



GUJARAT GAS

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**TECHNICAL SPECIFICATION**  
**FOR**  
**COMMERCIAL REGULATOR**

## 1. GENERAL

Gujarat Gas Ltd., is a Group Company of Gujarat State Petroleum Corporation Ltd., (State Government undertaking) and is developing city gas distribution including CNG stations in various cities of Gujarat.

GGL is supplying natural gas to automobile, industrial, commercial and domestic consumers in the various cities of Gujarat.

The intent of this specification is to establish minimum requirements to manufacture and supply Commercial regulators for supplying natural gas to customers.

The scope of the tender will include manufacture, supply, inspection, testing, marking, packaging, handling and dispatch of Commercial regulators as per **EN 88-1/EN 88-2** with latest amendments. The scope also includes hiring of Third party inspection agency by vendor for online inspection as per approved QAP.

All codes and standards for manufacture, testing, inspection etc. shall be of latest edition.

Owner reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

## 2. SCOPE

For this specification the following definitions shall apply:

**OWNER/ CLIENT:** Gujarat Gas Limited (GGL)

**CONSULTANT:** Consultant engaged by GGL for evaluation of vendor

**MANUFACTURER:** Means the Manufacturer of Commercial regulator

**VENDOR:** The person(s), firm, company, organization from whom Client / Contractor procures materials

**TPIA:** Third Party Inspection Agency to be appointed by Vendor/ Contractor for inspection of brought out items.

**EIC:** Engineer – in – charge

**AQL:** Acceptable Quality Limit

**Gas Pressure Regulator:** Device that maintains the outlet pressure independent of the variations in inlet pressure and/or flow rate within defined limits.

**Control Member:** Movable part of regulator that is positioned in the flow path to restrict the flow through the pressure regulator.

**Body:** Part of the pressure regulator that is the main pressure containing envelope.

**Main Diaphragm:** The function of which is to detect the feedback pressure of the controlled variable and or to provides the force to position the valve.

**Pressure:** All pressures specified in this document are static gauge pressures.

**Inlet Pressure:** Gas pressure at the inlet of the pressure regulator.

**Outlet Pressure:** Gas pressure at the outlet of the pressure regulator.

**Differential Pressure:** Difference between values of pressure at two different points.

**Lock-Up Pressure:** Outlet pressure at which a pressure regulator closes when the outlet of the pressure regulator is sealed.

**Maximum Component Operating Pressure (Pmax):** Highest operating pressure at which a component of a regulator will continuously operate within specified conditions.

**Maximum Allowable Pressure (Ps):** Maximum pressure for which the body and its inner metallic partition walls are designed in accordance with the strength requirements in this document.

**Test Pressure (Tp):** Pressure applied to a section of the regulator for a limited period of time in order to prove certain characteristics.

**Limit Pressure (p):** Pressure at which yielding becomes apparent in any components of the regulator or its fixtures.

**Permissible Inlet Pressure (Pemax):** Highest inlet pressure at which the regulator can continuously operate within specified conditions.

**Permissible Outlet Pressure (Pamax):** Highest outlet pressure at which the regulator can continuously operate within specified conditions.

**Minimum Operating Differential Pressure (Pdmin):** Minimum Operating differential pressure between the inlet and outlet pressures below which the regulator will no longer function correctly within specified conditions.

**Gas Volume:** Volume of gas at normal conditions expressed in m<sup>3</sup>.

**Volumetric Flow Rate (Q):** Volume of gas which flows through the regulator in unit time at normal conditions (It is expressed in m<sup>3</sup>/hr)

**Lock-Up Time (tf)** Time taken from the control member to move from an open position to the closed position.

### 3. PERFORMANCE REQUIREMENT AND STANDARD FEATURES

- a) Satisfactory operation over an inlet pressure range of 0.5 bar (g)/ 1 bar(g) to 5 bar (g), and nominal outlet pressure will be 75/110 mbar.
- b) Inlet / Outlet connection should be of screwed type as per BSPT female confirming to relevant standard as approved by Gujarat Gas.



