VCS Quality Services Private Limited

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

Tender For Procurement of

Car & Bus CNG Dispensers

TENDER NO:- GNGPL/C&P/T-50

DOCUMENT NO:- VCS/GNGPL/1023/SC/2022/003

TECHNICAL VOLUME

(VOLUME II OF II)

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Goa Natural Gas Pvt.Ltd.
A Joint Venture of GAIL Gas Ltd & BPCL

GOA NATURAL GAS PRIVATE LIMITED

Table Of Contents

S.No.	Description	Page #
1	Material Requisition	1
2	Scope of Work	09
3	Annual Maintenance Contract (AMC)	31
4	Datasheets a) Car Dispenser b) Bus Dispenser c) Mass flow-meter d) Pressure gauge e) Safety Relief value	43
5	Technical Specifications ➢ Car Dispenser & Bus Dispenser	62
6	VDDR a) List of Vendor documents & data requirements b) Checklist – Technical c) Compliance statement d) Deviation Sheet e) Drawings & Documents f) Instruction to Bidders g) List of spares h) Reference List	91
7	QAP ➢ Car Dispenser & Bus Dispenser	106

ENERGISING QUALITY	**PROJECT NUMBER: VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

MATERIAL REQUISITION-CNG CAR & BUS DISPENSERS

DOCUMENT NO	1023	GA	ME	MR	3010

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C2	15.11.2022	RE-ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
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CONTENTS

1. INTRODUCTION 3
2. DEFINITION 3
3. DOCUMENT PRECEDENCE 3
4. SCOPE OF SUPPLY & SERVICES 4
5. INSPECTION 5
6. SPECIAL INSTRUCTIONS TO BIDDERS 5
7. INFORMATION/ DOCUMENTS/ DRAWINGS TO BE SUBMITTED BY SUCCESSFUL BIDDER 6
8. INSTRUCTION TO BIDDER 7
9. LIST OF ATTACHMENTS 8

1. INTRODUCTION

GNGPL, the acronym for Goa Natural Gas Private Limited was incorporated on 13th Jan 2017. It is a joint venture company of GAIL Gas Limited and Bharat Petroleum Corporation Limited.

GNGPL is committed in supplying safe and uninterrupted natural gas to domestic, commercial, industrial and automotive sector in North Goa & Ponda. Further Ministry of Petroleum and Natural Gas has also recognized GNGPL as Central Government authorized entity to carry out the CGD projects in North Goa Ponda.

VCS Quality Services Private Limited (VCS has been appointed as Project Management Consultant for providing consultancy services for CGD Expansion Project for CNG stations (hereinafter referred as Consultant), by GNGPL.

2. DEFINITION

Where used in this document, the following terms shall have the meanings indicated below, unless clearly indicated by the context to this order:

PROJECT: CGD PROJECT OF NORTH GOA GA

OWNER/COMPANY: GOA NATURAL GAS PVT. LTD.

CONSULTANT: VCS QUALITY SERVICES PVT. LTD.

MANUFACTURER: THE PARTY WHO MANUFACTURERS & SUPPLIES EQUIPMENT & PROVIDE SERVICES TO OWNER OR TO CONTRACTOR.

MR: MATERIAL REQUISITION

3. DOCUMENT PRECEDENCE

It shall be the responsibility of the MANUFACTURER/ VENDOR to inform the PURCHASER of any errors, ambiguities, inconsistencies, discrepancies, or conflict of information that may be found to exist in any document, specification or drawing submitted by the PURCHASER.

In case of conflict, the order of precedence shall be as follows:

a) Material Requisition
b) Data Sheets
c) Technical Specifications
d) Basic Documents
e) Codes and Standards

As a general rule in the event of any discrepancy between technical matter and local laws/ regulations (and documents above listed) the most stringent shall be applied.

MANUFACTURER / VENDOR shall notify PURCHASER of any apparent conflicts between MR, specifications, related datasheets, any code and standards and any other

specifications noted herein. (Resolution and/ or interpretation precedence shall be obtained from PURCHASER in writing before proceeding with the design/ manufacturer or completion of services.

4. SCOPE OF SUPPLY & SERVICES

Design, procurement of materials and bought out components, manufacture, assembly at shop, inspection, testing at manufacturer's works, packing (if any), delivery of CNG Car & Bus Dispensers, supply of all Pre-commissioning, Commissioning and documentation as per the enclosed engineering standard, specifications and data sheets etc. attached or referred. Supply of Dispensers shall be at M/s Goa Natural Gas Pvt. Limited.

Item Sl. No.	Item Description	Unit	Qty.
CAR-CUM AUTO (DUAL ARM) CNG DISPENSER			
1.1	'Design, detail engineering, manufacturing, assembly, factory testing, supply of dispenser including packaging, insurance, handling, transportation of Dispenser, loading, and unloading at sites, documentation, etc. and providing all related services including installation, integration, site acceptance testing, trial run, and commissioning, Operation & Comprehensive Maintenance (AMC), commissioning spares, all drawings, documents and licensed software & hardware, converters, cables, etc. Complete in all respect for CGD of North Goa GA. project on an Annual Rate Contract (ARC) basis conforming to Material Requisition, Technical Specification & Scope of work defined in the Tender Documents inclusive of erection & commissioning spares. The materials shall be delivered as per PO on written intimation. Statutory clearance from W&M India for the field installation before the start of commercial operations is in the bidder's scope. 'On-site Training of each Purchaser's Personnel for Max. 4 (Four) days for Car dispenser at each site.	Nos.	09.
1.2	'NZS Nozzle Adapter	Nos.	05.
1.3	NGV Nozzle Adapter	Nos.	05.
1.4	'Vent Breakaway Coupling	Nos.	05.
1.5	'Fill Breakaway Coupling	Nos.	05.

2.0	'Comprehensive Maintenance Services during Warranty Period & Ten years after the Warranty period including repair, supply of consumables, Spare parts, Tools, & Manpower as defined in the AMC.	Nos.	09
Item Sl. No.	**Item Description**	**Unit**	**Qty.**
SINGLE ARM CNG BUS DISPENSER			
3.1	'Design, detail engineering, manufacturing, assembly, factory testing, supply of dispenser including packaging, insurance, handling, transportation of Dispenser, loading, and unloading at sites, documentation, etc. and providing all related services including installation, integration, site acceptance testing, trial run, and commissioning, Operation & Maintenance (AMC), commissioning spares, all drawings, documents and licensed software & hardware, converters, cables, etc. Complete in all respect for CGD of North Goa GA. project on an Annual Rate Contract (ARC) basis conforming to Material Requisition, Technical Specification & Scope of work defined in the Tender Documents inclusive of erection & commissioning spares. The materials shall be delivered as per PO on written intimation. Statutory clearance from W&M India for the field installation before the start of commercial operations is in the bidder's scope. 'On-site Training of each Purchaser's Personnel for Max. 4 (Four) days for Bus dispenser at each site.	Nos.	02.
4.0	'Comprehensive Maintenance Services during Warranty Period & Ten years after the Warranty period including repair, supply of consumables, Spare parts, Tools, & Manpower as defined in the AMC.	Nos.	02.

5. INSPECTION

Bidder shall appoint TPIA, for inspection purpose. Apart from inspection by TPIA, inspection shall also be performed by Client representative, as set out and specified in the codes and particular documents forming this MR. TPIA charges shall be paid by the Manufacturer/Supplier for all procured items as required

6. SPECIAL INSTRUCTIONS TO BIDDER

6.1 Bidder to note that no correspondence shall be entered into or entertained after the bid submission.

6.2 Bidder shall furnish quotation only in case he can supply material strictly as per this Material Requisition and specification/data sheets forming part of Material Requisition.

6.3 If the offer contains any technical deviations or clarifications or stipulates any technical specifications (even if in line with MR requirements) and does not include complete scope & technical / performance data required to be submitted with the offer, the offer shall be liable for rejection.

6.4 The submission of prices by the Bidder shall be construed to mean that he has confirmed compliance with all technical specifications of the corresponding item (s).

6.5 Bidder must submit all documents as listed in checklist along with his offer.

6.6 The Supplier shall deliver a Certificate confirming to **BS EN 10204 3.2** stating the quality, the mechanical properties, the chemical analysis, the process of manufacture for SS tubing & other fittings for complete assembly works.

6.7 All materials shall be delivered to consortium Warehouse / sites of M/s Goa Natural Gas Pvt. Ltd. detailed addresses are furnished in the technical bid document.

7. INFORMATION/ DOCUMENTS/ DRAWINGS TO BE SUBMITTED BY SUCCESSFUL BIDDER

Successful Bidder shall submit four copies unless noted otherwise, each of the following:

7.1 Piping & Instrumentation Diagram (P&ID) & schematic diagram.

7.2 General arrangements Drawings, Hookup drawings including hoses/pipes & Tubing's connection & specifications.

7.3 Foundation drawings & civil works detailed requirements.

7.4 OEM Datasheets & catalogs for all Instrumentation to be provided by vendors.

7.5 Inspection & test reports for all mandatory tests as per the applicable code as well as test reports for any supplementary tests, in nicely bound volumes.

7.6 Material test certificates (physical property, chemical composition, make, heat treatment report, etc.) as applicable for items in nicely bound volumes.

7.7 Statutory test certificates, as applicable.

7.8 Filled in Quality Assurance Plan (QAP) for Purchaser's/ Consultant's approval. These QAPs shall be submitted in four copies within 15 days from LOI / FOI.

7.9 WPS & PQR as required.

7.10 Other Drawing & document as specified in vendor data & drawing requirements as with Tender.

7.11 Detailed completion schedule activity wise (Bar Chart), within one week of placement of order.

7.12 Weekly & fortnightly progress reports for all activities including procurement.

7.13 Purchase Orders / Certificate of origin of material of bought out items soon after placement of order.

7.14 Manufacturer's drawings/documents for bought out items, in 4 copies, for Purchaser's / Consultant's approval within 4 weeks.

7.15 Manufacturer related information for design of civil foundation & other matching items within 6 weeks of FOI / LOI.

7.16 All approved drawings / design calculation / maintenance & operating manual documents as well as inspection and test reports for Owner's / Consultants reference / record in nicely category-wise bound volumes (in Hard Copy) and in Soft Copy separately.

7.17 Filled in data sheet for each instrument tag after sizing, range selection, proper selection of materials etc. shall be bidder's responsibility. Any necessary change required later for meeting the specification shall be done by the vendor without any price or delivery implications.

7.18 Bidder shall provide P&ID drawing, foundation drawing, and tubing specification in line with technical specification

7.19 Dispenser & all Instrumentation body Earthing cable to be supplied by vendor during Final delivery.

7.20 Bidder shall provide daily checklist, monthly maintenance checklist, breakdown report format, monthly maintenance format and test procedure.

7.21 Bidder shall be providing list of special tools.

7.22 Bidder shall provide W&M related document like Approval of model for dispenser, Approval of model for mass flowmeter, License of manufacture, License of Dealership, License of Repairing and any other document as required by W&M dept.

7.23 W&M approval Certificates of Mass flow meter during Bid submission.

7.24 CCOE approval certificates of Mass flow meter Sensor Unit & Transmitter unit during bid documents.

8. INSTRUCTION TO BIDDER

8.0 Bidder to furnish filled up documents / formats as per "Special Instruction to Bidders" of **Volume I of II** along with the offer.

8.1 Dispenser (including all components) shall be designed and suitable for Natural Gas and shall comply the technical specification of Car Dispenser & Bus Dispenser, **Doc. No. 1023-GA-ME-TS-3010.**

8.2 All physical and mechanical testing shall be in accordance with the requirements of connected line pipe.

8.3 Delivery of Dispensers shall be at M/s Goa Natural Gas Pvt. Limited designated storage yard and shall be in the Bidder's scope.

8.4 The submission of prices by the bidder shall be construed to mean that he has confirmed compliance with all technical specifications of the corresponding item(s).

8.5 If the offer contains any technical deviations or clarifications or stipulates any technical specifications (even if in line with MR requirements) and does not

include complete scope & Technical/ Performance Data required to be submitted with the offer, the offer shall be liable for rejection.

8.6 Bidder must submit all documents/ drawings/ calculations as specified in relevant specification along with his offer and after award of order.

8.7 Purchaser's inspector reserves the right to perform stage wise inspection and witness tests, as indicated in specification of Dispensers / ITP at manufacture's works prior to shipment. Manufacturer shall give reasonable notice of time and shall provide without charge reasonable access and facilities require for inspection to the purchaser's inspector. Inspection and tests performed/witnessed by purchaser's inspector shall in no way relieve the manufacturer's obligation to perform the required inspection and test.

