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شرکت ملی گاز ایران
مدیریت پژوهش و فناوری
امور تدوین استانداردها

IGS

مشخصات فنی خرید

رگولاتور خانگی

GAS PRESSURE REGULATOR, DOMESTIC



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دفتر مدیرعامل



ابلاغ مصوبه هیأت مدیره



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باسلام،

به استحضار می‌رساند در جلسه ۲۰۰۳ مورخ ۱۴۰۱/۱۲/۱۴ هیأت مدیره،
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۱- مشخصات فنی خرید رگولاتور خانگی

IGS-M-IN-201(3)



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Foreword

This standard 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 standard committees within NIGC standardization 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 standard 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 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 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

	Title	Page
1	Scope	3
2	References	3
3	Definitions	4
4	General requirement	6
5	Materials	10
6	Painting	11
7	Marking	12
8	Documentations	13
9	Inspection and testing	13
10	Packing and packaging	20
11	Guarantee	20
12	Warrantee	20
13	Appendices	21

1. SCOPE

This standard specifies the minimum design, material, performance, and painting, marking and testing and packing requirements of single stage type natural gas service regulators operating at inlet pressures 1 bar up to and including 4 bar. These regulators are used to control the gas delivery pressure to pressurize at a maximum 25.4 mbar.

2. REFERENCES

2.1. AGA XQ 9802 / ANSI B 109.4: self-operated diaphragm-type natural gas service regulators

2.2. ANSI B1.20.1: Pipe Threads, (Inch) General Purpose

2.3. ANSI B16.4: Malleable iron threaded fittings classes 150 and 300

2.4. ANSI B16.4: Gray Iron Threaded Fittings.

2.5. ASTM B85: Standard Specification for Aluminum-Alloy Die Castings

2.6. ASYM B16: Standard Specification for Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines

2.7. ASTM A126: Standard specification for gray iron castings for Valves, Flanges and Pipe fittings

2.8. ASTM A48: Standard for Gray Iron Castings

2.9. ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus

2.10. IGS-M-CH-033 (1): Specification for Iranian Natural Gas Quality

2.11. IGS-M-IN-308 (0): Specification for mechanical security seals

2.12. ANSI Z 21.15: Manually operated gas valves for appliances and appliances connector valves and holes end valves.

2.13. EN 13787: Elastomers for gas pressure regulators and associated safety devices for inlet pressures up to 100 bar.

2.14. EN 549: Rubber materials for seals and diaphragms for gas appliances and gas equipment

2.15. ISO 2409: Methods of test for paints and varnishes.

3. DEFINITIONS

3.1. Diaphragm: A flexible element used to sense the outlet pressure and, in combination with the loading spring and linkage, to position the valve to control the downstream pressure.

3.2. Diaphragm case or casing: The housing for the diaphragm usually consists of an atmospheric or ambient casing and a gas casing. The gas casing and the diaphragm form the gas chamber. The atmospheric or ambient casing and the diaphragm form the atmospheric or ambient chamber. The diaphragm seals and separates the gas chamber from the atmospheric or ambient chamber. The atmospheric or ambient chamber houses the loading spring and vents into the atmosphere.

3.3. Droop: The drop in outlet pressure from set point with respect to increasing gas flow rate.

3.4. Hysteresis: Characteristic used to describe a deviation in the regulator performance based on internal friction, the diaphragm material and flow.

3.5. Internal relief valve (IRV): A relief valve that relieves excessive outlet pressure through the diaphragm and vent assembly.

3.6. Loading spring: A spring placed on the diaphragm or diaphragm plate and contained in the atmospheric casing, which opposes the gas pressure exerted against the opposite side of the diaphragm. The outlet pressure of the regulator is set by the compression of this spring.

3.7. Lock-up: The state of the regulator when inlet pressure is applied and no gas is flowing.

3.8. Lock-up pressure: The outlet pressure above which there is no flow through the regulator.

3.9. Orifice: The primary flow restrictor that is used to control the flow of gas. It is the position of the valve disk with respect to the seating surface of the orifice that determines the amount of gas flowing through the regulator.

3.10. Over-pressure shut-off: A device designed to stop the flow of gas when the outlet pressure increases above a pre-determined pressure.

3.11. Under-pressure shut-off: A device designed to stop the flow of gas when the outlet pressure drops below a pre-determined pressure.

3.12. Pressure drop: The loss in pressure between two points in a system in which gas is flowing.

3.13. Gauge pressure: Pressure measured relative to the atmospheric pressure.

3.14. Pulsation, hunting or chattering: An unstable state in which there is oscillation of the regulator diaphragm, linkage and/or mechanisms that causes noise and/or fluctuating outlet pressure.

3.15. Seal cap: The cap serving as a weather seal and external closure for the loading spring and spring adjustment screw.

3.16. Set flow: The flow rate used for the initial setting of the regulator at a specified inlet pressure and outlet set pressure.