- c) Suitable for use with natural gas at nominal specific gravity of 0.6 & operating temperature range of 0 °C to 60 °C.
- d) Over Pressure Shut off (**OPSO**) device to protect against downstream over pressure preset to 130/165 mbar and creep relief valve to protect against downstream over pressure at low flows or in the event of valve seat malfunction, preset to 110/130 mbar.
- e) Under Pressure Shut off (**UPSO**) device to protect against downstream under pressure with a pressure settings range 50 mbar.
- f) The regulator shall also capable of operating either in the vertical or horizontal plane & shall be constructed to be fully resistant to corrosion when installed in outdoor locations in the high temperature & humid environment.
- g) The regulator shall be suitable for outdoor installation and tamper proof & corrosion resistance for a life a period of 20 Years.

#### 4. END CONNECTIONS

The regulator shall be supplied with inlet as well as outlet end connections as per Gujarat Gas requirements. End connections shall be protected by plastic caps. Regulators without end cap will be rejected by Gujarat Gas.

#### 5. MARKING

The regulator body shall be indelibly marked with details of capacity, inlet pressure range & outlet pressure range, set pressure of CRV, UPSO & OPSO, regulation accuracy, direction of flow, name of the manufacturer and the model, serial number, the suppliers' name, date of manufacturing & a unique reference number, which will be quoted on the delivery documentation & test certificate.

#### 6. INSPECTION / DOCUMENTS

Inspection shall be carried out as per GGL Technical Specification and GGL approved QAP at the works of manufacturer.

Owner Representative shall carry out stage wise inspection during manufacturing / final inspection.

Manufacture /Vendor shall furnish all the material test certificates, proof of approval / licence from specified authority as per specified standard, if relevant, internal test / inspection reports as per Owner Tech. Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material. All the codes / documents shall be made available for reference of TPIA at the time of inspection.

Review of calibration certificates for all the measuring instruments at the time of inspection i.e. used for checking & testing along with the master calibration certificate of the measuring instruments from which the instruments is calibrated.

For any control, test or examination required under the supervision of TPIA/Owner/Owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date and place along with production schedule.

Manufacturer /Vendor shall hire TPIA from approved TPIA list of Gujarat Gas/ TPIA approved by NABCB under IB Category/ TPIA approved by GGL for production witnessing and testing as per approved QAP of Gujarat Gas.

Even after third party inspection, Owner reserves the right to select a sample of regulators randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the right to reject all production supplied from the batch.

## 7. DATA SHEET FOR COMMERCIAL REGULATOR

	Description	10 & 25 SCMH	50 & 100 SCMH
<b>General</b>	Service	Natural Gas	
	Design	Two stage direct acting pressure regulator with spring control and diaphragm with inbuilt pressure balancing regulating unit to ensure constant outlet pressure.	
	Confirming Standard	Approved to EN 88-2	
	Connection Orientation	Inline inlet & outlet connection	
	Installation	Suitable for Outdoor installation, tamper proof and corrosion resistance for life period of 20 years.	
	Installation position	Horizontal/Vertical	
<b>Flow, Pressure &amp; Temperature</b>	Flow capacity	10 , 25 & 50 SCMH for outlet pressure range of 75mbar (g)	10, 25, 50 & 100 SCMH for outlet pressure range of 110 mbar(g)
	Inlet Pressure	0.5 to 5.0 bar(g)	0.5 to 5.0 bar(g) – 10 & 25 SCMH 1 to 5.0 bar(g) – 50 & 100 SCMH
	Outlet Pressure set point	As mentioned in Annexure A	
	Over Pressure cut off point	As mentioned in Annexure A	
	Under Pressure cut off point	As mentioned in Annexure A	
	Creep relief Valve	110 ± 5 mbar(g)	130 ± 5 mbar(g)
	Operating temperature	0-60 Deg C	
<b>Body</b>	Casing	Chemical composition of regulator casing and body to be made of Aluminium Alloy/Zinc alloy of LM2/LM6/LM24/ZnA14	