8.8 All drawings, instructions, catalogues, etc. shall be in English language and all dimensions shall be metric units.

9. LIST OF ATTACHMENTS

Sl. No.	Name of Documents	Documents No.	No. of pages
01.	Material Requisition	1023-GA-ME-MR-3010	09
02.	Scope of work – CNG Car & Bus Dispensers	1023-GA-ME-SOW-3010	22
03.	Annual Maintenance contract	1023-GA-ME-AMC-3010	12
04.	Data sheet – a. Mass flow meter b. Car Dispenser c. Bus Dispenser d. Pressure Gauge Safety relief valves	1023-GA-ME-DS-3010 1023-GA-ME-DS-3011 1023-GA-ME-DS-3012 1023-GA-ME-DS-3013 1023-GA-ME-DS-3014	17
05.	Quality Assurance plan- e. CNG Car & Bus Dispensers	1023-GA-ME-QAP-3010	06
06.	Vendor Drawing & Data Requirement	1023-GA-ME-VDDR-3010	15
07.	Technical Specification	1023-GA-ME-TS-3010	29
08.	Technical Specification	1023-GA-ME-TS-3010	29

ENERGISING QUALITY	**PROJECT NUMBER : VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

SCOPE OF WORK-CNG CAR & BUS DISPENSERS

DOCUMENT NO	1023	GA	ME	SOW	3010

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C2	21.02.2023	RE- ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
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CONTENTS

1. INTRODUCTION 3
2. DEFINITION 3
3. DOCUMENT PRECEDENCE 3
4. INSTRUCTION TO VENDOR 4
5. DESIGN BASIS 5
6. SCOPE OF WORK FOR CNG DISPENSER 5
7. SCOPE OF SUPPLY & SERVICES 6
8. DESIGN & ENGINEERING FOR DISPENSER 14
9. SAFETY 15
10. AS BUILT DOCUMENTS 15
11. CHECKLIST FOR SCOPE OF SUPPLY 15
12. SCOPE OF WORK OF COMPREHENSIVE ANNUAL MAINTENANCE 20

1. INTRODUCTION

GNGPL, the acronym for Goa Natural Gas Private Limited was incorporated on 13th Jan 2017. It is a joint venture company of GAIL Gas Limited and Bharat Petroleum Corporation Limited.

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4. INSTRUCTION TO VENDOR

M/s OWNER has been authorized by PNGRB for setting up infrastructure and operation of City Gas Distribution Project. The dispensers shall be installed at various refueling outlets for dispensing CNG to all types of Natural Gas Vehicles.

1.1 The dispensing stations shall be spread throughout allotted Geographical Area (GA).

1.2 The specification states the scope of supply and services as completely and clearly as possible. Any additional work/equipment or technical requirement not mentioned in the specification but required to make the offered system complete in accordance with the specification or required for safe operation shall be deemed to be included in the scope of vendor.

1.3 Vendor may contact and obtain from OWNER clarifications, if required, at any stage, before submission of offer.

1.4 The offered dispenser units' model shall have certification for specified flow and accuracy from the Weights & Measurement Department of the country of origin. In case it is not available for dispenser unit then offered mass flow meter model shall have certification for specified flow and accuracy from the Weights & Measurement Department of the country of origin. The certificate(s) shall be in English language or in the language of originating country along with English translation. Bids received without copy of such certificate(s) shall be liable to be rejected. Vendor to arrange for Weights and Measures approval from Indian Authorities. The dispenser model has to be type approved by the Indian Weights & Measurement Department.

1.5 Further manufacturing license, dealer of weights & measures, importer (where ever applicable) and license to repair by the bidder is mandatory at the time of bid due date.

1.6 The offered dispensers for dispensing CNG shall be type approved by the Petroleum & Explosive safety organization, Govt. of India as per latest Gas Cylinder Rules. If the vendor is yet to get the dispenser model type approved, the vendor shall have to give the model type approved as on bid due date.

1.7 The Vendor shall carry out modification required by the statutory bodies either during the approval or during inspection of the installation. All expenses shall be done and borne by the vendor. Unless the above formalities are cleared, supply part would be deemed incomplete.

1.8 The Vendor shall provide civil foundation/ dispenser frame drawings within two weeks of placement of order.

1.9 Any work, which is considered to be unsatisfactory and of poor workmanship shall be rectified by the vendor without any extra cost and time implications.

1.10 The approval from concerned Govt. Bodies in respect of complete installation of a CNG Dispensing Station shall be obtained by the OWNER. Necessary Information / Data as may be required by Govt. Bodies shall be furnished by vendor to facilitate OWNER in obtaining approval.

5. DESIGN BASIS

Gas from storage cascade or compressor through priority panel is dispensed to CNG vehicles like Car, Autos and Buses via dispenser. The Car Dispenser shall have Twin Arms, each with a flow capacity of 15 kg/min. and Bus Dispenser shall have single Arm type having flow capacity of 75 kg/min. under discharge to atmospheric condition. Instrument Air shall use for pneumatic controls of Dispenser and Instrument air / Ex. proof electronically controlled solenoid shall be used for such purpose Each unit to have fully automatic microprocessor based sequencing of 3 cylinder banks connected to dispenser through independent high pressure Stainless Steel (SS) tubes. Dispenser to have pressure control device to restrict fill pressure to 210 kg/cm2(g) at maximum allowable filling pressure for natural gas vehicle cylinder as per standard supply. Pressure control device to ensure complete shut off of gas flow at the pre-set pressure with dead band shift and shut off error within 2% of range. The preset fill pressure can vary from 150 kg/cm2g to 255 kg/cm2(g). The pressure control device to have provision to manually set pressure between above range.

6. SCOPE OF WORK FOR CNG DISPENSER

This document covers the details of supply of car Dispenser and bus dispenser. All works and clauses of this document shall be applicable unless specifically mentioned otherwise. This document shall be read in conjunction with Data Sheets, Technical Specification, Codes & standards, Drawings, and other documents forming a part of the MR Document. Supply of dual arm car dispenser having flow capacity of minimum 15 kg/min and supply of bus dispenser with single arm having flow capacity of minimum 75 kg/min for bus under discharge to atmospheric condition.

Bidder shall Design, detail engineering, manufacturing, assembly, factory testing, supply of CNG dispensers including packaging, insurance, handling transportation of Dispenser, loading and unloading at sites, documentation etc. and providing all related services including installation, integration, site acceptance testing, trial run and commissioning, Annual Maintenance Contract (AMC), commissioning spares, all drawings, documents and licensed software & hardware, converters, cables etc. Complete in all respect for project conforming to Technical Specification for CNG Dispenser: TS. No. **1023/GA/ME/TS/3010** enclosed with tender. Each CNG Dispenser shall have following

as a minimum:

6.1 The scope of work of the car dispenser are (quantity as per MR) of double arm type having flow capacity of 15 kg/min. under discharge to atmospheric condition.

6.2 The scope of work of the Bus dispenser are (quantity as per MR) of single arm type having flow capacity of 75 kg/min. under discharge to atmospheric condition. The dispensers shall be as per technical specifications defined elsewhere in the documents. Each CNG dispensers shall have following as mentioned below: -

6.3 Any other required for safe and accurate operation of Dispenser.

6.4 Any spare required during commissioning shall be in the scope of vendor. If any spare during commissioning borrowed from AMC spare shall be replaced by vendor, free of cost.

6.5 Supply of complete O&M manual (along with instruments datasheet & schedule, bill of materials, instrument hook-up diagram, electrical wiring diagram, control logic algorithm & flowchart and certificates & user guide of bought out items) for each dispenser for easy operation & troubleshooting.

6.6 Supply of drawings & documents, application program, list of error codes with description for programming the dispenser parameter.

6.7 If dedicated programming unit is required for programming/ parameter change. The same shall be submitted in "CD" along with supply of dispenser also hard copy of the same also be submitted.

6.8 Supply of Instrumentation & Electrical items required as per Specification. All internal cables shall be supplied with double compression type of cable glands tested & certified to be used in hazardous area classified as Zone-I. All equipment's, Ex. Proof JB and accessories also to be supplied and erected as per requirements. Any other item required for safe and accurate operation of Dispensers shall be in the scope of Bidder.

6.9 The supplier shall quote for Onsite training of dispenser operability procedure to client personals as per mentioned in MR documents.

7. SCOPE OF SUPPLY & SERVICES

7.0 The supply of double arm CNG car & single arm Bus dispensers have specified with following requirements mentioned below: -

For CAR Dispenser

7.10 Two CNG flexible electrically conductive twin (fill & vent) hose, with both hoses fitted with NGV-I for filling of vehicles. However, both the hoses shall be suitable

to be attached with Fill and vent breakaway connection and Type-2,3 fueling nozzles **(class-A nozzle)** for fast and slow filling of car & other NGV vehicles & nozzle shall equip with NGV1 & receptacles complies as per **ANSI/CSA NGV1 and ISO14469 standards.** Vendor shall include the supply of 3-way valve with each hose for filling & venting of gas. Vendor shall also include supply of Breakaway Coupling, suitable for NGV Industry, in the hose. Fill Hose shall be 3/8" ID 5000 psi(g), at least 4.0 Mtr. long. & venting shall done through 1/4'' ID hose for low noise & high gas velocity effects.

7.11 Vendor shall demonstrate the function of breakaway coupling during performance test at low pressure condition ≤ 10 bar(g) due to safety concern with proper Safety precautions. The dispensers shall be designed in such a way that free movement of hoses is possible, by spring loaded high mast. Supply of NZS 5425 nozzles is in bidders' scope.

7.12 Fast fill 3-bank sequencing system for car dispenser shall be provided sequencing system should be in-built to the dispenser unit.

7.13 Natural Gas shall not be used for pneumatic controls of Dispenser and Instrument air / Exe-proof electronically controlled solenoid shall be used for such purpose. Instruments Air if required for pneumatic operation of Solenoid Valve suitable of Dispensers has to be provided by the Client at Dispenser end at a pressure of 7 to 9 kg/cm2g.

7.14 Two numbers of Coriolis mass flow meter shall be provided on both side A & B of CAR dispenser.

7.15 The end connection for instruments airline will be ¼" Further tubing with necessary pressure reduction (if required), one pressure gauge with isolation valve for inlet pressure of instruments airline shall be provided by the bidder.

7.16 The Dispensers shall be complete including all required auxiliary equipment for efficient & safe operation as a whole. Bidder shall be responsible for furnishing all electrical, instrumentation, inter connecting Piping & Safety Items as required to make the Dispensers complete.

7.17 It is not the intent of Purchaser to specify every piece of equipment / item but nevertheless any item not specifically mentioned but required as per Good Engineering Practice and for the safe & trouble free operation of the dispensers deemed to have been specified & shall be in the scope of Bidder without any implication in the price or schedule.

7.18 Dispenser & Mass Flow meter, obtaining statutory approvals from the country of origin as well from India is in bidder's scope. The offered Dispenser / Mass flow meter model used for Dispenser measurement must be certified by the Weights

and Measures or any other statutory authority from the country of origin. The Bidder shall also get the offered Dispenser model certified by the Weights and Measures; India (Ministry of Consumer affairs) complied with latest Legal metrology act. The offered Dispenser model must also be approved by the Chief Controller of Explosive (CCOE) Nagpur now PESO (Petroleum and Safety Organization) and the Bidder shall submit the certificate along with the offer.

7.19 Any model certified by W & M India as on date offered by the bidder for supply, the responsibility of the model approval certification from local W&M / revalidation of model approval throughout the warranty & service periods of dispenser will be the responsibility of the bidder. Any issues related to W& M certification/ statutory authority certification already issued after supply & installation will also be under bidder's scope. Undertaking has to be furnished with the bid covering acceptance of this requirement.

7.20 The CNG Dispenser manufacturer must have valid PESO Certificate for the CNG Dispensers Model considered for supply under this bid.

7.21 The CNG Dispenser manufacturer must have valid Model approval from Legal Metrology Department (W&M) of the CNG Dispensers Model considered for supply under this bid.

7.22 Bidder shall note that the calibration of Dispensers at manufacture's works will be done only with Master calibrator certified by statutory authority (valid certification from W&M India and FCRI/ NABL accredited lab for the accuracy better than the Dispensers data sheet) during Inspection & FAT.

7.23 Any spare & consumables required during commissioning shall be in the scope of Bidder. The list of such spares shall be furnished at the time of detail engineering.

