

APPROVED



National Iranian Gas Co.

مدیریت پژوهش و فناوری

Research and Technology Management

امور تدوین استانداردها

Standardization Division

IGS

Iranian Gas Standards

مشخصات فنی خرید

کنتورخانگی مناسب برای فشاردوپیوند

Domestic 2-PSI Gas Meters

FOREWORD

This standard is intended to be mainly used by **NIGC** and contractors 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 ammended by technical standard committees within NIGC Standardization Div. 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** users .

This standard must not be modified or altered by the end users within **NIGC** and her contractors. Any deviation from normative references and/or well known manufacturers specifications must be reported to Standardization div.

Any comments from concerned parties on **NIGC** distributed **IGS** are welcome to technical standards committees and will receive serious attention and consideration should a revision to standards is recommended .

GENERAL DEFINITIONS :

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

1- "**STANDARDIZATION DIV.**" has been organized to deal with all aspects of industrial standards in NIGC . Therefore , all queries for clarification or amendments are requested to be directed to the mentioned div.

2- "**COMPANY**" : refers to national iranian gas company .

3- "**SUPLIER**" : 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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پیشگفتار

- ۱- این استاندارد/دستورالعمل بمنظور استفاده اختصاصی در شرکت ملی گاز ایران و شرکتهای فرعی وابسته تهیه شده است.
- ۲- شرکت ملی گاز ایران در مورد نیازهای عمومی از استانداردهای وزارت نفت (IPS) و در مورد نیازهای اختصاصی از استانداردهای اختصاصی خود (IGS) استفاده می نماید.
- ۳- استانداردهای شرکت ملی گاز ایران (IGS) توسط کمیته های تخصصی استاندارد متشکل از کارشناسان بخش های مختلف و یا مشاور تهیه می شود و توسط شورای استاندارد (منتخب هیئت مدیره شرکت ملی گاز ایران) به تصویب میرسند.
- ۴- در تنظیم متن استانداردهای (IGS) از کلیه منابع شناخته شده استاندارد، اطلاعات فنی - تخصصی مربوط به صنایع گاز دنیا، مشخصات فنی تولیدات سازندگان معتبر جهانی و نیز از نتیجه تحقیقات و تجربیات کارشناسان و متخصصان داخلی بر حسب مورد استفاده می شود. همچنین بمنظور استفاده هر چه بیشتر از تولیدات داخلی قابلیت های سازندگان داخلی نیز مورد توجه قرار میگیرد.
- ۵- استانداردها از طریق پایگاه اینترنتی شرکت * و یالوح فشرده (CD) در اختیار واحدها و کاربران قرار می گیرد .
- ۶- استانداردها بطور متوسط هر ۵ سال یکبار و یادر صورت ضرورت زودتر، مورد بازنگری و بروزرسانی قرار میگیرند. بنابراین کاربران باید همیشه آخرین نگارش را مورد استفاده قرار دهند.
- ۷- هرگونه نظر و یا پیشنهاد اصلاح در مورد استانداردها مورد استقبال و بررسی قرار خواهد گرفت و در صورت تأیید، استاندارد مربوطه نیز مورد تجدیدنظر قرار خواهد گرفت .

تعاریف عمومی

در متن استانداردهای (IGS) از تعاریف واصطلاحات زیر استفاده میشود.

- ۱- "شرکت" (COMPANY): منظور از شرکت "شرکت ملی گاز ایران" و یا شرکتهای فرعی وابسته میباشد.
- ۲- "فروشنده" (SUPPLIER/VENDOR): به فرد یا موسسه ای اطلاق میگردد که تعهدی رانسبت به شرکت تقبل نموده است.
- ۳- "خریدار" (PURCHASER): منظور از خریدار "شرکت ملی گاز ایران" و یا شرکتهای فرعی وابسته میباشد.
- ۴- "SHALL": در مواردی بکاربرده میشود که انجام خواسته مورد نظر اجباری است
- ۵- "SHOULD": در مواردی بکاربرده میشود که انجام خواسته مورد نظر ترجیحی و درعین حال اختیاری است
- ۶- "MAY": در مواردی بکاربرده میشود که انجام کار به شکل مورد بحث نیز قابل قبول میباشد

*آدرس پایگاه اینترنتی (<http://igs.nigc.ir>) ، آدرس الکترونیکی (nigcigs@nigc.ir)

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1. SCOPE:

This specification together with the appendices there to covers the minimum requirements for design , material fabrication , testing , inspection , painting , marking , packing and packaging of diaphragm type gas meter to be used for measuring of natural gas (as per composition in appendix “C”) for commercial and industrial usages with 138 MBAR (2PSIG) working pressure.

