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شرکت ملی گاز ایران

مدیریت پژوهش و فنآوری

امور تدوین استانداردها

IGS

مشخصات فنی خرید

عمل کننده هیدرولیکی شیرآلات

Gas Over Oil Actuators

ابلاغ مصوبه هیأت مدیره

مدیر محترم پژوهش و فناوری

باسلام،

به استحضار می‌رساند در جلسه ۱۹۲۷ مورخ ۱۴۰۰/۰۳/۲۳ هیات مدیره، نامه شماره گ۳۲۸۰۷/۰۰۰/۹ مورخ ۱۴۰۰/۰۳/۱۷ آن مدیریت درمورد تصویب نهایی مقررات فنی شرکت ملی گاز ایران به شرح زیر مطرح و مورد تصویب قرار گرفت.

۱-مشخصات فنی کنتور گاز آلتراسونیک چند مسیره IGS-M-IN-104(3)

۲-دستور العمل عمل کننده هیدرولیکی شیرآلات IGS-M-IN-304(2)

۳-مشخصات فنی کیفیت سامانه قطع گاز در ایستگاه های TBS/DRS در مقابل زلزله IGS-M-IN-306(1)

۴-مشخصات فنی فلنج های مهار (Anchor Flang) IGS-M-PL-027(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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رئیس محترم امور مجامع

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

1. SCOPE

This specification defines the minimum requirements for all types of gas over oil actuators to be installed on pipeline ball valves.

2. REFERENCE

2.1. API 6DX: Standard for actuator sizing and mounting kits for pipeline valves
2.2. IEC60079-1: Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures “d”
2.3. IEC60079-7: Explosive atmospheres - Part 7: Equipment protection by flameproof enclosures “e”
2.4. IEC 60529: Degrees of protection provided by enclosures (IP Codes)
2.5. SSPC 22: Painting system guide No.22 (Epoxy polyamide paints)
2.6. IGS-M-PL-10-3: Ball Valves Class Rating 600

3. TERMS AND DEFINITIONS

For the purposes of this document, terms and definitions are according to API 6DX

4. REQUIEMENTS

4.1. The actuator shall be natural gas–over–oil double-acting type. The actuator shall be supplied with emergency hand pump, local push buttons, local position indicator, automatic line break system (if specified) and emergency power gas storage tank for a complete operation (one open & one close stroke). The line break system shall have an adjustable range of 0.5 to 6 bar/min rate of drop and shall override the local push buttons of lever.

4.2. The supplier shall submit with technical quotation, the actual curves and values for the actuator output torque and the torque required for operation of the valve, plotted against each other within the specified pressure and temperature conditions as in actuator data sheet.

The torque of valve and actuator for the critical points as below, shall be delivered to the purchaser.

- BTO (Break to open) (Nm)
- ETO(End to open) (Nm)
- Running (Nm)
- BTC(Break to close) (Nm)
- ETC(End to close) (Nm)

4.3. The actuator maximum operating time at minimum pressure shall be according Table.1:

Table.1. Maximum operating time at minimum pressure

Valve Size	Maximum Operating Time
up to 30 inch	45 sec
32 to 56 inch	120 sec

4.4. The actuator itself shall be provided with hydraulic torque limit switch.

4.5. The hand-pump shall be provided for manual operation.

4.6. The control box and pneumatic components shall be totally enclosed in a waterproof enclosure. Table. 2 determines the IP rating of these components.

Table.2. IP rating of control box and pneumatic

Device	IP rating (at least)
Control box	IP65
Pneumatic components	IP54

4.7. All piping for hydraulic and pneumatic circuits shall be seamless stainless steel AISI-316.

4.8. Both actuator and emergency storage tank shall be sized for minimum operating pressure

4.9. When valve and actuator are not delivered assembled together, the supplier shall supply all necessary items (fittings, tubing, stop valves and shuttle valves, etc.) for complete installation of valve and associated actuator.