	Corrosion Protection	All parts of the regulator should be corrosion resistant. Suitable surface treatment for anti-corrosion to be provided on both sides of casing as per applicable code.
	End Connections	Adapter shall be of brass material and for inlet /outlet size refer Annexure A  **Female loose Nut with suitable washers to be provided  **In case of end connections are differing, vendor shall provide suitable adaptor of similar materials to meet the specified end connections.
	Fire Resistance-Resistance to high temperature	As per BS 4161
<b>Internals</b>	Diaphragm	Synthetic rubber
	Other internal parts	Internal parts shall be stainless steel, brass seal of reinforced nitrile rubber or aluminium.
<b>Others</b>	Filter	Essential(Inbuilt) at regulator inlet
	Accuracy class	AC-5 complying to EN 88-2
	Closing Pressure	SG-10, complying to EN 88-2
	Failure position	Closed
	Type of reset	Manual
	Breather Holes	Breather holes shall be provided and it should be protected against blockage by arranging them such that they do not get damaged by a sharp cleaning device inserted through the breather hole.  Breather hole shall be provided such that they cannot be blocked by dust, mud, insects, etc. The vent must always be open. Vendor shall ensure that the screen is in place which keeps out insects or mud which may plug the vent opening



**Notes:**

- 1) QAP shall be submitted by the vendor for approval prior to production.
- 2) Monogram of Gujarat Gas is to be pasted through sticker on regulator.
- 3) End connection shall be provided by plastic cap.
- 4) Each regulator shall have permanent type marking i.e. directly cast or on aluminium plate. Labels and stickers are not allowed. The regulator shall be marked with details of maximum flow, Inlet-outlet pressure range, , OPSO-CRV-UPSO set pressure and direction of flow, name of manufacturer and model no. and unique serial number.

**ANNEXURE A**

Sr. No.	Flow (At standard condition) Max.	Regulator outlet pressure set point	Inlet Size/Outlet Size Confirming to ANSI B: 1.20.1	Cut of Pressure
1	10 SCMH	75/110 mbar	3/4" X 3/4" BSPT (F)	OPSO : 130/165 mbar, UPSO : 50 mbar
2	25 SCMH	75/110 mbar	1" X 1 " BSPT (F)	OPSO : 130/165 mbar, UPSO : 50 mbar
3	50 SCMH	75/110 mbar	1" X 1"BSPT (F)	OPSO : 130/165 mbar, UPSO : 50 mbar
4	100 SCMH	110 mbar	1" X 2" BSPT (F)	OPSO : 165 mbar, UPSO : 50 mbar



**8.0 QAP** (Sample QAP for indicative purpose. On issuance of work order, vendor should furnish QAP in line with **EN 88-2** for final approval)

Sr. No	PARAMETERS	SPECIFICATION	INSPECTION PROCEDURE	INSPECTION FREQUENCY & SAMPLE SIZE	REF.DOCU MENT / STANDAR D / DRAWING No	DOCUM ENT OF RECORD	INSPECTION FREQUENCY & SAMPLE SIZE BY AGENCY	
							Vend or	TPI
1	Raw Material Testing	Chemical Composition of Regulator casing and body conforming to Aluminium alloy as per BS EN 1559-4:1999 or equivalent Grade LM6/LM24/ZNA 14	Review of Material Test Certificate from NABL approved laboratory	Material Test Certificate with each heat	BS EN 1559-4/ IS 713:1981 or equivalent Grade LM6/LM24/ ZNA14	Test Report s and certific ates	P	R
		Chemical Composition of Brass Confirming to IS 319:1989 Or Equivalent Grade 2	Review of Material Test Certificate from NABL approved laboratory	Material Test Certificate with each heat	IS 319		P	R
		Chemical Composition of Springs Confirming to AISI 304/316	Review of Material Test Certificate from NABL approved laboratory	Material Test Certificate with each heat	AISI 304/316		P	R
2	Test On Elastomeric (Rubber) Components	Mechanical/chemical properties	Vendor Inspection Report	Each Lot	EN 88-2		P	R
3	Humidity Test	Type test on protective coating shall be carried out as per clause No. 7.8.6 and 7.8.7 of EN 13611	Type test certificate	Each Lot			P	R
4	Breather hole with rupture diaphragm test	Confirming to clause no. 6.2.3 & 6.2.4 of EN 13611 specification and GGL specification. The design of breather hole should be such, that in both vertical & horizontal fitting of regulator,	Type Test certificate	Each lot	EN 13611	Test Report s and certific ates	P	R



		breather hole position should be parallel or downwards towards the ground. Vendor to submit GAD of regulator showing breather hole positioning for approval prior to manufacturing.						
5	Torsion & Bending	Confirming to clause no. 7.4 of EN 13611 specification and GGL specification	Type Test certificate	Each Lot	EN 13611	Test Reports and certificates	P	R
6	Flow Performance, Lock Up and Relief Pressure, Over Pr-Shut-Off Under Pr-Shut-Off	Soundness Test @ Pe of 5.0 bar	Checking the Leakage	100%	EN 88-2	Test Reports and certificates	P	W
		Pa setting @ Pe of 5.0 bar & Qmax	Tuning Pa @ 75/110 mbar	100%			P	W
		Pe checking @ Pe of 0.5/1.0 bar to 5.0 bar & Qmax	Checking the Pa at Test Bench ( Range 75-110bar)	100%			P	W
		Lockup Pressure @ Pe of 0.5/1.0 bar to 5.0 bar & regulator specified SCMH Flow	Checking the Lock-up Pr. at Test Bench ( Max.125 mbar)	100%			P	W
		Relief Pressure @ Pe of 0.5 / 1.0 bar to 5.0 bar	Checking the Relief Pr. at Test Bench (Range110/130 ± 5 mbar)	100%			P	W
		Over Pr-Shut-Off @ Pe of 0.5/1.0 bar to 5.0 bar	Checking the Over Pr. shutoff at Test Bench ( Range130/165± 5 mbar)	100%			P	W
		Under Pr-Shut-Off @ Pe of 0.5 /1.0 bar to 5.0 bar	Checking the Under Pr. shut off at Test Bench (Range 50± 5 mbar)	100%			P	W
7		Dimensions of Assembly	As Per Approved Dwg.	100%	EN 88-2	Test Report	P	W

Note:-



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Inspection of Final Regulator	Surface Coating & Color as per manufacture standard	Visual	100%	s and certificates	P	W
	Checking of Markings & Label for Visibility	Visual as per GGL specification	100%		P	W
	Inlet & Outlet Connection	As per Annex-A (INLINE)	100%		P	W
	Construction & Workmanship	Visual	100%		P	W
	Filter at Inlet	Visual	100%		P	W
	Checking Seal	Visual	100%		P	W

W-Witness of quantity shall as per inspection level 1 AQL 1 as per IS 2500(part 1):2000

Pe-Upstream Pressure

Pa-Downstream Pressure

Annexure B:(Reference standard: IS 2500)				
Sr. No.	Batch Size	Sample Size	Acceptance No.	Rejection No.
1	2 to 500	20	0	1
2	501 to 3200	50	1	2
3	3201 to 10000	80	2	3
4	10001 to 35000	125	3	4
5	35001 to 150000	200	5	6

**Explanation:**

No. of samples inspected will be equal to the sample size given by the plan. If the no. of nonconforming product(s) is equal to or less than the acceptance no., the non-confirming product(s) will be removed from the lot and the remaining lot accepted. If the no. of non-confirming product(s) is equal to or greater than the rejection number, the whole lot will be retested for that particular parameter and rejected products, if any, will be replaced by fresh OK products.

Approved Vendor List for Regulator (For Service Regulator Module)					
Item	Name of the Vender	Address	Phone No	Fax No	Qualified Size
Commercial regulator 10,25, 50 & 100 SCMH	Mesura Nirmal Gas Controls Pvt. Ltd	PLOT NO. 39-40, SAVLI GIDC, ALIDRA, VADODARA-391775	022- 67746200 9825457718	022 67746299	Approved for 10, 25,50 & 100 SCMH
	Green Globe Fuel Solutions	UNIT NO. 1-5, BLDG. NO. 5, RADHEKRISHNA INDUSTRIAL PARK, MUMBAI NASIK ROAD, PIMPLAS VILLAGE, BHIWANDI, THANE-421302	022-25654408 9820056837	022-25654416	
	Kriti Tradeimpex Pvt. Ltd.	4TH FLOOR, RECTANGLE-1, COMMERCIAL COMPLEX D-4, SAKET, NEW DELHI- 110017	9560657796		
	Raychem RPG Pvt. Ltd.	HOUSE NO. 94, S.NO. 357/97, WAGHJAINGAR INDUSTRIAL ASSOCIATION, OFF. AHMEDNAGAR FORGING, KHARBAWADI, CHAKAN, PUNE -410501	011-45753600 9654422000	011-25546239	Approved for 10, 25 & 50 SCMH
	Pietro Fiorentini India Private Ltd.	C-44, okhla industrial area, Phase-1, New Delhi-110020	011 41709866 8800499508	011 41069866	Approved for 10, 25 & 100 SCMH