For specific requirements see appendix “D” . in case of any exception to this specification , it shall be clearly stated on the technical quotation submitted by supplier.

2. REFERENCES

Throughout this standard specification the following standards and codes are referred to. The editions of these standards and codes that are in effect at the time of publication of this standard specification (1999) shall , to the extent specified herein, form a part of this standard specification . The applicability of changes in standards and codes that occur after the date of this standard specification shall be mutually agreed upon by the purchaser and supplier and/or manufacturer.

- 1- ASTM B117-1985 standard method of salt spray (fog) testing
- 2- ANSI B16.5 pipe flanges and flanged fittings .
- 3- ANSI B1.1 unified inch screw threads
- 4- BS 3900: part E6: 1992 methods of test for paints crosscut test.
- 5- BS 381.C specification for colours for identification coding and special purposes .

6- BS 4161 : part 5: 1990 specification for diaphragm meters for working pressures up to 7 bar .

7- EN 1359-1993 specification for diaphragm gas meter .

8- BS-EN – 549 : 1995 rubber materials for seals and diaphragms for gas appliances and gas equipment .

9- ISO 1817 rubber vulcanized – determination of the effect of liquids.

10-ISO 2409 :1992 methods of test for paints and varnishes .

11-OIML R61989 general provision for gas volume meters .

12-OIML : NO.31 diaphragm gas meters.

3. **DEFINITIONS**

DIAPHRAGM GAS METER : gas volume meter in which the gas volume is measured by means of measuring chambers with deformable walls.

difference between the pressure of the gas at the inlet of the meter and the atmospheric pressure.

MAXIMUM WORKING PRESSURE : upper limit of working pressure for which the meter has been designed , as declared by the manufacturer and marked on the meter index or data plate.

AMBIENT TEMPERATURE: the temperature of the surrounding air , at which the regulator may be operated.

DIAPHRAGM: A flexible member which , under the influence of the forces arising from loading and pressure, operates the valve.

PRESSURE ABSORPTION : difference between the pressure measured at the inlet and outlet connections of the meter whilst the meter is operating.

EXTERNAL LEAK TIGHTNESS: leak tightness of the gas carrying components of the gas meter with respect to the atmosphere.

ERROR OF INDICATION : value which shows the relationship in percentage terms of the difference between the volume indicated by the meter and the volume which has actually flowed through the meter, to the latter volume:

$$E = 100 \frac{V_i - V_c}{V_c}$$

Where

E is the error of indication, expressed as a percentage ,

V_i is the indicated volume and **V_c** is the volume which has actually flowed through the meter.

DISTRIBUTED GAS : gas locally available .

METERING CONDITIONS: conditions of the gas , the volume of which is to be measured , at the point of measurement (e.g. temperature and pressure of the measured gas).

4. REQUIREMENTS

4-1 DESIGN AND SERVICE CONDITIONS:

The meter shall have easy moving parts without stresses and be constructed of quality materials in a workmanlike manner in order to attain gas tightness , stability of performance and sustained accuracy over a period of time and over the

range of operating conditions with minimum of maintenance , when metering natural gas. Such meter shall have the general characteristics listed below:

- 4.1.1 The meter shall be tamper proof , gas tight and capable to sustain accuracy under the whole range of service conditions.
- 4.1.2 The meter shall be capable to register specified capacity at specified inlet and differential pressure.
- 4.1.3 Normal inlet pressure of meter is 138 MBAR (2PSIG).
- 4.1.4 Meter maximum working pressure shall be 500 MBAR.
- 4.1.5 The ambient temperature range for the meter is -29°C to 60°C (-20°F to 140°F) .
- 4.1.6 Pressure drop across the meter at rated capacity with air of density 1.2 kg/m³ shall be as shown in the following table :

