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شرکت ملی گاز ایران

مدیریت پژوهش و فناوری

امور تدوین استانداردها

IGS

مشخصات فنی خرید

اتصال غیر هم محور چدنی

Cast Iron Offset Swivel



شرکت ملی گاز ایران

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## ابلاغ مصوبه هیأت مدیره

مدیر محترم پژوهش و فناوری

باسلام،

به استحضار می‌رساند در جلسه ۱۶۲۸ مورخ ۱۳۹۴/۱/۲۳ هیأت مدیره، نامه شماره گ. ۳۹۰۷/۰۰۰/۹ مورخ ۹۴/۱/۱۹ مدیر پژوهش و فناوری و رئیس شورای استاندارد در مورد تصویب نهایی استاندارد تحت عنوان اتصال غیر هم محور چدنی به شماره استاندارد IGS-M-PL-036(0) مطرح و مصوب گردید.

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## **FOREWORD**

This standard is intended to be mainly used by NIGC and contractors, and has been prepared based on interpretation of recognized standards, technical documents, knowledge, backgrounds and experiences in natural gas industry at national and international levels. Iranian Gas Standards (IGS) are prepared, reviewed and amended by technical standard committees within NIGC Standardization division and submitted to the NIGC's "STANDARDS COUNCIL" for approval. IGS Standards are subject to revision, amendment or withdrawal, if required. Thus the latest edition of IGS shall be checked/inquired by NIGC employees and contractors.

This standard must not be modified or altered by NIGC employees or its contractors. Any deviation from normative references and / or well-known manufacturer's specifications must be reported to Standardization division.

The technical standard committee welcomes comments and feedbacks about this standard, and may revise this document accordingly based on the received feedbacks.

### **GENERAL DEFINITIONS:**

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

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

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## 1.SCOPE

This specification covers minimum requirements of N.I.G.C. for the purchase of malleable or ductile cast iron offset swivel suitable for gas meter diaphragm type, designation G2.5, G4, G6, G10, G16 and G25, according to IGS-M-IN-101(3).

## 2. NORMATIVE REFERENCES

Throughout this standard specification, the following standards are referred to. The edition of these standards that are in effect at the time of issues 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.

**BS 143 & 1256 (2000)** “Threaded Pipe Fitting in Malleable Cast Iron and Cast Copper Alloy”

**BS EN 1562 (1997)** “Founding-Malleable Cast Irons”

**BS EN 1563 (1997)** “Founding-Spheroidal Graphite Cast Iron”

**BS ISO 48 (2007)** “Rubber, Vulcanized or Thermoplastic – Determination of Hardness”

**BS ISO 37 (2005)** “Rubber, Vulcanized or Thermoplastic – Determination of Tensile Stress-Strain Properties”

**BS ISO 1817 (1999)** “Vulcanized and Thermoplastic Rubber – Determination of the Effect of Liquids”

**DIN ISO 815 (2000)** “Vulcanized and Thermoplastic Rubber – Determination of Compression Set at Ambient, Elevated or Low Temperatures”

**DIN 7168 (1991)** “General Tolerances for Linear and Angular Dimensions and Geometrical Tolerances”

**EN 13787 (2001)** “Elastomers for Gas Pressure Regulators and Associated Safety Devices for Inlet Pressure up to 100 bar”

**IGS-M-IN-101 (3)** “Gas Meter Diaphragm Types”

**ISO 188 (1998)** “Rubber, Vulcanized or Thermoplastic – Accelerated Aging and Heat Resistance”

**ANSI/ASME B 1.20.1 (2001)** “Pipe Threads, General Purpose (inch)”

**BS EN ISO 228-1 (2003)** “Pipe Thread where Pressure – Tight Joint Are Not Made on the Threads – Part 1: Dimensions, Tolerances and Designation”

**BS EN 10204 (2004)** “Metallic Products-Types of Inspection Documents”

### 3. TERM AND DEFINITIONS

#### **Off-Set Swivel**

A coupling fitting which allows an attached object to turn freely. Such a device made of two parts which turn independently.

#### **Gas Meter Diaphragm Types**

Gas volume meter in which the gas volume is measured by means of measuring chambers with deformable walls.

#### **Ductile Cast Iron**

Cast material, iron and carbon based, the latter element being present mainly in form of spheroidal graphite particles.

#### **Malleable Cast Iron**

Cast iron which is cast white and then given a heat treatment. Any remaining graphite is in the form of temper carbon.

### 4. ABBRIVATIONS

**N.B.R.** : Nitrile Butadiene Rubber

**H.N.B.R.** : Hydrogenated Nitrile Butadiene Rubber with recommended shore hardness of 75

**Viton.** : Fluoro Elastomers Materials .

### 5. TECHNIAL SPECIFICATIONS

Design, manufacturing ,material, dimensions and tolerances, threading , marking testing and inspection shall be as per BS143&1256, with the following addendum/supplementary

#### **5.1 Materials**

-Ductile cast iron (instead of malleable cast iron) which confirmed to BS EN 1563 is acceptable. The manufacturer shall ensure by testing that the material conforms to the grades specified in BS EN 1562 or BS EN 1563.The manufacturer shall conduct metallographic tests to ensure that all fittings are satisfactorily conformed to malleable or ductile iron microstructure.

- Gasket shall be elastomeric materials such as N.B.R./H.N.B.R. or Viton in accordance with EN 13787 as per Annex A.

#### **5.2 Dimensions and Tolerances**

Dimensions and tolerances of fittings shall conform to tables 1 to 3 of Annex B. All dimensions without individual tolerance shall be as per tolerance class" g "of DIN 7168.

#### **5.3 Threads**

The male threads shall be taper type in accordance with ANSI B 1.20.1. The thread of nut shall be, straight female thread conform to BS EN ISO 228/1. All other requirements shall be as per BS 143 & 1256.

#### **5.4 Coating**

Surface zinc coating are not recommended in this specification.

### **6. TESTING AND INSPECTION**

Testing and Inspection shall be as per BS EN 143 & 1256 as following:

- Material tests for both metallic and nonmetallic parts.
- Dimensional tests conforming to tables 1 to 3 of Annex B.
- Gauging and alignment of threads.
- Pneumatic leak tightness test for each fitting 5 bar ,10 second.
- Final visual inspection.

Inspection documents in accordance with BS EN 10204 Type 2.2 for above items shall be submitted by the manufacturer ,Nevertheless the inspector (third party/purchaser's inspector ,according to purchaser order)can inspect directly the purchased consignment and check the quality control and production documents.

### **7. MARKING**

Fittings shall be marked, by casting, with at least the following:

- a) the manufacturer's name or trademark;
- b) the fitting size

### **8. PACKAGING**

All fittings shall be packaged in cartons. The cartons shall bear at least one label with the manufacture's name, type and size of fitting, number of units in the box. For each carton, the gaskets shall be packed properly.

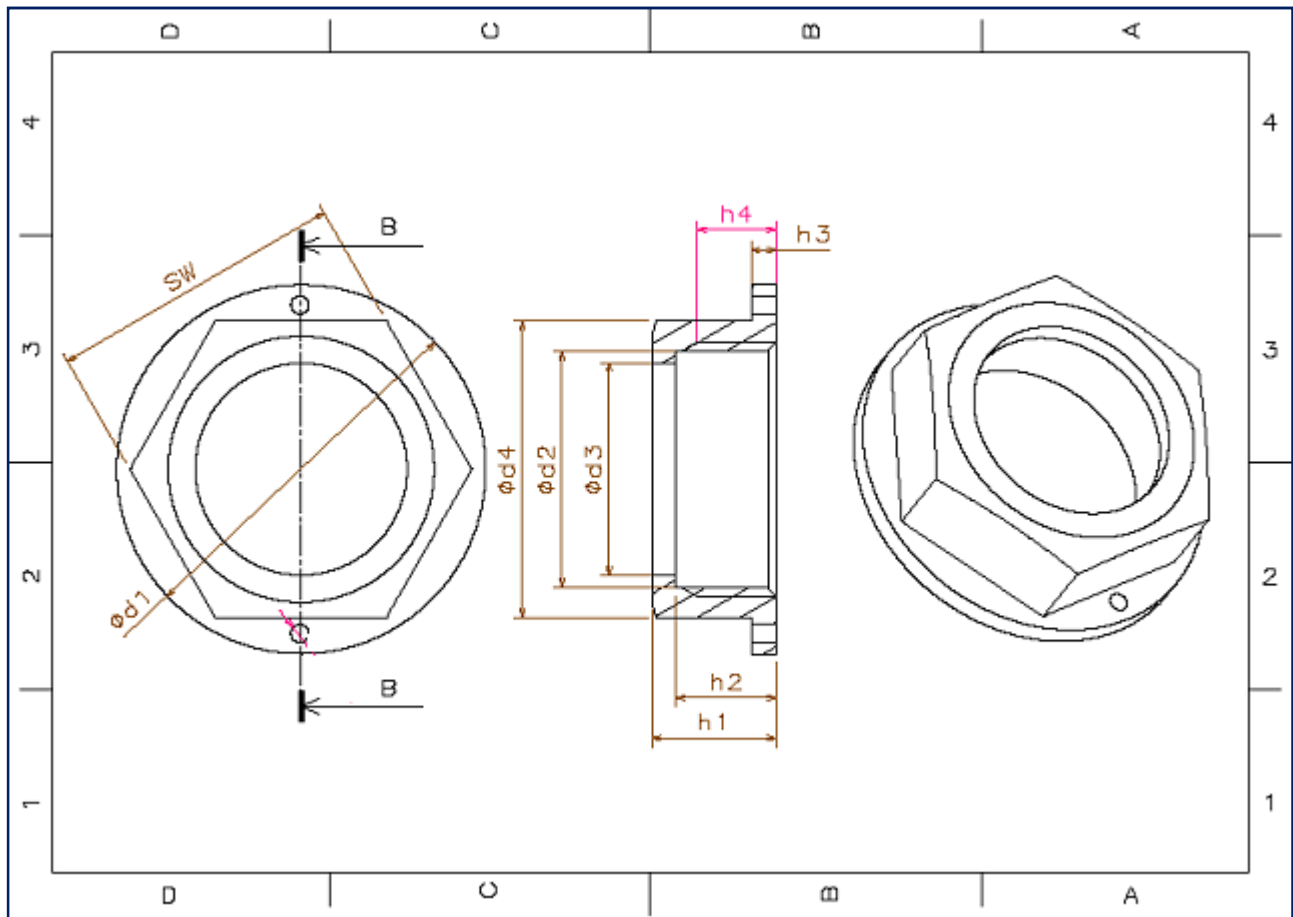
## ANNEX A

### Elastomer Characteristics

Item	Property	Unit	Hardness Class				
			50	60	70	80	90
1	Hardness Tolerances on stated nominal hardness	IRHD	$\pm 5$	$\pm 5$	$\pm 5$	$\pm 5$	+3/-5
2	Tensile strength, min	MPa	6	9	9	10	10
3	Elongation at break, min	%	400	300	200	150	80
4	Compression set <sup>a</sup> - at 70 °C, after 24h - Where applicable, at -10 °C after 24h or - at -20 °C after 24h		25	25	25	25	25
		%	40	40	40	40	40
		%	50	50	50	50	50
5	Resistance to ageing - Change in hardness - Change in tensile strength - Change in elongation at break	IRHD	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 8$	$\pm 6$
			$\pm 15$	$\pm 15$	$\pm 15$	$\pm 15$	$\pm 15$
		%	+10/-25	+10/-25	+10/-25	+10/-25	+10/-25
6	Resistance to gas (n-pentane) - Change in mass after immersion (72h, 23 °C)	%	+10/-5	+10/-5	+10/-5	+10/-5	+10/-5
	- Change in mass after drying (168h 40 °C), max	%	+5/-10	+5/-10	+5/-10	+5/-8	+5/-8
7	Resistance to lubricants Oil IRM 902 h at 70 °C - Change in hardness - Change in mass	IRHD	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$
		%	+15/-10	+15/-10	+15/-10	+15/-10	+15/-10
8	Visual Examination	Homogeneous, free from porosity, inclusions, grit, blisters and surface imperfections visible with the naked eye.					
9	Low temperature flexibility at -29 °C after 6h	Sufficient flexibility and no sign of delaminating, blistering or significant deterioration.					



**ANNEX B**  
**Figures and Dimensions**



**Figure 1 - Backnut**

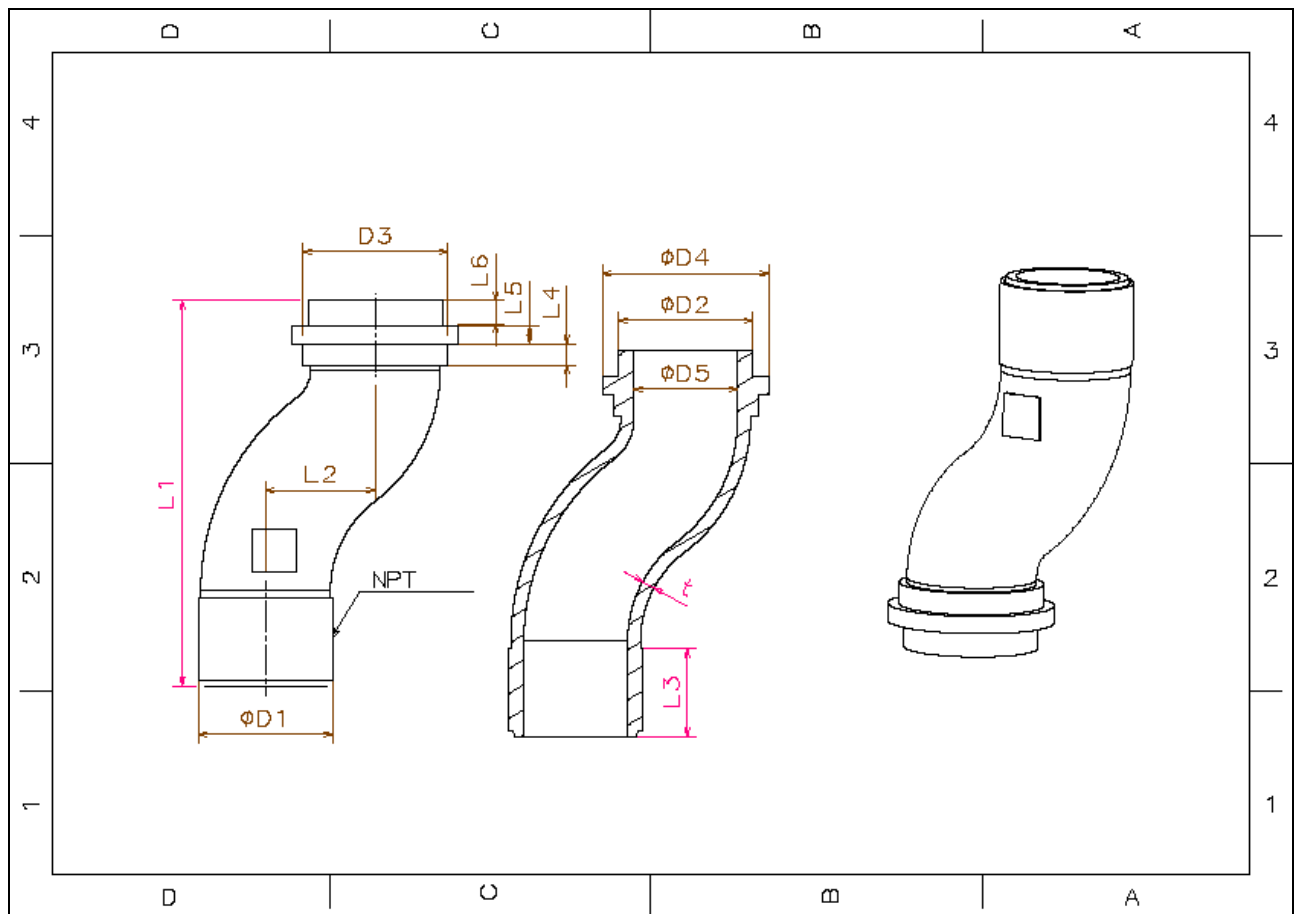
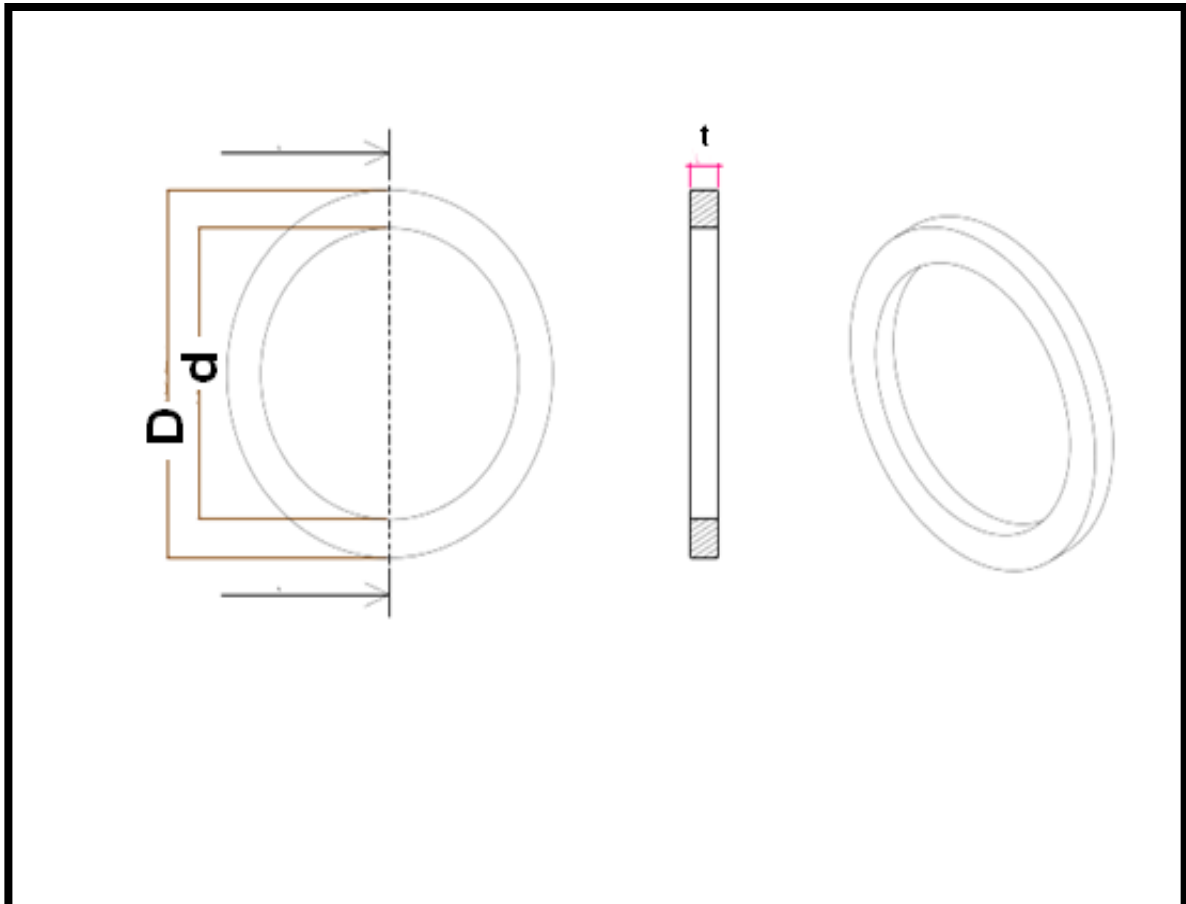