4.10. The serial Number of the valve tested with the actuator shall be marked on the actuator name plate.

4.11. The valve stem (extension) & actuator yoke shall be marked for proper alignment for field assembling.

5. INSPECTION AND TESTING & CERTIFICATES

Each valve and its corresponding actuator shall be assembled together and following tests shall be performed locally and / or by remote (if remote control is specified).

5.1. Shell Test

The actuator cylinders shall be hydrostatically tested with 1.3 times of design pressure for a duration of 1 hour using recording gauge. No defects shall be observed.

5.2. Piston Seal Test

Shall be according to API 6DX part 13.3.

5.3. Torque/Thrust Test

The manufacturer shall have proven documented procedures and associated acceptance criteria in place that demonstrate an ability to verify and validate the performance characteristics of the actuator. The purchaser may specify additional torque testing on either prototype or production actuators.

5.4. Solenoid Valves

The solenoid valves and limit switches and all other electrical components shall be enclosed in an explosion proof closure for: Zone1, group (natural gas), EEXd, T4, IEC60079-1

Note: Test certificates for all above mentioned items shall be submitted prior to shipment.

5.5. Line Break System (LBV)

With the valve in open position, line break system shall close the valve at maximum, operating and minimum pressure for the following rate pressure drops: 0.5, 0.75, 1.0, 1.25, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 5.0 and 6.0 bar per minute. Duration of closing time shall also be specified for each case. (Sample test should be mention in the data sheet, Graph or Table should be give us by manufacturer)

5.6. Emergency Closing Operation for Low Pressure (ESD)

With valve in open position, adjust the ESD pressure switch in minimum set range. By applying a pressure lower than minimum set range to ESD device pilot connection, valve shall be closed smoothly and without any difficulty. The same test as above shall be performed for maximum set range and ESD set point pressure.

5.7. Remote Function

- With valve in close position, by applying a proper voltage to open solenoid valve terminals, valve shall be opened smoothly and without any difficulty. After the valve opened, the open position switch should be active. Also the close position switch should be inactive.
- With valve in open position, by applying a proper voltage to close solenoid valve terminals, valve shall be closed smoothly and without any difficulty. After the valve closed, the close position switch should be active. Also the open position switch should be inactive.
- During the valve operation, both close & open position switches should be inactive.

5.8. Actuator Torque Limit Switches Function

5.8.1. Open Torque Limit Switch

By operating the manual open lever or pushbutton, valve will be fully opened. After this time, by continuing operation open lever or pushbutton, the open torque limit switch should be active and decrease the actuator pressure.

5.8.2. Close Torque Limit Switch

By operating the manual close lever or pushbutton, valve will be fully closed. After this time, by continuing operation close lever or pushbutton, the close torque limit switch should be active and decrease the actuator pressure.

5.9. Hand Pump Function

With valve in close position and differential pressure across the valve equal to maximum operating pressure and after depressurizing the cavity(only for trunnion ball valves), valve shall be opened by using hand pump smoothly and without any difficulty .

5.10. Valve Opening

With valve in close position and differential pressure across the valve equal to maximum operating pressure and after depressurizing the cavity (only for trunnion ball valves), valve shall be opened smoothly and without any difficulty. This test shall be performed twice. During the test, the actuator feed pressure shall be equal to maximum operating pressure. The same test as above shall be performed for minimum operating pressure.

5.11. Valve Closing

With valve in open position, adjust the valve pressure in maximum operating pressure and depressurize the cavity (only for trunnion ball valves), valve shall be closed smoothly and without any difficulty. This test shall be performed twice. During the test, the actuator feed pressure shall be equal to the maximum operating pressure. The same test as above shall be performed for minimum operating pressure.

6. MARKING (Nameplate)

Each actuator shall carry, grouped together on a steel badge plate, the following Inscriptions:

- Manufacturer name and trade mark.
- Type, model and serial number.
- Maximum and minimum working pressure.
- Maximum and minimum operating temperature.
- Line breaks range.
- Line breaks setting.
- ESD range
- ESD setting
- Range of opening and closing time.
- Output torque at min. working pressure.

- Corresponding valve serial number and size.
- Relief valve setting.
- Purchase order and item number.
- Year of manufacture.
- The serial NO, of the valve tested with the actuator shall be marked on the actuator name plate.
- The valve stem (extension) & actuator yoke shall be marked for proper alignment for field assembling.

7. Painting

The external surface of the actuator shall be thoroughly cleaned by removing all rust and mill scale. Surfaces to be painted shall be completely free from grease, grit and other foreign materials.

Primer coat	Epoxy polyamide, in accordance with SSPC 22, with a min. thickness of (DFT) of 70-m.
Intermediate coat	Epoxy polyamide ,in accordance with SSPC 22 , with a min. thickness of 140-m.
Top coat	Two-component aliphatic polyurethane , in accordance With MIL-C-83286 B, or equivalent, with min. thickness (DFT) of 70-m. Colour : white (RAL 9016)

8. Shipment

8.1. Test certificates for all above mentioned items shall be submitted prior to shipment

8.2. For valve sizes larger than 20 inch after performing all the required tests the valve with stem extension & actuator shall be packed separately .The actuator and valve with stem extension shall then be clearly marked so that it can re- assembled in the field. For valve sizes up to 20 inch after performed all the required tests. The valve, stem extension and the actuator shall be assembled together & packed and delivered as one unit.

9. Documentation

Supplier is required to submit the following information and material in English, 3 sets with technical quotation and 3 sets after receiving the order.

9.1. All technical information and original catalogue (s).

9.2. The actuator output torque and the torque required for operation of the valve for the critical points according to 4.2

9.3. Material specifications for all components.

9.4. Complete parts list catalogue (s).

9.5. Recommended spare part lists and prices for commissioning and two years operation.

9.6. General drawing (s) showing outline dimension.

9.7. Manual for installation, commissioning, operational maintenance including trouble shooting procedures.

9.8. Detailed description and drawing (s) for operation of the control system.

9.9. Actuator shall operate using line pressure directly

10. Data Sheet

Data Sheet	Item			Filled by N.I.G.C			Filled by manufacturer		
Valve	Serial No.								
	According to IGS-M-PL-002-3(0) data sheet								
Actuator	Serial No.								
	Type / Model								
	Service Condition								
	PROCESS DATA	Pressure (psi)		Min	Nor	Max	Min	Nor	Max
		Temperature(Deg)		Min	Nor	Max	Min	Nor	Max
	Environment Temperature			..... ☐°C ☐ °F			..... ☐°C ☐ °F		
	MOUNTING	Storage Tank		Required (with at least one complete stroke)			.....		
		Actuator Orientation		Vertical			☐		
		Valve position indicator		Required			☐		
	Control	Local / Remote		Required			☐		
		Line break (L.B.)		.....			☐		
		ESD	Emergency low pressure shut down	☐			☐		
			Emergency high pressure shut down	☐			☐		
		Local reset		For ESD & LBV is required			☐		
		Gas Power/Signal Failure		Last Position			☐		
		Hand Pump		Required			☐		
		Speed Control		Required			☐		
		Torque Limit device		Required			☐		
		Filter		Required			☐		
		relief valve		Required			☐		
		Pressure gauge for power gas		Required			☐		
		IP rating	Control box	IP65			.....		
			Solenoid valve	IP65			.....		
			Limit switch	IP65			.....		
		Area classification for solenoid valve, limit switch		EExd, IIB T4			.....		
		Electrical connection for solenoid valve, limit switch		M20 x 1.5			.....		
		Solenoid valve	Quantity	2 (One Open/One Close)			.....		
			Type	3 way			.....		
			Body/trim material	SS316			.....		
		Limit switch	Quantity	2 (One Open/One Close)			.....		

			Type	Snap-action switch	.....
			contact rating	24 VDC, 2Amp	.....
	Line break (L.B.) setting pressure drop	Pressure drop range		From..... to ..... bar/min	From..... to ..... bar/min
		Set pressure drop		..... bar/min	..... bar/min
	ESD setting pressure	Pressure range		From..... to ..... ☐bar ☐psi	From..... to ..... ☐bar ☐psi
		Set pressure		..... ☐bar ☐psi	..... ☐bar ☐psi