7.24 Bidder shall note that the calibration of the Dispenser Instruments, Mass Flow Meter / Electronics, other major items shall be valid at the time of commissioning. Due to any reason if the validity of the calibration (to be considered one year from the last calibration date, if not indicated) expired, then bidder shall arrange / complete the calibration before commissioning. The Performance Guarantee test shall be conducted positively within two months of commissioning. Bidder has to provide all the necessary arrangements if required for PG test.

7.25 Bidder shall ensure that Dispenser supplier shall provide necessary supports and input for client's SCADA (Supervisory Control and Data Acquisition) system and provide data register address details & protocol for automation / SCADA integrations.

7.26 Three rows of liquid crystal backlit display for night viewing showing total sale in Rupees (00000.00), quantity of gas sold in kg (0000.00), unit price of CNG in Rs. /Kg (000.00) for each hose on either side of the dispenser (total 4 sets of three

rows for each Dispenser, Two set display for each side of display cabinet). The whole dispenser electronic unit shall have IP - 65 protection. The display should be with back cover to make the display free from dust and display cabinet shall have IP 54 protection.

7.27 There is a Provision for Pre-set of Dispenser Electronic meter with (R.s. 500.00) or Gas to be sold in Kg. (i.e. 5 kg) etc. by Manual key-pad display or any other Push buttons.

7.28 Non-resettable and non-volatile totalizer up to 999999.99 for total CNG sold in Kg with an independent battery backup. For further details refer Section B: Instrumentation & Control specification.

7.29 One number of three banks electronic software and controller including hardware.

7.30 Two numbers of holster/ cradle for fill nozzles along with weather caps for the protection of nozzles. Holster/ cradle shall be suitable for both NZS and NGV nozzles. Holster/cradle shall be provided for NGV nozzle and shall be compatible to be attached with NZS-5425 nozzles. Supply of NZS 5425 is in bidder's scope.

7.31 Two number of Hi-mast with flexible hose arrangement so that the hose doesn't touch the ground.

7.32 Emergency stop switch is required on both side of the dispenser. However, the filling on both sides should stop in emergency condition, when any one of the emergency switches is pressed. During activation of emergency switch, the power supply to the dispenser should be available.

7.33 Two nos. of **liquid filled 4" dia. (0-400 Kg/cm2g)** pressure gauges showing the vehicle filling pressure for each filling arm.

7.34 Two Nos. bubble tight manual shut-off valve for fill hose.

7.35 Complete Stainless Steel (SS316) outer body of cabinet & Body thickness 1.6 mm with door/panel & Including Interior supports angle & other bracket to selected min. (SS304) as per suitable thickness for proper rigid and smooth fitments work.

7.36 Vendor has to supply the dispensers with solenoid operated valve made of ANSI 316 SS, for ON-OFF control of flow, on the gas inlet with 1/2" tube OD end connection. Valves shall be provided for each bank per hose separately. Vendor to ensure the system design in such a way that any gas if passes, should be recorded by dispenser and added to the mass inventory total (Both Electronics & Electro-Mechanical Totalizer). There should not be any possibility of unmetered gas supply through dispenser in case of malfunctioning of solenoid valves.

7.37 The gas tubing inside the dispensers shall be seamless SS 316 fully annealed

(Bright Annealed) conforming to ASTM A 269 with maximum hardness of RB 80 or less and suitable for bending and flaring. The tubes shall be fully annealed (bright annealed), 1/2" OD with a 1/2" SS 2-way Ball valve at inlet and 1/2" OD end connection suitable for connecting with 1/2" OD SS Tube. Any open ends on fittings and vents shall be provided with caps/ dust plugs.

7.38 Coalescent and particulate filter of Grade 6 or better to be provided at inlet of each bank supply line with manual drain valve to ensure that the oil carryover in the CNG being filled to vehicle is < 1 ppm and particulate size is < 0.5 Micron. Filter housing for said filter must be capable for collection of oil for a drain interval of 24 hrs. with oil carryover < 1 ppm. Filter elements made of paper shall not be accepted. Vendor to provide appropriately plugged drain valve outside the dispenser housing with suitable arrangement to collect the drained oil. Filter size shall be in accordance with max flow through the dispenser. Filtration efficiency shall not be less than 95%.

7.39 The CNG specification should meet the ISO 15403:2000 (E) or IS: 15958 natural gas quality designation for use as a compressed fuel for vehicles.

7.40 Vendor shall ensure that the system design in such a way that any gas if passes, should be recorded by mass flow meter and there should not be any possibility of unmetered gas supply through dispenser in case of malfunctioning of solenoid valves. Any unmetered gas passing shall be recorded in the dispenser is retrievable as and when required. Vendor shall also provide surge protection device of approved make at 230 V AC power inlet to protect the dispenser from any electrical surge/spike.

7.41 Any spare required during pre-commissioning shall be in the scope of vendor.

7.42 Training to OWNER personnel at vendor's shop (10 personnel for three working days). The travelling, boarding & lodging of OWNER's Engineers shall be borne by OWNER. The training module shall cover the equipment construction features, operational & maintenance procedures, practical hands on experience on assembling, dismantling etc.

7.43 Vendor shall make a provision to change the price of CNG through the keypad inside the dispenser unit that shall be covered with security lock. It shall also be possible to change the price from remote station (from SCADA/ from any part of the city). RS 485 port shall also be provided for price change. In case standard RS485 port is not available in the dispenser, then RS232C to RS485 convertor with all relevant hardware and software to be provided by vendor.

7.44 RS 485 serial port shall be provided for down loading the CNG sale data with the help of Purchaser's Personal Computer for each shift (8 hours interval). In case standard RS485 port is not available in the dispenser, then RS232C to RS485

converter with all relevant hardware and software to be provided by vendor. Suitable software shall be provided to obtain the same for each shift (8 hours interval).

7.45 Vendor shall provide a common processor and open communication protocol/ RS 485 port for RTU to transfer all the dispenser data to central SCADA system. In case standard RS485 port is not available in the dispenser, then RS232C to RS485 converter with all relevant hardware and software to be provided by vendor.

7.46 Vendor must note that non-standard / propriety type communication protocol in dispenser for communication with RTU is not acceptable. Protocol must be standard as specified above or any standard protocol with compatible convertor shall be made available and must be compatible to any make of RTU. RTU will have Serial communication port RS 485 protocol to interface with dispenser. Vendor is responsible to provide the communication port compatibility with RTU. Vendor is required to carry the communication port functional test and display all the values in Lap top or in applicable device during dispenser inspection (FAT) at vendor premises. Also, functional test shall be carried out by vendor after installation and looping is junction box at site. Vendor shall also share the dispenser protocol/RS485 details with OWNER during FAT at vendors works and submit relevant documents in desired format (both hardware/ software)

7.47 Vendor must furnish/share the details of implemented MODBUS/RS485 protocol for function code read, write & slave Id, list of signals to be transferred, CRC implementation, register addressing methods/mapping etc. with M/s owner and provide their assistance during interfacing with RTU to automation vendor. Vendor must provide looping details and number of dispensers connected in one loop.

7.48 Dispenser vendor shall loop (multidrop) all the dispensers in common junction box per station in the safe area. Supply of Communication Cables, cable glands, termination of cable and cable laying from dispenser to junction box is in dispenser Vendor's scope. Supply of standard make, WP IP 42 junction boxes, terminal blocks and installation of junction box shall be is in dispenser Vendor's scope.

7.49 Junction box shall have 8 inputs cables entry points (side) and two outgoing entry points including spare (bottom), cable entry from top is not accepted, size of junction box to be decided by vendor. All the spare entry shall be plugged properly. Vendor shall be responsible to provide all the signals at the junction box which will be connected to RTU. During installation & commissioning of dispenser same will be checked by OWNER's Engineer.

7.50 Communication cable is single pair (1Px 1.5mm2), multi strand, armored cable (FRLS) with HR PVC insulation and PVC st2 inner and outer sheath. Tentative cable length forms each dispenser to junction box is approx. 50 meters, however vendor shall provide cable length as per requirement.

7.51 Vendor must share junction box termination details with OWNER. Vendor shall Loop all the dispensers in junction box and looping shall be ring type or re-loop so that is case of communication break or physical loop break then only faulty dispenser should isolate, all others dispensers remain connected and continue to report.

7.52 The meter factor adjustment port /switch should be exclusively dedicated without any additional functionalities and parameter controls. If any incident/problem occurs during the warranty period and comprehensive AMC period which needs breaking of W&M seal, W&M charges for re-stamping will be recovered from AMC charges.

7.53 Vendor must submit the following documents within 2 weeks of placement of LOI/ PO for review and approval of OWNER:

a) Detailed project schedule giving all activities such as Design and review, Major bought out items (such as Mass flow meter, electronics, Valves, Hoses etc.), Sub-assemblies, Stage inspection, Final Assembly, Final factory testing of dispensers, Final inspection, dispatch etc.

b) Process and instruments diagram (P&ID) of gas flow giving Bill of Material. The Bill of Material shall clearly indicate all items, quantity of all items installed per dispenser, make and part number etc.

c) Certification from Weights and Measures department, PESO Department or other statutory authorities of the country of origin for offered model dispenser for specified flow and accuracy.

7.54 All spares required during AMC (Operations & Maintenance) are in the Bidder's Scope. The Bidder shall submit the list of critical spares which are to be stored necessarily in the bidder's store during AMC.

For BUS Dispenser

7.55 Two CNG flexible electrically conductive twin (fill & vent) hose, with both hoses fitted through fill and vent break-way NGV-I (for filling of transit buses & large trucks vehicles with high flow/fast fill capabilities. However, both the hoses shall be suitable to be attached with Type-1 nozzles **complied with NGV-I & ISO 14469 Type-1** (shall. Vendor shall include the supply of Bus/Heavy duty truck nozzle with each hose for filling & venting of gas. Vendor shall also include supply of Breakaway Coupling, suitable for NGV Industry, in the hose. Fill Hose shall be 1/2" ID 5000 psi (g), at least 4.0 Mtr. Long & venting shall done through 3/8'' ID for low noise effects.

7.56 Bus nozzle shall provide with Nozzle holder for protecting the nozzle from dust,

rain & direct sun light during not operational condition at CNG stations and vehicles and which nozzle holder shall place with SS304 stand for smooth operation and free from burrs and sharp edges for minor injury during repeatable operation.

7.57 Vendor shall demonstrate the function of breakaway coupling during performance test at low pressure condition ≤ 10 bar(g) due to safety concern with proper Safety precautions. The dispensers shall be designed in such a way that free movement of hoses is possible, by spring loaded high mast. Supply of NZS 5425 nozzles is in bidders' scope.

7.58 Single bank for Bus Dispenser shall be provided for Sequencing system should be in-built to the dispenser unit.

7.59 One numbers of Coriolis mass flow meter shall be provided only one side.

7.60 Three rows of liquid crystal backlit display for night viewing showing total sale in Rupees (00000.00), quantity of gas sold in kg (0000.00), unit price of CNG in Rs. /Kg (000.00) for each hose on single side of the dispenser (total 2 sets of three rows for each Dispenser, one set display for each side of display cabinet). The whole dispenser electronic unit shall have IP - 65 protection. The display should be with back cover to make the display free from dust and display cabinet shall have IP 54 protection.

7.61 One numbers of holster/ cradle for fill nozzles along with weather caps for the protection of nozzles. Holster/ cradle shall be suitable for both NZS and NGV nozzles. Holster/cradle shall be provided for NGV nozzle and shall be compatible to be attached with NZS-5425 nozzles. Supply of NZS 5425 is in bidder's scope.

7.62 One number of Hi-mast with flexible hose arrangement so that the hose doesn't touch the ground.

7.63 Emergency stop switch is required on one side of the dispenser. However, the filling on both sides should stop in emergency condition, when any one of the emergency switches is pressed. During activation of emergency switch, the power supply to the dispenser should be available.

7.64 one nos. of **liquid filled 4" dia. (0-400 Kg/cm2g) pressure gauges** showing the vehicle filling pressure for each filling arm.

7.65 one Nos. bubble tight manual shut-off valve for fill hose.

7.66 Vendor has to supply the dispensers with solenoid operated valve made of ANSI 316 SS, for ON-OFF control of flow, on the gas inlet with 3/4" tube OD end connection. Valves shall be provided for each bank per hose separately. Vendor to ensure the system design in such a way that any gas if passes, should be recorded

by dispenser and added to the mass inventory total (Both Electronics & Electro-Mechanical Totalizer). There should not be any possibility of unmetered gas supply through dispenser in case of malfunctioning of solenoid valves.