Figure 2 - Body



**Figure 3 - Gasket**

**TABLE 1 - nut**

Size (NPS)	SW	Design of meter	d1 (min)	d2	d3	d4	h1	h2	h3	h4 <sup>(2)</sup>	Minimum Weight (gr)
1 × 1-1/4	49	G2.5/ G4/G6	57.0	39.0 ±0.2	35.0 ±0.3	49.0 ±0.5	20	16.0	4.5 ±0.5	12	118
1-1/2 × 2	65	G10/ G16	73.0	57.0 ±0.2	53 ±0.5	65.0 ±0.5	25.0	19.5	6.5	14	190
2 × 2-1/2	84	G25	92.0	72.3 ±0.2	66.5 ±0.5	84.0 ±0.5	32.0	25.0	8.0	19	410

1-Dimension are in millimeter.  
2-Female thread according to ISO 228/1 (Straight)

**TABLE 2 - Body**

size	Design of Meter	D1	D2	D3	D4	D5	L1	L2	L3 <sup>(2)</sup>	L4	L5	L6	t	Minimum Weight (gr)
1 × 1-1/4	G 2.5/ G4/G6	1" NPT	31.0 ±0.5	33.5 ±0.6	38.3 ±0.3	23.5 ±0.5	89	25.4	-	5 ±0.5	4.0 ±0.3	5.5 ±0.5	3.2	225
1-1/2 × 2	G10/ G16	1-1/2 NPT	46.0 ±0.5	51.0 ±0.6	56.2 ±0.4	35.5 ±0.5	105	25.4	-	8.0	5.5 ±0.4	6.0	4.0	490
2 × 2-1/2	G25	2" NPT	59.5 ±0.5	64.0 ±0.6	71.5 ±0.4	46.0 ±0.5	145	25.4	-	13.0	6.0 ±0.5	6.5	5.0	1000

1-Dimensions are in millimeter.  
2-Male thread according to ANSI/ASME B1.20.1(NPT)

**TABLE 3 - Gasket**

<b>Size</b>	<b>d</b>	<b>D</b>	<b>t</b>
1"	30.5	38	3
1-1/2"	45.5	55.5	4
2"	59	70	5