مشخصات فنی خرید

فلنج های مهار کننده

Anchor Flanges , (formerly PLD-108)



شرکت ملی گاز ایران

دفتر مدیر عامل

تاریخ: ۱۳۸۸/۲/۸

شماره: گ/دب/۱۰۱/۱ - ۱۵۰۷۵

ابلاغ مصوبه هیأت مدیره

مدیر محترم پژوهش و فناوری

باسلام،

به استحضار می‌رساند در جلسه ۱۳۵۸ مورخ ۱۳۸۷/۱۲/۲۶ هیأت مدیره، نامه شماره
۱۶۰۵۷۶/۰۰۰/۹۵ مورخ ۸۷/۱۲/۱۷ آن مدیریت درمورد تصویب نهایی استاندارد تحت عنوان
"مشخصات فنی خرید فلنج های مهارکننده Anchor Flanges" به شماره (IGS-M-PL-027(0)
مطرح و مورد تصویب قرار گرفت.

ناصر آنگون

دبیر هیأت مدیره

رونوشت: مدیرعامل محترم شرکت ملی گاز ایران و قائم مقام رئیس هیأت مدیره

معاون محترم مدیرعامل

اعضای محترم هیأت مدیره / مدیر محترم توسعه منابع انسانی / مدیرعامل محترم
شرکت انتقال گاز ایران / مدیر محترم پالایش گاز / رئیس محترم امور
حسابرسی داخلی / رئیس محترم امور حقوقی / رئیس محترم امور مجامع /
رئیس محترم روابط عمومی

• FOREWORD

This standard specification **cancel and replaces PLD 108** , 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 & 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 NIGS users.

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

Table of content

Title	Page No.
1.0. Scope	2
2.0. references	3
2.1.Normative references.	3
2.2.Informative references.	3
3.0. Design requirements	3
4.0. Materials	3-4
5.0. Welding	4
6.0. Inspection and testing	4
7.0. Documentation	5
8.0. Marking	5
9.0. Packing	5
1.0.Data sheet	6

1. Scope

1.1 This standard specification provides NIGC'S requirements for material, manufacturing, inspection & testing of carbon steel anchor flange suitable for welding to natural gas transmission pipeline and associated distribution systems.

1.2 The anchor flange will be embedded in reinforced concrete blocks on site

1.3 The following data shall be specified by purchaser:

1.3.1 Nominal diameter, grade and wall thickness of matching pipe.

1.3.2 Pipeline design pressure (PSI).

1.3.3 Pipeline axial thrust.(N or PSI)

1.3.4 Pipeline end preparation details (matching pipe).

1.3.5 Length of transition pieces (if applicable).

1.3.6 Allowable concrete stress.(MPa)

1.3.7 Differential temp. (ΔT). C⁰

2.0. 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. Anchor flange shall conform to latest edition of ANSI/ASME B.31.8 and shall be manufactured in accordance with the standards specified herein an as supplemented in this specification.

2.1. Normative references:

- | | |
|--|---|
| 2.1.1. ASME section 8 (VIII)-2007, Div. I & Div II | : Pressure vessel code |
| 2.1.2. ASME section 9 (IX) ,2002. | : Qualification for welding and brazing procedures. |
| 2.1.3. ASME B.31.8 ,2003
(end preparation) | : Gas transmission and distribution piping system. |
| 2.1.4. MSS –SP-25, 1998 | : Standard marking system for valves, fittings , flanges & unions. |
| 2.1.5. ASTM A 105, 2002 | : Standard specification for carbon steel forging for Piping components. |
| 2.1.6. ASTM A 694, 2000 | : Standards specification for carbon and alloy steel forging for pipe , flanges fittings , and parts for high pressure transmission services. |
| 2.1.7. ASTM E23 ,2002 | : Standard test methods for notched bar impact testing of metallic material. |

2.2. informative references :

- | | |
|----------------|------------------------------------|
| 2.2.1. PLD 108 | : Specification for anchor flange. |
|----------------|------------------------------------|

3.0. Design requirements:

- 3.1. The manufacturer / supplier shall furnish drawings and calculations to the purchaser.
- 3.2. Permissible design stresses shall not exceed those specified by the ASME section VIII.(DIV.1 & 2.) ,latest edition. (as applicable.).
- 3.3. As temperature increases ($\Delta T > 0$), design and manufacturing load calculation should be based on following formula :

$$F = (\alpha \cdot \Delta T \cdot E + 0.2 \delta h) [t(D-t) \Pi]$$

- | | | |
|--------------|--|--------------------------|
| F | : Load on anchor flange. | (N) |
| α | : Thermal expansion coefficient | (IN/IN) C ⁰ - |
| ΔT | : Temperature differences of design and installation | (C ⁰) |
| E | : Modulus of elasticity of carbon steel | (UNITLESS) |
| ∂h | : Hoop tensile stress | (N or PSI) |
| t | : Pipe wall thickness | (IN) |
| D | : Pipe outside diameter | (IN) |

3.4. Transition piece shall be shop welded to the hubs and the entire assembly to be stress relieved and then radio graphed.

4.0. Materials :

- 4.1. Flange material shall be carbon steel or alloy steel in accordance with ASTM A105 or ASTM A 694, LFX ,which ,max. yield strength differences between flange and pipe piece shall be 50 % of pipe yield strength.
- 4.2. For the transition pieces the material shall be made by the open – hearth , basic oxygen or electric furnace processes and be suitable for field welding at 0⁰C to matching pipe without pre- heating . The transition pieces shall have mill certificate or tested 90% of yield strength or 1.5 times of design pressure.
Max. yield strength differences between pipe piece and matching pipe shall be 50 %.

4.3. Test specimens selection:

- 4.3.1. Two specimen for tensile test shall be taken from the disc of flange, one having its lengthwise axis directionally normal to flange bore, the second specimen to be taken with its lengthwise axis directionally at right angles to the equivalent axis of the first specimen.
- 4.3.2. three charpy notch impact test specimens, each two – third size as specified in ASTM E 23, shall be taken from the hub, with their lengthwise axis tangential to the flange bore and three specimens equally spaced around the hub. Tests shall be carried out at – 10⁰C and the average obtained value from three tests shall not be less than 2.1 Kgf and no individual test result being less than 1.4 Kgf.

5.0. Welding:

The shop welding shall conform to the relevant part of ASME code. Section VIII & IX as summarized as follows:

- 5.1. Welder performance test shall conform to the ASME code section IX .
- 5.2. Shop welding shall be either by manual ARC or automatic or semi- submerged arc or inert gas shielded process
- 5.3. Pre- heating procedures shall be mentioned in WPS as per ASME code.
- 5.4. Heat treatment shall conform to the defined procedures of ASME SEC,VIII

6.0. Inspection and testing :

Inspection & non-destructive testing of flange assembly shall conform to the requirements of ASME code, section IX as summarized hereunder:

- 6.1. Welds shall be examined either ultrasonically or radiography at full length after hydrostatic testing
- 6.2. The flange assembly including transition pieces shall be hydrostatically tested with 1.5 times of the specified design pressure and the procedures shall conform to ASME code.sec.VIII.
The duration of test shall be at least 30 minutes without loss of pressure as specified by end user.
Welding repair is not permitted after the above test ,unless with the prior agreement of the end user.

7. Documentation:

The manufacturer / supplier shall submit the following documents to end user, as specified in the purchase order:(three set).

- 7.1. Certificate of works inspection
- 7.2. Welding procedure , welder qualification and PQR.
- 7.3. Certified report provides chemical analysis and physical properties of raw material.
- 7.4. Stress relieve & heat treatment reports.
- 7.5. Non – destructive test report.
- 7.6. Hydrostatic test report.
- 7.7. As-built drawing.

8.0. Marking:

Marking shall conform either to ANSI B16.5 or MSS-SP 25 as specified by end user and shall be included following items on body of flange :

- Design code.(ASME SEC.VIII DIV.1 &2.)
- Design pressure.(PSI).
- Trust force.(N or PSI)
- Manufacturer ,s name.
- Order no.

9.0. Packing:

All flanges shall be suitably packed so to prevent damage during shipment. The packing shall be appropriated for storage without cover, order no., & the specific item no, shall be clearly identified on each package.

- 9.1.Up to 20 in. ,shall be packed in wooden box.
- 9.2.Larger than 20 in., shall be packed on the pallet with bevel protector.

DATA SHEET

Properties	Requirements
Nominal diameter of matching Pipe (IN.)	
Grade of matching pipe	
Wall thickness of matching pipe (IN.)	
Pipeline design pressure (PSI)	
Pipeline axial thrust (N or PSI)	
Pipeline end beveling details	As per API 5L
Length of transition pieces (when applicable)	Min. 0.5 M
Allowable concrete stress	12 M.Pa
Differential temp.	T=45 °C (Max)

TO BE COMPLETED BY PURCHASER.