3.17. Set pressure, setting pressure or set point: The initial setting of the regulator outlet pressure at a specified set flow and inlet pressure.

3.18. Spring adjustment mechanism: Usually a threaded part by which the loading spring is adjusted to set the outlet pressure.

3.19. Valve: A valve consists of the valve orifice and valve disk, and it is used to control gas flow through the regulator.

3.20. Valve body: That part of the regulator that consists of inlet and outlet piping connections and the orifice.

3.21. Valve disk or valve seat: A resilient disk or similar device that is positioned with respect to the regulator valve orifice to control and shut off the flow of gas.

3.22. Valve linkage: A lever or mechanism connecting the diaphragm to the valve disk.

3.23. Vent: The opening to the atmospheric side of the diaphragm casing through which the regulator breathes.

3.24. Vent cap or vent screen: A cap that is inserted into the vent of the regulator to keep bugs, insects and water from getting into the regulator's atmospheric or ambient casing. It may also act as a restrictor in the vent to prevent pulsation or chattering.

3.25. Type tests: All tests mentioned in this standard those carried out in order to compatibility of specifications manufactured regulator with all requirements of this standard.

3.26. Sample tests: The tests those carried out on limited samples of each lot ready for shipment selected by inspector.

3.27. Factory test: all test mentioned in this standard those carried out by the manufacture on regulators prepared for delivering.

3.28. Single stage regulator: A regulator that reduce inlet pressure to outlet set pressure directly in one step.

3.29. Water column (W.C.): As in a manometer, a means for measuring pressure, usually stated as inches of water column.

4. GENERAL REQUIEMENTS

4.1. Natural gas specifications are according to IGS-M-IN- 033.

4.2. Ambient temperature range is -25°C up to +55 °C.

4.3. Standard condition is 1.013 bar (14.696 Pisa) and 15. 6°C (60°F).

4.4. Inlet pressure range is 1 bar up to and including 4 bar.

4.5. Normal outlet pressure range is 15 to 25.4 mbar.

4.6. Set point of regulator shall be 7.0 inches W.C. (1.74 kPa) (17.4mbar) $\pm$ 1 inch W.C. (0. 25 kPa) (2.5mbar).

4.7. The outlet pressure of regulator shall not rise above 25.4 mbar (10in.w.c) or fall below 15 mbar (6in.w.c) with flow variation between zero and full capacity of regulator inlet pressure variation between 1 bar to 4 bar (15psig to 60psig).

4.8 The regulator shall be equipped with under pressure shut off device (u.p.s.o), over pressure shut off device (o.p.s.o) & internal relief valve (i.r.v). The three safety devices and the regulator shall be integrated and comprise one unit.

4.9. Under pressure shut off (u.p.s.o) shall be adjustable and set at 8.7 ± 1.2 mbar ($3.5 \pm 0. 5$ in.w.c).

4.10. Under pressure shut off device shall be manually reset.

4.11. Over pressure shut off (o.p.s.o) shall be adjustable and set at 42.3 ± 2.5 mbar (17 ± 1 in.w.c).

4.12. Over pressure shut off device shall be independent from the main diaphragm case and valve seat of the regulator.

4.13. Over pressure shut off device shall be manually reset



4.14. Internal relief valve (I.R.V) shall be adjustable and set at 62.3 ± 7.5 mbar (25 ± 3 in.w.c).

4.15. Internal relief valve (I.R.V) shall be designed to relieve pressure at a rate that limits the downstream pressure to a maximum of 1.5 psig (10.3 kPa) (103 mbar) for the maximum inlet pressure.

4.16. The regulator 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 accurate regulation over a period of time and over the range of operating conditions with minimum of maintenance, when regulating natural gas

4.17. The regulator shall be for outdoor installation.

4.18. Regulators shall operate without objectionable noise, malfunction, hunting, pulsation or chattering over an ambient temperature range and at inlet pressure range.

4.19. The regulator shall incorporate an internal static pressure sense point with no external static or control lines.

4.20. The regulator valve body shall conform to the dimensions and pressure requirements of the ANSI B 16.4.

4.21. The valve body must meet the strength, casting integrity and leakage- performance testing requirements of this standard.

4.22. Assembled regulators shall with stand an outlet pressure of 2 psig without leakage (vents shall be blocked closed) or permanent deformation of any component.

4.23. The regulator shall with stand a cantilevered load of 250 lbs. (113.4 kg) without affecting performance or causing leakage, fracture or permanent deformation of any component.

4.24. The upper cover of the diaphragm case shall have a vent connection.

4.25. The diaphragm case, which contains the natural gas under normal operation, shall with stand a pressure of 10 psig (68.9 kPa)(689 mbar) without rupture.

4.26. All Screws, bolts and nuts shall conform to ANSI B1.20.1.

4.27. All parts coming in contact with the diaphragm shall not have sharp edges, burrs, projections or similar conditions, which might chafe or abrade the diaphragm.

4.28. Adequate means shall be provided to prevent the diaphragm and diaphragm plate from restricting the vent.