TABLE 1: PRESSURE DROP

DESIGNATION OF METER	MAX. ALLOWABLE PRESSURE DROP (MBAR)
G 25 , G 40 INC.	3
G 65 , G 100	4

- 4.1.7 Meter accuracy shall be 3% for capacities up to 2 times the minimum capacity ($2 \times Q_{\min}$) and 2% for capacities over 2 times the minimum capacity.
- 4.1.8 The transmission system to index shall be magnetic coupling type.

4.1.9 Index shall be digital and direct – reading type , except decimal(s) which could be either digital or pointer type.

4.1.10 The index of the meter shall be sealed against from the gas inside the meter. The index window shall be sealed in its frame and vent to atmosphere through a small hole in the frame and positioned to prevent the ingress of water .

4.1.11 Uper and lower parts of the meter body shall be connected together by means of:

1- steel nuts & bolts or

2- steel band

Provisions shall be made by manufacturer for sealing purposes of upper and lower parts of meter in order to prevent tampering by unauthorized persons .

4.1.12 No sealant or grease shall be used for sealing purposes and valve covers or grids and diaphragm and pan assembly.

4.1.13 Inlet and outlet connections of meter shall be flange type, raised face , serrated finish. Meter flanges shall be in accordance with ANSI B16.5 to Match welding neck flanges ANSI class 150.

4.2 MATERIALS:

4.2.1 The materials of all components of meter whether specified or unspecified shall be suitable for pressure ,temperature and other operating conditions specified. In appendix “D” (DATA SHEET)

4.2.2 All parts of the meter shall be resistant to corrosion developing media normally tracked in air or gas including the continous attack of odorized natural gas.

4.2.3 Rubber parts material such as diaphragm shall be made of synthetic material resistant to odorized natural gas. Other rubber parts material such as sealings and sealing glands shall be from resilient materials.

Test requirements for rubber parts material shall be in acc. With appendix “B” item 9.

4.2.4 The index case shall be made of material same as those of body of meter or plastic . In case of plastic for index case , the expansion and contraction of the index due to temperature changes must be the same as the body of the meter.

4.2.5 The index window shall be made of suitable material to satisfy the test requirements specified in appendix “B” item 10.

4.2.6 All screws , bolts and nuts shall be stainless steel or corrosion resistant plated steel and shall conform to ANSI B1.1 .

4.2.7 The body of meter shall be made of steel plate with sufficient strength and thickness to meet the requirements of this specification.

4.2.8 Diaphragm casing shall be pressed steel and suitably protected from corrosion.

4.2.9 Plastic parts including , gears, levers , etc shall be from acetal materials acc. To (IGS-MS-CH-034 1998) app “E”.

4.2.10 Valve and valve seat of meter shall be bakelite.

4.2.11 Metallic internal linkages and levers shall be corrosion resistant.

5. INSPECTION , TEST & CERTIFICATION

The manufactured meter will be inspected and the inspection shall cover the following stages as specified in this specification and according to terms and conditions of purchase order.

Approximately 3% of each item and lot ready for presentation (unless otherwise specified by mutually agreed inspection procedure based on capacity and quantity of each lot) shall be selected randomly by identified NIGC inspector.

Manufacturer shall provide and present to NIGC inspector test results for different examinations and accuracy correlated to serial number and material test certificates acc. To requirements of NIGC specification:

- 1- Visual inspection.
- 2- Dimension test.
- 3- Accuracy test.
- 4- Capacity and differential pressure test.
- 5- Leak test.
- 6- Ambient temperature test.
- 7- Life test.
- 8- Cyclic volume test.
- 9- Diaphragm & other rubber parts test.
- 10- Index window test.
- 11- Salt spray test.
- 12- Paint test
- 13- Inlet /Outlet connection torque test.

6. PAINTING: