

		QUALITY ASSURANCE PLAN FOR DRS/CPRS			QAP No.:		PROJECT :DRS/CPRS						
					DATE:								
GUJARAT GAS LIMITED		P.O. NO. :			MANUFACTURE'S NAME & ADDRESS:								
SR No	Component & Stage	Characteristic	Type of Check	Quantum of Check	Reference Standard/ Documents	Acceptance Standard / Documents	Format of Records	Inspection By			Remarks		
								M	TPA	CLIENT			
1	Drawings & Calculations												
1.1	P & ID, GAD, BOM, QAP, Technical Datasheet, FAT ,SAT	Complete Skid	Submittals	100%	Technical Spec. and Datasheets	Approved Datasheet	Mfrs Format	P	RF	A			
2	Incoming Material Identification of Brought out Items												
2.1	Ball valves, Globe valves & Check Valves	Material TC for valves	Chemical test	Per heat No	ASTM 370	1)-Ball Valve- Below 2" I)- BODY- ASTM A 105 (Charpy test at 0°C) II) Ball & STEM- ASTM A479 Gr. SS 316/ASTM A 351 CF8M+ 80 micron ENP 2)-Ball Valve- 2" and above I) Body For 150# - ASTM A 216 Gr. WCB (Charpy test at 0°C) (Investment Casting) Body for 300# - ASTM A 216 Gr WCB (Charpy test at 0°C) II) Ball & STEM- ASTM A479 Gr. SS 316/ASTM A 351 CF8M 3)-Globe Valve- I)- BODY& BONNET- -ASTM A 105 (Charpy test at 0°C) - for Operating pressure 19 bar-g -ASTM A 216 Gr WCB (Charpy test at 0°C) – for Operating pressure 49 bar-g II)DISC & STEM-ASTM A 479 SS 316 4)-Check Valve- I)-Body & DISC: For 150# -ASTM A 216 Gr. WCB (Charpy test at 0 Deg C) For 300# -ASTM A 216 Gr WCB (Charpy test at 0°C)	Inspection Report 3.1	P	R	R			
			Physical Test (tensile, yield ,elongation& Hardness)	Per heat No									
			Impact Test	Per heat No									
		Dimension- Size, Rating,	Visual, Measurement	100%	Approved Datasheet	1)Ball Valve: a)Below 2" as per BS 17292 b)- Above 4" as per API 6D 2)Globe valve: a) Below 2" as per BS EN ISO 15761 / API 602 b)Above 2" till 12" as per API 602 / BS 1873 / ASME B 16.34	Inspection Report 3.1	P	R	R	--		
		RT for casting	Test	100%	ASME B16.34 Appendix 1	ASME B16.34 Appendix 1	Inspection Report	P	R	R			
UT for Forging	Test	100%	ASME B16.34 Appendix 1	ASME B16.34 Appendix 1	Inspection Report	P	R	R					
	Ball valves, Globe valves & Check Valves	Hydro Body Test	Leak Test	100%	Approved datasheet/API6D/API 598	1.5 x Design PressureFor 800# = 207 kg/cm2FOR 150# = 28.5 kg/cm2For 300# = 73.5 kg/cm2Holding Time shall be as per the standard	Inspection Report 3.1	P	R	R			

		Hydro seat test	Leak Test	100%	Approved datasheet/API6D/API 598	1.1 x Design Pressure For 800# = 151.8 kg/cm2 For 150# = 20.9 kg/cm2 For 300# = 53.9 kg/cm2 Holding Time shall be as per the standard	Inspection Report 3.1	P	R	R	
		High Pressure closer seat test	Leak Test	100%	Approved datasheet/API6D/API 598	Approved datasheet/API6D/API 598	Inspection Report 3.1	P	R	R	
		LOW PRESSURE (AIR) CLOSER(SEAT) TEST AT 7 KG/CM ²	Leak Test	100%	Approved datasheet/API6D/API 598	at 7 kg/cm2 pressure Holding Time shall be as per the standard	Inspection Report 3.1	P	R	R	
		Back seat test	Leak Test	100%	Approved datasheet/API6D/API 598	Approved datasheet/API6D/API 598	Inspection Report 3.1	P	R	R	Not Applicable for Check Valves
		High Pre. Pneumatic Shell Test	Leak Test	100%	Approved datasheet/API6D/API 598	1.1 x Design Pressure For 800# = 151.8 kg/cm2 For 150# = 20.9 kg/cm2 For 300# = 53.9 kg/cm2 Holding Time shall be as per the standard	Inspection Report 3.1	P	R	R	
		External Leak test at 7 kg/cm2	Leak test	100%	Approved datasheet/API6D/API 598	at 7 kg/cm2 pressure Holding Time shall be as per the standard	Inspection Report 3.1	P	R	R	
		Fire Safe Test	Type Test	100%	Approved datasheet/API6D/API 598 API 6FA	Approved datasheet/API6D/API 598 API 6FA	Inspection Report 3.1	P	R	R	
		Double Block & Bleed Test for 4" and above		100% for TMBV	Approved datasheet/API6D/API 598	Approved datasheet/API6D/API 598	Inspection Report 3.1	P	R	R	
		Anti-Static Test (as Applicable)		100%	Approved datasheet/API6D/API 598	Direct current <12V and resistance on dry valves shall not exceed 10 ohms	Inspection Report 3.1	P	R	R	
		Operational Torque Test (As applicable)		100%	Approved datasheet/API6D/API 598	Breakaway torque or thrust shall not exceed 360 N (80 lbf)	Inspection Report 3.1	P	R	R	
		Functional Inspection (Open/Close Operation for flange end valves)	MINIMUM 10 CYCLES	100%	ASME B 16.34/ API 598	ASME B 16.34/API 598	Inspection Report	P	W	V	
		Hydrotest before installation in skid at skid supplier premise (Pup end & Screwed end Valves in as welded and as screwed condition respectively on pipe spools)		100%	Approved datasheet/API6D/API 598	For 150# = 28.5 kg/cm2 For300# = 73.5 kg/cm2 Holding Time shall be as per the standard	Inspection Report	P	W	V	Not Applicable for Flanged Valves
2.2	PG/DPG/TG	Calibration, Accuracy, Range, Size, End connection)	Visual, Measurement Checks	100%	As per Approved Datasheet	As per Approved Datasheet	Inspection Report 3.1	P	R	R	--
2.3	Pipe, Pipe Fitting, Flanges for Interconnecting Piping & Fasteners	Material TC, Size & Dimension	Chemical test	Per heat No	ASTM 370,ASME B 16.20 & B16.5 ASTM A320 & ASTM A194	As per GGL PMS and Datasheet	Inspection Report 3.1	P	R	R	Impact Test Not Applicable for Fasteners as per PMS
		Physical Test (tensile, yield, elongation & hardness)	Per heat No								
		Impact test	Per heat No								
2	Gaskets	Material TC	Chemical test & Physical Test	Per heat No	As per GGL Data sheet/Specification	As per drawing and Data sheet	Inspection Report 3.1	P	R	R	

		Size & Dimension	Visual, Measurement	100%								
3	Equipments											
3.1	Filter	Raw Material -Material TC, Size & Dimension	Chemical test	Per heat No	ASTM 370	Filter body: MOC-ASTM A 106 Gr. B (Charpy test at 0 deg C) or ASTM A 333 Gr. 6 (Other material as per PMS)	Inspection Report 3.1	P	R	R		
			Physical Test (tensile, yield ,elongation& Hardness)	Per heat No								
			Impact Test	Per heat No								
3.2	Filter	WPS & PQR	Welders Qualification & Welding	100%	ASME Sec. IX, Article II, follow QW200.1, QW482 for WPS & QW 483 for PQR or API 1104	As per ASME SEC. IX	WPS / PQR from Record	P	R	R		
3.3		In Process Inspection	Fit Up	100%	Approved Drawing	Approved Drawing & Standards	Inspection Reports	P	R	R		
3.4		DP test on Fillet Welds	Surface Defects	100%	As per ASME SEC. V	As per ASME SEC. VIII Div: 1	Inspection Reports	P	R	R		
3.5		Radiography after Final Weld	Soundness of weld joints	100%	As per ASME SEC. V	As per ASME SEC. VIII Div: 1	Inspection Reports	P	R	R		
3.6		Visual & Dimensional Check of Filter & Filter Element	Surface Finish & Dimensions	100%	Approved Drawing	Approved Drawing	Inspection Reports	P	W	R		
3.7		Hydro Test (4 hours Holding time)	Strength of weld joints	100%	Approved Drawing/1.5 times of Design Pressure/ASME SEC VIII DIV 1 UG 99	Approved Drawing/1.5 times of Design Pressure/ASME SEC VIII DIV 1 UG 99	Inspection Reports	P	W	V		
4	Welding, NDT & Testing for Interconnecting Piping											
4.1	WPS / PQR	Welders Qualification & Welding	Welders Qualification & Welding	100%	ASME Sec. IX, Article II, follow QW200.1, QW482 for WPS & QW 483 for PQR or API 1104	As per ASME SEC. IX//ASME B 31.8	WPS / PQR	P	R	R		
4.2	Liquid Penetrant Examination (DPT)	On Fillet Welds	Surface Weld Defects	100%	ASME Sec V	ASME SEC.31.3	Internal Inspection Report	P	R	R		
4.3	Radiography Test	To identify internal surface defects	Soundness of weld	100%	ASME Sec V	ASME SEC.31.3	Interpretation Report -Review of report	P	R	R		

4.4	Hydro Testing of Interconnecting Piping	Hydro test of weld joints	Strength of weld joints	100%	1.5 times of Design Pressure for 4 hrs	For 150#: 28.5 kg/cm2 Holding time: 4 Hours For 300#: 73.5 kg/cm2 Holding time: 4 Hours	Inspection Report	P	W	V	
5	PRV (Pressure Regulating Valve), SSV, CRV, PSV (Pressure Safety Valve)										
5.1	PRV, SSV, CRV, PSV	Material TC for Body and Trim	Chemical Test	Per heat No	ASTM 370	Material as per GGL datasheet	Inspection Report 3.1	P	R	R	
			Physical Test(Tensile, Yield , elongation & hardness)	Per heat No							
			Impact Test	Per heat No							
		Dimension- Size, Rating, End Connection	Visual, Measurement	100%	Approved Datasheet	Approved Datasheet	Inspection Report 3.1	V	R	R	
5.2	PRV (Pressure Regulating Valve), SSV	Body Hydrotest as per Standard	Strength test	100%	EN 334, Clause no. 7.7.4, 1.5 times of design pressure Table no. 14 EN 14382	PRV as per EN 334 SSV as per 14382	Test Reports	P	R	R	
		External Seat tightness test			EN 334, Clause no. 7.7.6, 1.1 times of design pressure Table no. 15 EN 14382						
5.3	PRV	Accuracy Test	Accuracy Test	100%	EN 334, Clause no. 7.7.7.3	PRV as per EN 334 & approved data sheet	Test Reports	P	R	R	
5.4	CRV & PSV	Body Hydrotest as per Standard	Leak Test	100%	API 520	API 527	Test Reports	P	R	R	
		External Seat tightness test									
5.5	PRV, SSV, CRV. PSV	Set Point	Visual, Measurement	100%	Approved Datasheet	Approved Datasheet	Test Reports	P	R	R	
6	Final Inspection of Skid Assembly										
6.1	Final Dimensional/ Visual Inspection	Complete Skid	Visual Inspection	100%	Approved P&ID & GAD	Approved Drawings	Test Reports	P	W	V	--
6.2	Cleaning & Painting of complete Skid	Surface preparation of Pipe Spools, Filter Housing, Support & Base Frame as per SA 2.5	Visual	100%	Surface preparations per Approved Painting Spec.	Surface Preparation and blasting as per GGL approved Painting Spec.	Inspection Report	P	R	R	Witness Random 20%
		Surface preparation of Pressure Safety Valve, Regulator, Creep Relief Valve, Ball Valve, Globe Valve, Check Valve as per SA 2.5	Visual	100%	Surface preparations per Approved Painting Spec.	Surface Preparation and blasting as per GGL approved Painting Spec.	Inspection Report	P	R	R	--
		Galvanizing of Pipe, Fittings and fasteners as per ASTM A 153	Visual	100%	Hot Dip as per Approved Painting Spec.	Hot dip galvanized as per approved Painting Spec.	Inspection Report	P	R	R	--
		Galvanizing of Pipe, Fittings and fasteners as per ASTM A 153	Visual after Galvanizing & before Painting	Random 20%	Hot Dip as per Approved Painting Spec.	Hot dip galvanized as per approved Painting Spec.	Inspection	P	W	R	--
		Check total DFT at Random location of complete Skid (including Filter, Pressure Safety Valve, Regulator, Creep Relief Valve, Ball Valve, Globe Valve, Check	Visual & Final DFT Measurement	100%	Visual & DFT check as per Approved Painting Spec.	Painting as per GGL Approved painting Spec.	Inspection	P	W	V	--

		Valve, Base frame & Support,)									
6.3	FRP Canopy	Thickness, Colour, dimension, Material & Specification Check	Visual & Thickness	100%	Approved Specification	FRP Canopy material are checked & tested as per IS 1456, IS 6746, IS 4020	Inspection	P	W	V	--
6.3	Verification of Material from approved vendor of equipments	Each Material (valves, Piping ,fittings & Filter)	Approved Vendor	100%	Approved Vendor List of GGL	Approved Vendor List of GGL	Inspection	P	V	V	
6.4	Factory Acceptance Test	Pneumatic Test	No leakage from bolt Joints	100%	Approved FAT procedure	1) Pneumatic Test @ 7 kg/cm2 2) Holding Time 30 mins	FAT Report	P	W	V	--
7	Final Documentation:										
7.1	Design & Calculation, Material compliance report as per EN 10204 3.1 , Calibration Certificate, GAD & P & ID, Final FAT report, NDT reports, Hydro & Pneumatic report, Test certificate of PRV,PSV,SSV,CRV	History docket	Verification of records	100%	Approved specification	As per approved specification	History Docket	P	R	R	
M : Manufacturer; P : Performer; W : Witness ; R : Review ; A: Approval; RW: Random Witness ; V : Verification											
Prepared By:			Reviewed By:				Approved By:				
Shubhi Gupta			Mustak Patel				Upendra Sharma				

8. QAP FOR EVC, GAS DETECTORS AND SOLAR PANEL

(On issuance of Contract, vendor shall furnish compliance of this QAP)

EVCs									
#	Parameters	Characteristics	Acceptance Criteria	Manufacturer's Testing		TPIA Scope of Testing – Witness/Review		Inspection Scope	
				Extent of Check	Records	Extent of Check	Records	Manufacturer / Supplier	TPI
1.1	Visual	2 LF and AT ports	GGL Approved Data Sheet	100%	CCM*	As Per Annexure-A	Witness report	P	W
		Display shall be scrollable with keypad buttons at front							
		Parameters to be monitored are available on the EVC display							
		No Flicker in display							
		Data Storage: EVC shall display all types of logs such as Interval log, hourly log, daily log, monthly log, Event log, Parameter log etc.							
1.2	Visual	Optical Port Availability	GGL Approved Data Sheet As per datasheet	100%	CCM*	As Per Annexure-A	Witness report	P	W
		Suitable dedicated port for connection with any third party system (Like SCADA) other than port provided for EVC's own Modem connectivity.							
		Provision for Wire Sealing on the EVC enclosure, metrological compartment, both pressure sensors and associated isolation valves							
		GSM / GPRS Integral Modem availability							
		Cable Length (Pressure and temperature sensor)							
		Pressure sensor shall be external type							
		ATEX Marking on EVC name plate							
Dimensions of Junction box									
2.1	Functional	Metrological parameters shall not be changed while metrological switch is off. Test method: With metrological switch OFF, try to change Pulse weight.	It should not be possible to change the metrological parameters when metrological switch is OFF	As Per Annexure-A	CCM*	As Per Annexure-A	Witness report	P	W
2.2	Functional	EVC shall be configurable to directly send the SMS to concern person whenever there is change in metrological parameters. Test method: Set Temperature threshold value and exceed the limit by increasing the temperature beyond the set limit. <i>(Include picture of one sample SMS received in the witness report)</i>	Verify that Alarm is recorded in EVC logs and SMS is received on the mobile number configured.	As Per Annexure-A	CCM*	As Per Annexure-A	Witness report	P	W
2.3	Functional	Coherence (difference between LF1 & LF2) Test method: Enable coherence check facility in the EVC (With tolerance limit set to Zero), give different number of pulses on LF1 and LF2 ports of the EVC.	Coherence counter shall display the difference in pulses found and alarm should be recorded in the EVC	As Per Annexure-A	CCM*	As Per Annexure-A	Witness report	P	W
2.4	Functional	Provision to configure backup / fix value in case of pressure malfunction. Test method: Set pressure back up value as 4 Bar. Remove the pressure sensor wire and verify Correction factor (CF) with back up value	Correction factor displayed by the EVC shall be commensurate as per Backup value set	As Per Annexure-A	CCM*	As Per Annexure-A	Witness report	P	W

EVCs									
#	Parameters	Characteristics	Acceptance Criteria	Manufacturer's Testing		TPIA Scope of Testing – Witness/Review		Inspection Scope	
				Extent of Check	Records	Extent of Check	Records	Manufacturer / Supplier	TPI
2.5	Functional	No loss of EVC configuration data and logs in case battery is removed. Test method: Remove the battery and reconnect after 1 minute. Verify the device configuration and Logs	Entire configuration and logs should be present	As Per Annexure-A	CCM*	As Per Annexure-A	Witness report	P	W
2.6	Functional	Modem shall be suitable to operate on external power supply alone in case battery is not connected. Test method: Remove the modem battery, connect the external power supply. Set Temperature threshold value to 30 and exceed the limit by increasing the temperature beyond the set limit.	Verify that SMS is received on the mobile number configured.	As Per Annexure-A	CCM*	As Per Annexure-A	Witness report	P	W
2.7	Functional	Modem should be able to operate on Battery in case power supply is not available Test method: Connect external power supply and Battery to the Modem. Now disconnect the external power supply. Set Temperature threshold value to 30 and exceed the limit by increasing the temperature beyond the set limit. While the battery still connected to Modem, resume the external power supply. Modem should switch back to external power supply.	Verify that SMS is received on the mobile number configured. Verify the modem is using the battery (as done in test 2f).	As Per Annexure-A	CCM*	As Per Annexure-A	Witness report	P	W
2.8	Functional	Modem shall consume battery subject to time window slot availability only. Test method: Configure the time window for the modem say for 10 minutes. Switch off the external power supply during time window active time. Attempt to dial the EVC from OEM software.	OEM software should be able to connect the EVC	As Per Annexure-A	CCM*	As Per Annexure-A	Witness report	P	W
2.9	Functional	Modem shall consume battery subject to time window slot availability only Test method: Configure the time window for the modem say for 2 minutes. Switch off the external power supply after time window slot has lapsed. Attempt to dial the EVC from OEM software.	OEM software should not be able to connect the EVC	As Per Annexure-A	CCM*	As Per Annexure-A	Witness report	P	W
3	Documents	Temperature Sensor Range	EVC Test Certificate	100%	CCM*	As Per Annexure-A	CCT*	P	R
		Pressure Sensor Range	EVC Test Certificate <i>Certificate should be valid at the time of TPI</i>	100%	CCM*	As Per Annexure-A	CCT*	P	R
		PT Accuracy							
		TT Accuracy							
		Overall Accuracy							
Type Approval Certificate of EVC	Certificates should be valid at the time of TPI	100%	CCM*	As Per Annexure-A	CCT*	P	R		
ATEX certificate of EVC									

EVCs									
#	Parameters	Characteristics	Acceptance Criteria	Manufacturer's Testing		TPIA Scope of Testing – Witness/Review		Inspection Scope	
				Extent of Check	Records	Extent of Check	Records	Manufacturer / Supplier	TPI
		Ingress Protection	<i>Certificates should be valid at the time of TPI</i>	100%	CCM*	As Per Annexure-A	CCT*	P	R
		Manufacturer's records for internal inspection as per test requirements above	CCM*	-	-	As Per Annexure-A	CCT*	P	R