7.67 The gas tubing inside the dispensers shall be seamless SS 316 fully annealed (Bright Annealed) conforming to ASTM A 269 with maximum hardness of RB 80 or less and suitable for bending and flaring. The tubes shall be fully annealed (bright annealed), 3/4" OD with a 3/4" SS 2-way Ball valve at inlet and 3/4" OD end connection suitable for connecting with 3/4" OD SS Tube. Any open ends on fittings and vents shall be provided with caps/ dust plugs.

7.68 Remaining clause are applicable in this bus dispenser as per above mentioned clauses in car dispenser.

Sl. No.	Type of Dispenser	Type of flow	Flow Rate kgs/min	Fill pressure (kg/cm2)	Fill & Vent hose/ Dispenser	Remarks
1	Car	Low/Med /High	Low-0.1 High-15	200	Dual Side (3/8"ID Hose)	Inlet pressure 255 kg/cm2 (g)
2	Bus	High	Low-0.1 High-75	200	Single side (1/2" ID Hose)	

8.0 DESIGN & ENGINEERING FOR DISPENSER: -

a) Design & Engineering
b) Manufacturing & Assembling
c) Procurement from Sub-Bidders
d) Inspection & Testing at Works and Training at site, Arranging TPI for inspection, client inspection
e) Documentation and obtaining statutory approvals as per specification
f) Packing, Forwarding and Transportation up to Job Sites/ Client's stores.
g) Testing and commissioning, trial run etc.
h) Site calibration of the Mass Flow Meter of the supplied dispensers by Master Meter before commencement of performance test.
i) AMC after site installation of each Car, Bus Dispenser, individually
j) The sites/station shall be at CGD of North Goa GA. The Vendor shall be responsible for supply of dispenser at client stores/sites depending upon the availability of sites. The Transportation from client stores to respective sites for erection, installation, testing & commissioning shall be in Vendor's scope.

EXCLUSION

Civil Foundation & Trenches for pipes / Tubes, Instruments air for Dispenser & Erection

of Dispenser will be done by another contractor. However Bidder shall provide Dispenser Foundation Design & drawing details during detail Engineering.

9.0 SAFETY

All Electrical devices shall meet the requirement for the area classification specified elsewhere in tender document. Tubing & other devices shall be so arranged that there is proper access for operation & maintenance.

10.0 AS BUILT DOCUMENTS

On successful completion of hydrostatic testing, the Bidder shall prepare As Built drawings & reports of entire Dispenser package as specified in scope of work. All "As Built" drawings / reports shall be submitted as below.

Four sets of hard copies of following documents shall be submitted by Bidder. All documents shall be bounder together:

i) As-built drawing of Compressor package GAD / Fabrication Drawing / P&ID etc.

j) Test Reports/Results/Records

In addition, the above documents shall also be submitted in electronic media i.e. CD ROM diskettes/Pen drive. Software used for the presentation of these documents shall be as follows:

Type of document Software

k) Test Reports/Results/Records MS Word/Excel (MS Office 2000)

l) Drawings AutoCAD

For the purpose of preparation of as-built drawings, Bidder shall update the "Issued For Construction" (IFC) drawings approved by the Company.

11.0 CHECK-LIST FOR SCOPE OF SUPPLY

a) Vendor shall furnish all the equipment of Dispenser System instruments and gauges and safety devices as per the enquiry document. Anything required over the above what is specified, for safe and satisfactory operation of the equipment package shall be included by the Vendor in his scope.

b) Vendor to write YES/NO against each item. Vendor is required to include complete scope, as such 'NO' is not warranted. However, in case for any of the items if vendor's is reply is 'NO', Vendor should give reason for the same:

c) Vendor's scope of supply shall include but not limited to be following:

Sl. No.	Description	Specified By purchaser Yes/No	Included By vendor Yes/No	Remarks
1.0	**Each Dispenser package completes with:**	YES		
Sl. No.	**Description**	**Specified By purchaser Yes/No**	**Included By vendor Yes/No**	**Remarks**
1.1	Frame material – STAINLESS STEEL 304	YES		
1.2	Built-in Coalescing unit of 3-5 microns with manual drain valve at inlet.	YES		
1.3	Certificate of "Weights & Measures" approval for Dispenser & Mass Flow Meter	YES		
1.4	Certificate of "CCOE" / PESO approval for Dispenser & Mass Flow Meter & master meter (as applicable).	YES		
1.5	Certificate by Weights and Measures or the other statutory authorities of the country of origin is Provided.	YES		
1.6	Fast fill type and electronic display – **Car: 4 Sets of 3 rows** **BUS: 2 Sets of 3 rows**	YES		
1.7	Dispenser with Tamper-Proof Locking arrangement	YES		
1.8	Cabinet suitable to accommodate all valves, fitting flow meter and all required electronic equipment	YES		
1.9	Front/Side mounted Nozzle with lockable holder and safety lever/latch to firmly hold when not in use	YES		
1.10	Separate non-resettable straight forward reading Totalizer	YES		

Sl. No.	Description	Specified By purchaser Yes/No	Included By vendor Yes/No	Remarks
1.11	Liquid filled Pressure Dial gauge of 4"size (Min)	YES		
1.12	Separate non-resettable straight forward reading Totalizer	YES		
1.13	Liquid filled Pressure Dial gauge of 4"size (Min)	YES		
1.14	ESD button mounted on both side of the dispenser or front panel.	YES		
1.15	One set of Isolation Valve complete with venting line valve and end plug installed on the inlet of the inlet steel pipes of dispenser.	YES		
1.16	Certificate by Weights and Measures or the other statutory authorities of the country of origin is Provided.	YES		
1.17	Electrical equipment and Instrumentation wiring are provided with Certificate of Area Classification.	YES		
1.18	Dispenser automatically and immediately shut off CNG supply to each fill hose individually in case of -Power failure, Failure of metering, Low flow, Failure of Totalizer, Overfill, pressure transducer failure.	YES		
1.19	Overall CV is indicated of dispenser from inlet of the dispenser up to outlet probe including mass flow meter, interconnecting tubing, valves, hoses, nozzles etc.,	YES		

Sl. No.	Description	Specified By purchaser Yes/No	Included By vendor Yes/No	Remarks
1.20	Dispenser is shipped in fully wired and assembled condition only gas supply connection, Instrument Air supply connection and power supply connection shall be made at site.	YES		
1.21	Warranty for a period of 12 months is provided from the date of final site acceptance of CNG facilities by the Company's.	YES		
2.0	**Spares**			
2.1	All necessary Spares and consumables during warranty period are in the scope of supplier.	YES		
3.0	**Inspection & Testing**			
3.1	As specified on the datasheets and Technical Specifications	YES		
4.0	**Vendor Data and drawings**			
4.1	All data & drawings as required per VDR format	YES		
5.0	**Erection, commissioning, and trial runs at site of the Dispenser**			
5.1	Additional Items not specified by purchaser but recommended by Vendor for safe smooth and normal operation. (Vendor shall indicate separate list of such items in his proposal)	YES		
6.0	**Technical parameters to be confirmed by**			
6.1	Inlet Pressure Kg/cm2g -255	YES		
6.2	Fill Pressure Kg/cm2g -210	YES		
6.3	Operating Temperature range – [-10°C to 70°C]	YES		
6.4	Electrical Supply Single Phase AC, 230V±} 10%, 50Hz±} 2%.	YES		

Sl. No.	Description	Specified By purchaser Yes/No	Included By vendor Yes/No	Remarks
6.5	Fill Nozzle CAR: NGV-1 for both arm, loose supply of NZS 5425 with adaptor for both side Bus dispenser: Fill Nozzle –NGV-2	YES		
6.6	Flexible fill & vent hose-Twin of Parker/ Synflex	YES		
6.7	Fill hose pressure rating – Working pressure 5000 PSIG	YES		
6.8	**Sequential filling- Three bank for Car Dispenser.** **Bus dispenser-Single Bank**	YES		
6.9	Temperature compensation – 210 kg/cm2 (g) equivalent at 15°C	YES		
6.10	Breakaway coupling – CAR side: 3/8" BUS side: ½"	YES		
6.11	Principle of mass metering – Coriolis	YES		
6.12	Flow meter Coriolis type Model with integral display -CAR & BUS	YES		Bidder to confirm the model
6.13	Minimum Flow rate – CAR : 15 Kg/min Minimum Flow rate – BUS : 75 Kg/min	YES		
6.14	Batch delivery accuracy - ±} 1.5% of batch	YES		
6.15	Mass flow accuracy for gas meter - ±} 0.5% (inclusive of sis & linearity, hysteresis & repeatability errors	YES		
6.16	Calibration tractability - To NIST as per ISO 5168	YES		
6.17	Repeatability - ±} 0.3 %	YES		
6.18	Enclosure weatherproofs to - IP55, NENA4x	YES		
6.19	Pressure rating of Wetted parts - 5000 psi At 25°C as per ASME/ANSI B 31.3	YES		

Sl. No.	Description	Specified By purchaser Yes/No	Included By vendor Yes/No	Remarks
6.20	Process Temperature effect - ±} 0.01% of nominal flow	YES		
6.21	Pressure influence – Nil	YES		
6.22	Surge and frequency Transient - Shall be in compliance with ANSI/ EEE(EFT) c 62.41(1991)	YES		
6.23	EMI effect on sensor and Transmitter - To the requirement of EMC directive (jan'94)	YES		
6.24	Vibration effect - As per SAMA PMC 31.1 1994	YES		

12.0 CHECK-LIST FOR SCOPE OF SUPPLY

12.1 General:

12.1.1 This contract covers the provision of services to undertake the Comprehensive Maintenance as per Company schedule and Breakdown repair of CNG dispensers as & when complaints are received at CNG control room. For the purpose of clarity, the agency providing maintenance services for above dispensers shall, herein after be referred to as "Contractor" and the company hiring the services of the agency will, herein after be referred to as "Company" (GOA NATURAL GAS PVT. LTD.)

12.1.2 "Comprehensive Maintenance refers to preventive maintenance of equipment as per schedule which includes breakdown, equipment spare parts replacement, engineering and labor charges."

12.1.3 Preventive Maintenance:

To carry out the Preventive & Breakdown maintenance of dispensers strictly in accordance with the schedule provided by Company / OEM Manual. The Contractor shall confirm to Company their availability to carry out the Maintenance in advance.

The spares required for carrying out preventive maintenance shall be in the scope of Contractor. The contractor personnel shall inform the exact time to the EIC before and after carrying out the maintenance.

The Contractor shall ensure all required consumables such as cotton waste, cleaning solvent, insulation tapes, thinner, soap solution, Teflon tape etc. including required tools & tackles, are available on site. Supply of consumables, tools & tackles etc. is in the scope of Contractor. Tools shall include multi meters, Laptop with required software (Pro-link etc.) etc.

Contractor shall note down the dispenser performance before and after carrying out the maintenance. Contractor to submit report of Percentage difference between Mass Flow Meter and Non-rest-table Totalizer on fortnight or Monthly basis as per order of EIC. Later on after continuous operation, if calibration of installed Mass Flow Meter will be required. Same will be executed by Contractor at site with the help of laptop and suitable software. Only in case of lab calibration, if established by Contractor in front of Goa Natural Gas Pvt. Limited Site in charge through proving exercise by Standard Master Calibration Device, During CAMC Contractor will be entitled to send the Mass Flow Meter, PG, PT, safety relief valve for calibration at its own cost.

Preventive maintenance will be carried out on Monthly basis during non-peak hours in consultation with EIC. Any maintenance that needs to be taken up shall be well planned in advance with due approval of EIC.

The contractor shall produce the compliance report of each maintenance activity on the next Working day to the Engineer - In - Charge. Compliance report shall be descriptive in nature. Provide proper communication facilities to all contractor personnel such as engineers, Technicians etc.

The contractor shall inform the Company, names and mobile numbers of all the service personnel who will be deployed for providing the services during the CAMC. An alternate number will also be informed to the company, which can be contacted in case all service personnel's mobile are not reachable. Changes, if any, will be notified to the company.

12.1.4 Break down Repair:

On receiving information from the CNG control room/Dealer, contractor shall ensure that his team reaches the concerned retail outlet. Attend to dispenser breakdown service calls on 24X7 basis. The service personnel will report to the call site within 2 hours from the time of receiving service call in M/s Goa Natural Gas Pvt. Limited site or at whatever site dispensers are installed (Prior Information will be provided for location of installation of Dispensers).

Before proceeding to the outlet, the contractor personnel shall collect all necessary spares required for the repair depending on the nature of the complaints received. Upon reaching the retail outlet, the contractor personnel shall contact the CNG Control room to advise his attendance on site and confirm the breakdown reporting.

The contractor shall coordinate with the Company representative for instructions on undertaking the repair work. After solving the complaint, the contractor shall inform CNG control room. Provide proper communication facilities to all contractor personnel such as engineers, technicians etc., Maintain records of the services provided, and submit the same to the company, once in a Month.

12.1.5 Reports to be submitted

a. Reports (in soft copy and print form) of individual equipment as and when the dispensers are undertaken for preventive maintenance/break down/on complaint service. Report shall be descriptive in nature including nature and quantity of material used or repaired.

b. Monthly cumulative list on preventive maintenance/breakdown repair/ on complaint service of dispensers carried out with actual date and time of service.

c. Monthly cumulative list on consumption of spares in each dispenser consumed during preventive maintenance/breakdown repair/ on complaint service attend. Separate analysis report on breakdown if anything occurred which needs special attention.

d. Report of Percentage difference between Mass Flow Meter and Non-resettable Totalizer as per guaranteed parameter declared at the time of supply.

12.1.6 Breakdown Penalty

In case, the contractor's service personnel are unable to reach the break down site within stipulated time or is unable to complete the maintenance within stipulated time, following penalty will be applicable. This amount will be deducted from the invoice raised by the contractor, at the end of the month.

a. Penalty for 1-hour delay in reaching at all site (i.e., within 3 hours instead of 2 hours) – Rs 500/- per arm per dispenser.

b. Penalty for 2-hour delay in reaching at all site (i.e., within 4 hours instead of 2 hours)- Rs 1000/- per arm per dispenser.

c. If the shutdown time, which will be calculated from the time the dispenser is offered to service person on reaching site, is extended beyond 4 hours, a penalty of Rs 500/- per hour will be applicable. Rs 2500 towards non availability of mandatory spares at operational sites.

d. Contractor shall not deploy the employee of age less than 18 years in any of the activities. If it is found, then it will be viewed seriously and heavy penalty of Rs. 20000/-per instance and also the termination/blacklist will be done from our approved vendor list.

e. The contractor shall provide full Personal Protective Equipment (PPE) to each individual employee including, soft hat, eye protection, ear plug, and safety shoes. It is mandatory for all personnel to wear said PPE whilst performing their duties, failing which a penalty @ Rs. 500/- per incidence will be levied in addition to dismissal of the person.

Energising Quality	**PROJECT NUMBER: VCS-0400**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

ANNUAL MAINTENANCE CONTRACT (AMC) -CNG CAR & BUS DISPENSER			Total Sheets		12
Document No	1023	GA	ME	AMC	3010

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

REV	DATE	DESCRIPTION	PREP	CHKD	APPR
C1	11.11.2022	Issued For Client Review	RP	RZ	MC

CONTENTS

1. INTRODUCTION 3
2. GENERAL GUIDELINES & INFORMATION 3
3. REPATRIATION & TERMINATION 5
4. INDEMNITY AGREEMENT 5
5. PENALTY OBLIGATION AGAINST AMC 5
6. CONTRACTOR'S RESPONSIBILITY 7
7. EMPLOYEMENT LIABILITY OF CONTRACTOR 7
8. GENERAL INSTRUCTION 7
9. MAINTENANCE OF DISPENSER PACKAGE 9

1.0 INTRODUCTION:

The date of successful commissioning and performance test at site will considered date of start of the annual maintenance contract. The supplier must follow the ANNUAL MAINTENANCE REQUIREMENT as stated below but not limited to and ensure to provide trouble free services to the satisfaction of the owner.

2.0 GENERAL GUIDELINE & INFORMATION:

The content of this clause will provide guidelines for the contractor for performing AMC during contract period.

2.1 ACCOMMODATION / TRANSPORTATION / MEDICAL:

The contractor shall make his own arrangement for the accommodation of his personnel at respective locations and subsequent transportation arrangement for them from their place of residence to work place or any other place as required and company shall have no obligation in this respect. The company shall not be responsible for providing any type of medical assistance to the contractor personnel during the period of contract.

2.2 Discipline:

The contractor shall be responsible for the discipline and good behavior of all his personnel deployed in the services contracted out and should any complaint be received against any of his employee, he shall arrange to replace such persons within 24 hours of notice issued by the Engineer-in-Charge. The decision of the Engineer – in-Charge in this matter shall be final and binding on the contractor.

2.3 Gate pass/identity card

The contract shall arrange to supply / renew identity card to his workforce at his own cost, if so required by Client for security or for any other reasons. Those contractor's personnel shall be required to carry and display their respective identity cards while on duty and produce on demand.

2.4 Right to get services carried out through other agencies

If the contractor fails to provide the said services any time, nothing contained herein shall restrict Client from accepting similar service through other agencies, at its discretion and at the risk and cost of the contractor.

2.5 Sub-letting of contract

No part of this contract nor any share or interest therein in any manner or extent, will be transferred or assigned or sub-let, directly or indirectly to any person/firm or organization without prior permission of Client.

2.6 Compliance of laws

The contractor deploying 20(twenty) or more workmen as contract labor shall have to obtain license from appropriate licensing authority, if required. The contractor (which shall include the Contracting firm / company) shall be solely liable to obtain and to abide by all necessary licenses from the concerned authorities as provided under the various labor laws legislation's including labor license from the competent authority under the Contract Labor ("Regulation & Abolition") Act 1970 and Acts made thereafter.

The Contractor shall be responsible for necessary contributions towards PF, Family Pension, ESIC or any other statutory payments to Government Agencies as applicable under the laws in respect of the contract and personnel deployed by the contractor for rendering services to Client and shall deposit the required amount with the concerned statutory authorities on or before due dates. The contractor shall obtain a separate PF number from the concerned Regional Provident Fund Commissioner and submit necessary proof of having deposited the employees as well as the employer's contribution to the Provident Fund.

The contractor shall not engage /deploy any person of less than 18 years under this contract and the persons to be deployed should be physically and mentally fit.

The installations where job is to be carried out are live and have hydrocarbon environment. Contractor shall comply with all safety and security rules and regulations and other rules laid down by Client for its operation. It shall be the duty/responsibility of the contractor to ensure the compliance of fire, safety, security and other maintenance rules and regulations by his personnel. Disregard to these rules by the contractor's personnel will lead to the termination of the contract in all respects and shall face penal/legal consequences.

The contractor shall arrange for insurance of all his workers engaged on the job as per the relevant Acts, rules and regulations, etc. In case by virtue of provisions of worker's compensation Act, 1923 or any other laws in force. Client has to pay compensation for a workman employed by the contractor due to any cause whatsoever the amount so paid shall be recovered from the dues payable to the contractor and /or security deposit.

2.7 The officer in charge shall have power to

- Issue the contractor from time to time during the running of the contract such further instructions as shall be necessary for the purpose of proper and adequate execution of the contract and the contractor shall carry out and bound by the same.

- During the currency of this contract, Client can increase or decrease the number of the services / technicians to meet contractual requirements.

- Order the contractor to remove or replace any workman whom the company considers incompetent or unsuitable and opinion of the company representative as to the competence of any workman engaged by the contractor shall be final and binding on the contractor.

3.0 REPATRIATION & TERMINATION:

- CLIENT shall reserves the right at any time during the currency of the contract, to terminate it by giving 30 days' notice to contractor, and upon expiry of such notice period the contractor shall vacate the site/office occupied by him immediately.

4.0 INDEMNITY AGREEMENT:

- Contractor shall exclusively be liable for non-compliance of the provision of any act, laws, rules and regulations having bearing over engagement of workers directly or indirectly for execution of work and the contractor hereby undertake to indemnify the company against all actions, suits, proceedings, claims, damages demands, losses, etc. which may arise under minimum wages act, payment of wages act, workman compensation act, personnel injury (compensation insurance) act ESI Act, Fatal Accident Act, Industrial Dispute Act, Shops and Establishment Act, Employees Provident Fund Act, Family Pension and deposit Linked Insurance Scheme or any other act or statutes not herein specifically mentioned but having direct or indirect application for the persons engaged under this Contract. (A certificate to this effect shall be submitted by the contractor immediately on receipt of LOA).

5.0 PENALTY OBLIGATION AGAINST AMC:

5.1 During the one-year warranty period and 10-year post warrantee period the Contractor must ensure that the dispenser is performing required services as define in the contract documents well round the 24 hours a day & 365 days. During AMC services if dispensers break down any time then Client have right to impose penalty as defined in Contract.

5.2 **Penalty:**

In case, the contractor's service personnel are unable to reach the break down site within stipulated time or is unable to complete the maintenance within stipulated time, following penalty will be applicable. This amount will be deducted from the invoice raised by the contractor, at the end of the month.

5.2.1 Penalty for 1-hour delay in reaching at all site (i.e., within 3 hours instead of 2 hours) – Rs 500/- per arm per dispenser.

5.2.2 Penalty for 2-hour delay in reaching at all site (i.e., within 4 hours instead of 2 hours)- Rs 1000/- per arm per dispenser.

5.2.3 If the shutdown time, which will be calculated from the time the dispenser is offered to service person on reaching site, is extended beyond 4 hours, a penalty of Rs 500/- per hour will be applicable. Rs 2500 towards non-availability of mandatory spares at operational sites.

5.2.4 Contractor shall not deploy the employee of age less than 18 years in any of the activities. If it is found, then it will be viewed seriously and heavy penalty of Rs. 20000/-per instance and also the termination/blacklist will be done from our approved vendor list.

5.2.5 The contractor shall provide full Personal Protective Equipment (PPE) to each individual employee including, soft hat, eye protection, ear plug, and safety shoes. It is mandatory for all personnel to wear said PPE whilst performing their duties, failing which a penalty @ Rs. 500/- per incidence will be levied in addition to dismissal of the person.

5.3 The day start will be considered from 0000 hrs for the calculation purpose. Contractor shall be allowed 24 hours downtime of the each arm of dispenser per month to carry out the periodic / scheduled / breakdown maintenance/ routine checking of dispenser package. This can be adjusted considering the penalty clause as define above only once in a month. In case Contractor has utilized less down time of the dispenser package than that allowed, the Contractor could carry forward only max unutilized 12 hours downtime to immediately next month.

5.4 In any case, the maximum penalty imposed in a month for non- performance of the equipment would be limited to 50 % of the amount of Maintenance charges to be paid to the contractor per month per dispenser.

5.5 A logbook for time record shall be maintained in the Central control room wherein the records shall be made for the time Dispenser develops trouble and the time at

which the Contractor rectifies the same and Dispenser put back to service.

5.6 The penalty clause and maintenance charges will come into force immediately after successful performance test as defined in the tender.

5.7 In case of any complaint regarding non-fulfillment of any obligation under the contract, Client reserves the right to withhold payment to the Contractor and out of such amount and the security deposit which may held, Client can make such payment as it may consider necessary for smooth and unhindered working of the contract.

6.0 CONTRACTOR'S RESPONSIBILITY:

- Contractor shall depute a technically competent person for the maintenance services and to receive instructions from Engineer-in-change or his representative.

7.0 EMPLOYMENT LIABILITY OF CONTRCATOR:

7.1 The contractor shall indemnify purchase & shall be solely and exclusively responsible for any liability arising due to any difference or dispute between him and his employer for the execution of this contract at any time during/after the contract period is over. All workmen engaged by the contractor shall be on his roll and be paid by him and CLIENT shall have no responsibility towards them. The contractor shall ensure and will be solely responsible for payment of wages and other dues latest by 7th of the following month to the personnel deployed by him in the presence of the Company's representative.

7.2 The contractor shall be directly responsible and indemnify the company against all charges, claims, Dues etc. arising out of disputes relating to the dues and employment of personnel deployed by him.

7.3 The contractor shall indemnify the company against all losses or damages caused to it on account of Acts of the personnel deployed by the contractor. The contractor shall ensure regular and effective Supervision of the personnel deployed by him.

7.4 The contractor shall be liable for making good all damages/losses arising out of loss or theft of each handled, leakage, pilferage of any office, furniture equipment fitting and fixtures what-so-ever as may be caused directly or indirectly by the engaged persons through him/work carried out by them. During the period of the job, if the work progress does not commensurate with the time elapsed in respect of any person/persons engaged by the contractor; the contractor shall be liable to pay the compensation to the company as may be considered reasonable by the company.

8.0 GENERAL INSTRUCTION :

8.1 The maintenance services shall be provided as per Client's requirement and to be finalized immediate after installation in consultation with Client / Consultant.

i) The contractor shall deploy adequate number of technicians / supervisors / Engineers / helpers as well as tools & equipment for smooth and proper

maintenance of the dispensers supplied in terms of the contract. In case required to meet operational requirements, the contractor shall augment the same as per direction of Engineer–in-Charge.

ii) The contractor is required to carry out all services as mentioned in the Scope of Services and Schedule of Rates on all the 365 days including Sunday and all Holiday & as per Client's requirement.

iii) The contractor shall allow weekly rest and daily working hours to his workmen as per the relevant Act/Law/and Rule made there under. However, no work shall be left incomplete/unattended on any holiday/weekly rest. Technician/operators provided shall have minimum qualification of ITI.

iv) Contract in person or his authorized representative shall provide the services on daily basis to interact with Engineer-in-charge and deployed workman.

v) The work force deployed by the contractor for Maintenance services at CNG installation shall be of sound relevant technical professional expertise, which is otherwise also essential from the safety point of view of the personnel of the contractor as well as for the installation.

vi) Contractor has to ensure the safety of man and machine all the times. Damages of equipment due to negligence will be recovered as per the decision of Engineer-in-Charge, which will be final.

vii) Regarding work completion, the decision of the Engineer-in-Charge will Be final and binding.

viii) The contractor shall make his own arrangements to provide all facilities like boarding and transport etc. to his workmen.

ix) All personnel of the contractor entering on work premises shall be properly and neatly dressed and shall wear uniform, Safety Shoe, badges while working on premises of the company including work Sites.

x) Contractor shall maintain proper record of his working employee's attendance and payment made to them. The contractor's representative/supervisor shall report daily to the Shift-in-Charge for day to day working.

xi) All the safety rules and regulations prevailing and applicable from time to time at the installations as directed by Client and will be strictly adhered to by the contractor.

xii) The rates quoted by the Contractor must be inclusive of all the taxes, duties, services tax, work contract tax and any other levies, contractor's share of P.F. and insurance charges, contractor's profit and any other expenditure etc.

xiii) It will be the responsibility of the contractor to pay as per the minimum wages of the appropriate government applicable under the Minimum Wage Act 1948.

xiv) The services shall be provided as per the Clients requirements. The contractor is responsible to provide effective and efficient services and assure that there is no disruption in the services for want of any resources.

xv) For any complain regarding non-performance of dispenser can be communicated to Contractor for Further necessary action at the earliest. For this purpose the Contractor has to inform the concern Person with contact details such as Mobile no. , fax no. etc. / address (available 24 hrs.) to whom Client can inform any problem regarding dispenser for corrective action immediately. Further, the contractor shall deploy adequate number of technicians/ supervisors / engineers at various site offices if required in consultation with Engineer-in-Charge to provide trouble free maintenance of the dispensers.

xvi) For any complain regarding non-performance of dispenser will be communicated to bidder for further necessary action at the earliest. For this purpose the bidder has to provide inform the concern person with contact details such as Mobile no. , fax no. etc. / address (available 24 hrs.) to whom client can inform any problem regarding dispenser for corrective action immediately.

xvii) All arrangements for communication from control room to the contract person working on job under the services shall be the responsibility of the contractor, viz. pagers / walky-talky.

xviii) The successful Contractor shall indemnify the company from any claim of the contract labor.

xix) The Contractors / contractor who fail to furnish any proof in respect of separate PF Code/No of the Concerned RPF Commissioner / Authority their bids shall be liable for rejection.

xx) All the jobs mentioned under scope of services shall be carried out as per sound engineering practices, work procedure documentation, recommendation of the manufacturer and as per the guidelines/direction of engineer-in-charge of authorized representative.

9.0 MAINTENANCE OF DISPENSER PACKAGES :

During one-year warranty period and Ten post warranty period. (As applicable, refer respective SOR / scope of work in tender).

9.1 SCOPE OF SUPPLY WORK DURING WARRANTY PERIODS : -

All consumables, man power, sealant etc. required for carrying out the maintenance of the complete dispenser package during the warranty period, including periodic, breakdown maintenance for continuous and uninterrupted operation of the dispenser shall be in scope of the Contractor. A consolidate list has to be provided during detailed engineering for such type of spare. All the damaged part has to be replaced with new within the stipulated time. Electricity shall be supplied free of cost to the Contractor.

9.2 SCOPE OF SUPPLY WORK DURING POST WARRANTY PERIODS : -

Spare parts (out of the spare parts purchased for 10 years normal O&M period or mandatory spares) shall be supplied free of cost. Any spare parts required during 10 year O&M service, which are not recommended by the Contractor in the list of "spares for 10 years Normal O&M services" shall has to be supplied by Contractor free of cost. All the consumables, man Power etc. required for carrying out the maintenance of the complete dispenser package during the Warranty period, and post warranty including periodic, breakdown maintenance for continuous and uninterrupted operation of the dispenser shall be in scope of the Contractor and shall be kept in stock. Electricity shall be supplied free of cost to the Contractor.

9.2.1 SCOPE OF SUPPLY DURING POST WARRANTY PERIODS : -

AMC with spares as define in SOR / price schedule means no spares will be supplied to Contractor during the period. All the spares, consumables, Man-power etc. required for carrying out the maintenance of the complete dispenser package during post warranty period, including periodic, breakdown maintenance for continuous and uninterrupted operation of the dispenser shall be in scope of the Contractor and shall be kept in stock. Electricity shall be supplied free of cost to the Contractor.

9.2.2 SCOPE OF SERVICES : -

- The Contractor shall have to keep all the spares, consumables, lubricants, etc. required for carrying out Periodic, breakdown, emergency maintenance etc. of the package so as to minimize the down time of the dispenser. Non-availability of dispenser for non-availability of spares shall be liable for compensation.

- All tools tackles and fixtures required for carrying out the above maintenance of the dispenser shall be in scope of the Contractor. The scope will also include handling equipment required during the any maintenance activity.

- Any expert services required from principal company or OEM has to be arranged by the supplier or his agent at his own cost. All arrangements like phone, fax, computer, Internet etc. required for correspondences with above personnel has to be arranged by the Contractor.

- The periodic maintenance required to be done, as per OEM recommendation shall be taken up promptly. The Contractor shall provide the detailed preventative maintenance schedule along with

  a) Estimated down time required for each type of maintenance schedule.
  b) List of spares and their quantities required for each type of maintenance schedule per Dispenser.

c) Type and number of man-days required for each type of maintenance schedule per Dispenser.

- The Contractor shall plan such maintenance during non-peak hours and in consultation with the Engineer In-Charge (EIC) of Client. Any maintenance that needs to be taken up shall be well planned in advance with due approval of the EIC.

- The Contractor shall use only OEM's certified spares during maintenance. In case, the schedule maintenance of the OEM manual recommends check and replace parts like valve spring, valve seat etc. after certain time interval, same shall be replaced or used further only on approval from Client representative. However any unto ward consequences for non-replacement of such parts shall be the Responsibility of the Contractor.

- All routine and periodic checks / inspections required to be done as per OEM recommendation shall be done by the Contractor. Instruments required for above inspection like Vernier caliper, micrometer screw gauge, fill gauges, bore gauge etc. shall be in scope of the Contractor and these instruments shall Be calibrated every year.

- All parts replaced by the Contractor during the above contract period shall be properly packed and handed over to Client on replacement.

- The supplier shall submit a copy of the daily / weekly / fortnightly / monthly / bimonthly / quarterly and yearly performance report to the EIC in both soft and hard form. All stationery including the printed material shall be in scope of the Contractor.

- All the maintenance / inspection job carried out by the Contractor shall be recorded and the report of the same shall be jointly signed by Client representative.

- The EIC will be final authority to take decision with regards to maintenance or replacement of parts or any disagreement between the Contractor and Client, during the execution of the contract.

- The Contractor shall carryout yearly calibration of all instruments such as pressure gauges, transmitters, mass flow meters etc. In addition to the above all safety relief valves shall also be tested and calibrated every year.

- **Calibration shall be done during AMC at site with the help of Master Meter / Calibrator instruments for Mass Flow Meter / Instruments in presence of client / consultant representative. The Master calibration Instruments except for Mass Flow Meter shall be arranged by the contractor.**

- **The Mass Flow Meter / Calibrator shall be certified / calibrated from the government approved laboratory and will be provided by the contractor.**

- The periodic maintenance required to be done, as per OEM recommendation shall be taken up promptly. The Contractor shall plan such maintenance during non-peak hours and in consultation with the Engineer in Charge (EIC) of Client. Any maintenance that needs to be taken up shall be well Planned in advance with due approval of the EIC. The scope shall include preparation of maintenance schedule for carrying out the maintenance during the contract period.

NOTE:-

1) Successful bidders shall take prior approval of the Makes / Items not covered above for which complete technical credentials (must be for CNG applications) of the proposed vendors shall be required to submit for evaluation by Purchaser/Consultant.

2) The some Items indicate only Indian Makes. Successful Foreign bidders / also Indian bidder may take prior approval of any other makes also for which complete technical credentials (must be for CNG applications) of the proposed vendors shall be required to be submitted for evaluation by Purchaser/Consultant.

3) The Dispenser Manufacturer having / develop the specific products for the use with their own brand name are also accepted subjected to submission of proven track record and the acceptance/ testing /certification. Decision of the client / consultant will be final.

ENERGISING QUALITY	**PROJECT NUMBER: VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

DATA SHEET OF CNG MASS FLOW METER

DOCUMENT NO	1023	GA	ME	DS	3010

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C2	15.11.2022	RE-ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
C1	12.08.2022	ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

MASS FLOW METER (CORIOLIS TYPE) DATA SHEET				
	Sl.No.	**Description**	**Client Specifications**	**Vendor to Provide**
General	01.	Tag No.	#	#
	02.	Service	#	#
	03.	Model No.	#	#
	04.	Make	#	#
	05.	Measuring principle	Coriolis type	-
	06.	Fluid	Natural Gas	-
	07.	Design Pressure	345 bar(g)	-
	08.	Working pressure	250 bar(g)	-
	09.	Nominal Line size (inches)	½'' to ¾''(DN15 to DN20)	-
Hazardous Area Requirements	10.	Electrical Area classifications	IEC Zone 1 Gr IIA, IIB	-
	11.	Ingress Protection Rating	IP 66/67	-
	12.	Certification Required	ATEX IECEx Exi/Exd	-
	13.	Hazardous area classifications	Class I, Div. 1, Groups C and D	-
Sensor unit	14.	Sensor unit series	CNG Mass	-
	15.	Type	Coriolis	-
	16.	Function	Mass flow	-
	17.	Connection size / ratings	#	#
	18.	Facings & finish	RF 125AARH	-
	19.	Custody transfer	#	#
	20.	Flow tube Design pressure ratings	#	#
	21.	Combined sensor and process fitting ratings	#	#
	22.	Union to NPT adapter piece ratings	#	#
	23.	Body Material	SS316	-
	24.	Sensor Housing Material leads	SS Hermetically Sealed	-
	25.	Sensor/Wetted Parts Material	SS316	-
	26.	Enclosure	WP to IP 66/67 (EN60529)	-

	Sl.No.	Description	Client Specifications	Vendor to Provide
Sensor unit	27.	Non-Wetted Parts Material	#	#
	28.	Intrinsically safe	Required	-
	29.	Flow range Max./Min.(kg/min)	#	#
	30.	Batch Accuracy	+/-0.5 %	-
	31.	Repeatability	+/-0.25 %	-
	32.	Jacketing	Required	-
	33.	Zero stability	0.009 kg/min.	-
	34.	Sensor weight (kg)	#	#
	35.	Turn down	10:1	#
	36.	Pressure Relief path	Required	#
Transmitter unit	37.	Enclosure	FLP+WP	-
	38.	Mass & Vol. Flow display	Required	-
	39.	Density	N/a	-
	40.	Display configuration	Local integrated display with sensor module	-
	41.	Power	Both AC & DC supply applicable	-
	42.	Transmitter Output	4-20 mA	-
	43.	10KHz pulse	Required	-
	44.	Modbus communication	Required	-
	45.	HART wireless communication	Required	-
	46.	Transmitter Design Temperature	-40° to 120°C	-
	47.	Transmitter Housing	NEMA 4X(IP66/67)	-
	48.	Electronics interface	#	#
	49.	Load Driving Capability in ohms	600 Ω	-
	50.	Conduit connection	1/2-inch NPTF (Applicable for Brass gland FLP Type)	-
	51.	Diagnosis application software	Pro-link latest version	-
	52.	Power consumption in watt	#	#
	53.	Baud Rate	#	#
	54.	Meter ID	#	#
	55.	Flow rate Measured	Kg/min.	-

	Sl.No.	Description	Client Specifications	Vendor to Provide
Transmitter unit	56.	Low flow cutoff @	0.1 kg/min.	-
	57.	High flow cutoff @	#	#
	58.	Transmitter Earthing point	Required	-
	59.	Equipment Ground	Required	-
	60.	Totalizer	shall be non-volatile and non-resettable	-
	61.	Local Display with touchless sensor	Integral with Transmitter unit	_
Fluid data	62.	Fluid / State	CNG / GAS	-
	63.	Pressure: Operating / Max.	200 Bar(g) / 250 Bar(g)	-
	64.	Temperature: Operating / Max.	Refer Technical specifications	-
	65.	Operating density (kg/m3)	170 to 219 kg/m3 @ 15°C	-
	66.	Relative Molecular mass	16.80 kg/k mol.	-
	67.	Operating viscosity	Cp	-
	68.	Maximum allowable pressure drops	Bar(g)	-
Parameter Display	69.	Mass flow rate(kg/Min.)	#	#
	70.	Gas Temperature (°C)	#	#
	71.	Volume flow rate (L/min.)	#	#
	72.	Volume total (Liter)	#	#
	73.	Mass total (kg)	#	#
Certification	74.	AGA11 conformance	Required	#
	75.	Hazardous Area PESO	Required	#
	76.	Hazardous Area ATEX	Required	#
	77.	Custody Transfer-W&M India approval	Required	#
	78.	Calibration Certificates as per ISO 17025	Required	-
Inspection & Testing	79.	Material Inspection certificates	Required	-
	80.	Radiographic Test certificates	Required	-
	81.	Pressure Testing	Required	-
		Weld examination	Required	-
Mounting Condition	82.	Inlet to Outlet Connection	Inline type to process connection	_

NOTE: -

I. Vendor to provide the data as marked "#".

II. Vendor to provide individual data sheet along with operating manual & other compliance certificates during detail engineering.

III. Vendor shall provide proper earthing of mass flow meter as per oem standards.

IV. Vendor shall verify three common types of field verification checks, which include meter zero verification, sensor diagnostic checks, and transmitter diagnostic checks. Performing these verification procedures will confirm accurate performance of the Coriolis meter and when an out of tolerance condition exists where re-calibration of the sensor maybe required.

V. Vendor shall mount the mass flow meter In gas service the ideal orientation of the sensor is with the flow tubes in the upright position.

VI. Bidder shall check meter **Zero stability periodically** and reset if it does not meet the manufacturer's / OEM specifications.

VII. Bidder shall establish Mass flow meter in accuracy measurement & Mass totalizer jumping issue diagnosis details In order to adjust the zero of the meter there must be no flow through the flow sensor and the sensor must be filled with gas at process conditions by using both upstream & downstream Ball valve to be provided for on-site Zero calibration.

VIII. The meter zero must be established at process conditions of temperature, pressure and density. Even though the stream is not flowing, the flow meter may indicate a small amount of flow, either positive or negative. Which shall referred as per OEM standards.

IX. The bidder shall replace or diagnosis the mass flow meter if meter Calibration fail & Mass totalizer Jumping issues continuously at site.

ENERGISING QUALITY	**PROJECT NUMBER: VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

DATA SHEET OF CNG CAR DISPENSER

DOCUMENT NO	1023	GA	ME	DS	3011

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C1	12.08.2022	ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

CAR DISPENSER DATASHEET			
S. No.	**DESCRIPTION**	**SPECIFICATION**	**OFFERED**
1	**Dispenser**	Car	
1.1	Make	#	
1.2	Model	#	
1.3	Normal inlet Pressure Kg/cm2 g	255	
1.4	Maximum Fill Pressure kg/cm2g	200	
1.5	Operating Temperature range of wetted parts	(-) 10 °C to 60 °C	
1.6	Flow Rate (kg/min)	15	
1.7	Normal flow (kg/min)	#	
1.8	Minimum flow (kg/min)	#	
1.9	Overall Cv of dispenser from inlet of dispenser to outlet of fill nozzle	#	
1.10	Batch accuracy	1.5%	
2	**Electrical supply**	AC 230 Volts 10% 50 Hz 3 %	
2.1	Tolerance value of voltage range for accurate operation	#	
3	**Fill Nozzle**	#	
3.1	Type	NGV1 Type2 Class A in one arm with adopter (NGV to NZS) /NZS type in second arm.	
3.2	Make	Refer Technical specification	
3.3	Pressure Rating kg/cm2 g	255 Kg/cm2 g	
3.4	Fill pressure through NGV nozzle	200 kg/cm2 g	
4	Flexible fill & vent hose	Both should separate	
4.1	Type	#	
4.2	Make	#	
4.3	Pressure rating kg/cm2 g	#	
5	**Sequential filling**	Three Bank	
6	Mass flow meter	#	
6.1	No. of metering lines	Two independents	
6.2	Metering principle	Coriolis mass flow with integral Display	
6.3	Make	#	
6.4	Model	#	
6.5	Mass flow accuracy for gas meter (inclusive of linearity, hysteresis, repeatability errors)	0.5%	
6.6	Repeatability	0.25%	
7	Temperature compensation	YES	

S. No.	DESCRIPTION	SPECIFICATION	OFFERED
8	Frame Material / Internal accessories	SS316 /SS 304	
9	Breakaway coupling	YES	
10	Vent Return coupling	YES	
11	Fill Breakaway coupling size	3/8''	
12	Vent Return coupling size	1/4''	
13	Total Power consumption by dispenser	#	
14	Tube pressure rating	5000 Psi(g)	
15	Fill Valve Type	3-way valve	
16	Fill Hose Length	Min. 4 Mtr.	
17	Hose Burst Pressure	4 time of working Pressure	
18	ESD switch	Required on Both side	
19	Earth Quake zone	III	
20	Temperature Compensation	Required	
21	Installation	Outdoor	
22	Captured vent	Yes	
23	Electrical Area hazard	Class I, Zone I	
24	Gas Group	D, Group-IIA/IIB	
25	Dispenser tubing	SS316	
26	FLP Solenoid Valve / Pneumatic valve	Required	
27	FLP Solenoid Valve / Pneumatic valve supply	AC/DC (#)	
28	LCD Display supply	AC/DC (#)	
29	Electronics Mother Board	AC/DC (#)	
30	Overall, Power consumption at Min. flow rate (Watt)	#	
31	Overall, Power consumption at Max. flow rate (Watt)	#	
32	Spares & Consumables	Required	
33	Shipping Weight of Dispenser	#	
34	Gas Group	D, Group-IIA/IIB	
35	Bleed & Needle valve	Required	

NOTE:-

I. Fill checklist for completeness of the Scope of Supply.

II. All necessary software with licence for dispenser electronics and mass flow meter shall be provided. Necessary converter with connecting cables for downloading the data into client's Laptop shall also be provided.

III. Two no's of holster/cradle for filling nozzles along with weather caps for the protection of nozzles. Holster / cradle shall be suitable for NGV/NZS Nozzles.

IV. Vendor To Provide the Data As Marked "#".

V. Vendor To provide Individual data sheet of Solenoid valve, Actuator, SRV, Pressure Transmitter, Ball valves, Electronics Mother Board, Hoses, Surge protection device, fill Nozzle, Breakaway coupling, Coalescing Filter during Detail Engineering.

ENERGISING QUALITY	**PROJECT NUMBER: VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

DATA SHEET OF CNG BUS DISPENSER

DOCUMENT NO	1023	GA	ME	DS	3012

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C1	12.08.2022	ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

BUS DISPENSER DATASHEET			
S. No.	**DESCRIPTION**	**SPECIFICATION**	**OFFERED**
1	**Dispenser**	Bus	
1.1	Make	#	
1.2	Model	#	
1.3	Normal inlet Pressure Kg/cm2 g	255	
1.4	Maximum Fill Pressure kg/cm2g	200	
1.5	Operating Temperature range of wetted parts	(-) 10 °C to 60 °C	
1.6	Flow Rate (kg/min)	75	
1.7	Normal flow (kg/min)	#	
1.8	Minimum flow (kg/min)	#	
1.9	Overall Cv of dispenser from inlet of dispenser to outlet of fill nozzle	#	
1.10	Batch accuracy	1.5%	
2	**Electrical supply**	AC 230 Volts 10% 50 Hz 3 %	
2.1	Tolerance value of voltage range for accurate operation	#	
3	**Fill Nozzle**	#	
3.1	Type	NGV1 Type1 Class A Nozzle (CT5000)	
3.2	Make	Refer Technical specification	
3.3	Pressure Rating kg/cm2 g	255 Kg/cm2 g	
3.4	Fill pressure through NGV nozzle	200 kg/cm2 g	
4	Flexible fill & vent hose	Single Side	
4.1	Type	#	
4.2	Make	#	
4.3	Pressure rating kg/cm2 g	#	
5	**Sequential filling**	Single Bank	
6	Mass flow meter	#	
6.1	No. of metering lines	Single	
6.2	Metering principle	Coriolis mass flow with integral Display	
6.3	Make	#	
6.4	Model	#	
6.5	Mass flow accuracy for gas meter (inclusive of linearity, hysteresis, repeatability errors)	0.5%	
6.6	Repeatability	0.25%	
7	Temperature compensation	YES	

Sl. No.	DESCRIPTION	SPECIFICATION	OFFERED
8	Frame Material / Internal accessories	SS316 /SS 304	
9	Breakaway coupling	YES	
10	Vent Return coupling	YES	
11	Fill Breakaway coupling size	1/2"	
12	Vent Return coupling size	3/8"	
13	Total Power consumption by dispenser	#	
14	Tube pressure rating	5000 Psi(g)	
15	Fill Valve Type	Type-1 Class-A Nozzle CT5000	
16	Fill Hose Length	Min. 4 Mtr.	
17	Hose Burst Pressure	4 time of working Pressure	
18	ESD switch	Required on Both side	
19	Earth Quake zone	III	
20	Temperature Compensation	Required	
21	Installation	Outdoor	
22	Captured vent	Yes	
23	Electrical Area hazard	Class I, Zone I	
24	Gas Group	D, Group-IIA/IIB	
25	Dispenser tubing	SS316	
26	FLP Solenoid Valve / Pneumatic valve	Required	
27	FLP Solenoid Valve / Pneumatic valve supply	AC/DC (#)	
28	LCD Display supply	AC/DC (#)	
29	Electronics Mother Board	AC/DC (#)	
30	Overall, Power consumption at Min. flow rate (Watt)	#	
31	Overall, Power consumption at Max. flow rate (Watt)	#	
32	Spares & Consumables	Required	
33	Shipping Weight of Dispenser	#	
34	Bleed & Needle valve	Required	

NOTE: -

I. Fill checklist for completeness of the Scope of Supply.
II. All necessary software with license for dispenser electronics and mass flow meter shall be provided. Necessary converter with connecting cables for downloading the data into clients Laptop shall also be provided.
III. Two nos. of holster/cradle for filling nozzles along with weather caps for the protection of nozzles. Holster / cradle shall be suitable for NGV/NZS Nozzles.
IV. Vendor To Provide the Data as Marked "#".
V. Vendor To provide pro-link latest software for online diagnosis if troubles found during operation.

ENERGISING QUALITY	**PROJECT NUMBER: VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

DATA SHEET OF GLYCERINE FILLED PRESSURE GAUGE

DOCUMENT NO	1023	GA	ME	DS	3013

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C1	12.08.2022	ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

PRESSURE GAUGE DATASHEET			
S. No.	**DESCRIPTION**	**SPECIFICATION**	**OFFERED**
1.	Type of service	CNG	
2.	Pressure Gauge Type	Bourdon sensing	
3.	Mounting	Local	
4.	Model	#	
5.	Case Filling	Liquid Filled Case	
6.	Dial Size	100 mm	
7.	Color	White with black inscriptions	
8.	Case Material	SS316 with bayonet bezel Phenol with screwed bezel	
9.	Bezel Ring	Bayonet type SS316	
10.	Window	Shatterproof glass	
11.	Enclosure	WP to IP 65 as per IEC 60529 / IS 2147	
12.	Pressure Elements	Bourdon type	
13.	Elements/Socket Material	SS 316	
14.	Accuracy	+/-0.5% FSD	
15.	Zero Adjustments	Micro pointer	
16.	Connection	½" NPTM Centre back mount	
17.	Connection location	Bottom	
18.	Movements	SS316	
19.	Range	0 to 400 kg/cm2	
20.	Least Count	10 kg/cm2	
21.	Ref. Standards	EN 837 Latest version	
22.	Protection	WP to IP68 (IS:13947 part I / IEC:60529)	
23.	Bourdon	SS316	
24.	Connection	½" NPT(M)	
25.	Over Range	As per EN 837	
26.	Zero Adjustment	#	
27.	Socket	22 mm SQ. in SS316	
28.	Blow out Disc	Required	
29.	Temperature Suitability	-20°C to 60°C	
30.	Temperature Effects	Within +/-0.4 % FSD/10°C	
31.	Diaphragm seal	#	
32.	Wetted parts materials	#	

33.	Process connection size & ratings	#	
34.	Flushing & filling connection with	#	
35.	Overrange protection	130 % of FSD	
36.	Temperature error	#	
37.	Approvals	#	
38.	Make	Wika /General instrument /AN instrument/ Baumer	
39.	CE conformity	Pressure equipment directive 97/23/EC, PS > 200 bar, module A, pressure accessory	
39.	Approvals	#	
40.	Certificates	2.2 Test report per EN 10204 (e.g., state-of-the-art manufacturing, material proof, indication accuracy) 3.1 inspection certificate per EN 10204 (e.g., indication accuracy)	
41.	Shipping weight(kg)	#	

42	**Notes.**
a.	(#) Marked data to be furnished by Vendor/Manufacturer
b.	At the time of approval of DS, Supplier shall furnish DS with Catalogues.
c.	Vendor to provide all Pressure Tag List with Aluminum embossed plate (where mention with Tag no./Date of calibration/Due date of Calibration /Items serial no etc.)
d.	Vendor to provide Pressure gauge spare items like Glycerin Liquid & Rubber filling cap with mandatory spares.
e.	Vendor to provide Operating and Instruction manual before dispatch.
f.	Vendor to provide Leak rate of pressure gauge on High pressure application of natural gas.
g.	Gauge shall withstand steady pressure, over pressure & cyclic pressure.
h.	Gauge shall withstand mechanical shock & Vibration within accuracy range.
i.	Gauge shall be equipped with Manifold valve or bleed valve and venting system in case of maintenance.
j.	Gauge shall have designed to satisfy requirements to operate in aggressive Environment.

ENERGISING QUALITY	**PROJECT NUMBER: VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

DATA SHEET OF SAFETY RELIEF VALVES

DOCUMENT NO	1023	GA	ME	DS	3014

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C1	12.08.2022	ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

SAFETY-RELIEF VALVE DATASHEET			
S. No.	**DESCRIPTION**	**SPECIFICATION**	**OFFERED**
1.	Type of Service	CNG	
2.	Tag No.	#	
3.	Model No. / valve series	#	
4.	Make/Model	Refer approved vendor list	
5.	Orifice	#	
6.	Inlet specification	½'' NPTM	
7.	Outlet specification	1'' NPTF	
8.	Set pressure	Refer Technical specifications	
9.	CDS pressure	#	
10.	Relieving temperature	45°C	
11.	Back pressure	#	
12.	Min. Seat Leakage pressure	#	
13.	Max. Seat Leakage pressure	#	
14.	Allowable Leakage rate @ BPM (bubble per min.) at Min. seat leakage	#	
15.	Allowable Leakage rate @ BPM (bubble per min.) at Max. seat leakage	#	
16.	Design code	**ASME sec. VIII & XIII**	
17.	Operating Temperature Range	-10°C to 60°C	
18.	Valve Design temperature Range	#	
19.	Min. Set pressure point	#	
20.	Max. Set pressure point	#	
21.	Max. outlet pressure	#	
22.	Seal Type	Metal to Metal seat /O-ring soft seal	
23.	**Material of Construction**		
a.	Base	SS316	
b.	Cylinder	Carbon steel SA-216 gr. WCB	
c.	Disc Insert	SS316	
d.	Disc Holder	SS316	

e.	O-Ring	#	
f.	Guide	SS316	
g.	Spindle	416 SS	
h.	Spring	17-7 PH SS	
i.	Spring washers	416 SS	
j.	Adjusting Bolt	SS 316	
K.	Adjusting Bolt Nut	SS 316	
l.	Threaded Cap	#	
L.	Metal to Metal Seat material	#	
24.	Effective area in Sq. mm @ Min. set pressure	#	
25.	Effective area in Sq. mm @ Max. set pressure	#	
26.	**Service Condition**		
a.	Fluid	Natural gas	
b.	State	Pure compressible gas (Natural Gas)	
c.	Molecular weight	16.04	
d.	Specific heat Ratio (Cp/Cv) @ 15.5°C, 1 atm.	1.31	
e.	Relieving temperature	#	
f.	Overpressure %	10 %	
g.	Max. Fixed Blowdown %	≤ 20 %	
h.	Blow down %	#	
i.	Back pressure	#	
j.	Critical flow nozzle pressure	#	
k.	Effective coefficient of discharge (Kd)	#	
l.	Combination correction factor (Kc)	#	
m.	Compressibility factor(z)	0.9	
n.	Required effective discharge area	#	
o.	Recommended std. effective orifice area	#	
27.	Seat Leakage Test Pressure	#	
28.	Shell Pneumatic Test pressure & Media	#	
29.	Cylinder Hydrotest pressure & Media	#	
30.	Base Hydro Test Pressure	#	

31.	Notes.
a.	(#) Marked data to be furnished by Vendor/Manufacturer
b.	At the time of approval of DS, Supplier shall furnish DS with Catalogues.
c.	Vendor to provide all pressure safety valve Tag List with Aluminum embossed plate (where mention with Tag no./Date of calibration/Due date of Calibration /Items serial no etc.)
d.	Vendor to provide Operating and Instruction manual before dispatch.
e.	Process data shall be as per tender specification mentioned elsewhere.
f.	At the time of approval, vendor shall furnish sizing calculation and catalogues of SRV.
g.	Vendor to confirm SRV cold differential test pressure (CDTP).
h.	This Relief requires valves OPEN when system pressure reaches the set pressure and CLOSE when system pressure falls below the set pressure.
i.	Vendor to provide Inlet pressure of relief valve Vs Flow rate curve during detail engineering.
j.	Vendor to provide Maximum & Min. set pressure range of safety relief valve during detail engineering.
l.	Differential pressure (ΔP) equals inlet pressure (set pressure plus overpressure) at flowing conditions minus back pressure.
m.	Vendor to share Back pressure flow correction factor curves.

ENERGISING QUALITY	**PROJECT NUMBER: VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

TECHNICAL SPECIFICATION-CNG CAR & BUS DISPENSERS

DOCUMENT NO	1023	GA	ME	TS	3010

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C1	06.08.2022	ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

CONTENTS

1. INTRODUCTION 3
2. PROJECT REQUIREMENTS 3
3. PROJECT DETAILS & GUIDELINES FOR EQUIPMENT DESIGN 4
4. OPERATION & CONTROL PHILOSOPHY 4
5. DESIGN PHILOSOPHY 4
6. APPLICABLE STANDARDS & CODES 5
7. GAS COMPOSITION 6
8. TECHNICAL SPECIFICATIONS OF MAJOR ITEMS 7
9. HAZARDOUS AREA CLASSIFICATION & EQUIPMENT SELECTION 22
10. CALIBRATION & CERTIFICATIONS 23
11. INSPECTION & TESTING 24
12. DISPENSER PERFORMANACE 25
13. TECHNICAL SUPPORT 26
14. REQUIREMENT OF TECHNICAL SUPPORT IN AUTOMATION SYSTEM 26
15. TRAINING REQUIREMENTS 27
16. PACKAGING & PROTECTION DURING SHIPPING 28
17. PERFORMANCE GUARANTEE 28
18. DATA & DRAWING DETAILS 29
19. ENVIRONMENTAL & SITE CONDITION 29

1. INTRODUCTION

GNGPL, the acronym for Goa Natural Gas Private Limited was incorporated on 13th Jan 2017. It is a joint venture company of GAIL Gas Limited and Bharat Petroleum Corporation Limited.

GNGPL is committed in supplying safe and uninterrupted natural gas to domestic, commercial, industrial and automotive sector in North Goa & Ponda. Further Ministry of Petroleum and Natural Gas has also recognized GNGPL as Central Government authorized entity to carry out the CNG Station facilities in North Goa Ponda.

For filling of Compressed Natural Gas (CNG) to Commercial & Private Vehicles (CNG Bus, Car, auto etc.) through Filling Stations & setting up of CNG filling Dispenser with its Infrastructure are the prime objectives of this Specification.

2. PROJECT REQUIREMENTS

The project requirements will be as define in respective SOW for CNG Bus, Car & Dual Car and Bus Dispenser. The Supply and Installation complete with all auxiliaries & features required for efficient & safe operation, in accordance with this Technical Specification, Data sheets & other enclosures at the CNG station is included in the Scope of Vendor. **Natural Gas shall not be used for pneumatic controls type of Dispenser and Instrument air / Exe proof electronically controlled solenoid shall be used for such purpose.** The metering system shall be Coriolis true Mass Flow System. Bus Dispenser shall be as per the Data sheet & Specification defines elsewhere in this Technical Specification.

2.1 The Dispenser Model and Mass Flow Meter or Dispenser Model using a Mass Flow Meter part of Dispenser offered by the vendor shall be certified from the Weights and Measures or any other statutory authority of the Country of Origin as well as shall also certified by the Weights and Measures, India. (Ministry of Consumer affairs). The offered Dispenser model must also be Type Approved by the Chief Controller of Explosive (CCOE), Govt. of India as per Gas Cylinder Rules, 2016 (latest).

2.2 Vendor shall use Calibration Unit During testing of Dispenser at Factory & site for checking the Batch accuracy in the form of Master Meter (Master Mass Flow Meter) The Calibrator Master Meter should be certified by Weights and Measures or any other statutory authorities as certified Custody transfer meter of the Country of Origin (such as PTB, NMI, Trans Canada Calibrations, (TCC) Canada, Colorado Engineering Experiment Station Inc. (CEESI) USA, South West Research Inc. (SWRI) USA, PISGAR, etc.) and in India by FCRI. The calibration shall be not more than 2 months old at the time of supply.

3. PROJECT DETAILS & GUIDELINE FOR EQUIPMENTS DEESIGN

Technical Data of CNG:

The CNG specification should meet the IS 15403:2000 (E) natural gas quality designation for use as a compressed fuel for vehicles. The proposed specification of the CNG is as follows:

-Gas Temperature -10°C to +70°C
-Oil Content 10 PPM
-Particulate matter Less than 5 microns
-Odorant 20 mg/m3 (Ethyl Mercaptan)

The dispenser shall be suitable for the Climatic Conditions as define in the MR specification.

All Electrical devices shall meet the requirement for the area classification specified in this Technical Specification.

Tubing & other devices shall be so arranged that there is proper access for operation & maintenance. All the Dispensers shall be suitable for Outdoor installation without roof/shed.

4. OPERATIONS & CONTROL PHILOSOPHY

4.1 The CNG dispensing facilities should be designed with minimum operator intervention. Routine maintenance work will be carried out during normal working hours and outside the scheduled refuelling activities. The control system will be fully automated, only requiring manual intervention for connection of the hose and to initiate the filling operations.

4.2 Dispenser shall be use instrumentation air / electronically controlled Solenoid for operation and made available necessary provision for it. The dispensing facilities should be designed to operate for twenty years or At least 1,31,400 hrs. Whichever comes first, without major overhaul of the gas Dispenser .

4.3 To commence refuelling of CNG vehicles, the drivers / operators need to unhook the NGV/NZS connector from the dispenser and hook-up to the inlet of the CNG vehicles. Thereafter, the refueling would commence upon activation either through manual reset switch. The dispenser will automatically stop the refueling process at 200 kg/cm2 (g) and all such refuelling transaction data would be stored and subsequently downloaded into a computer or forecourt management system. The printer attached with the dispenser will generate a cash memo for each hose separately after completion of refilling Process.

5. DESIGN PHILOSOPHY

It is anticipated that CNG Feed consumption, Flow rate, pressure & ambient temperature will be fluctuating. Hence supplier should design the CNG dispenser with optimum degree of flexibility, operability & reliability to accommodate the varying composition of feed, other unexpected flow rate, composition & pressure.

Sl. No.	Type of Dispenser	Type of flow	Flow rate (kgs/min.)	Fill pressure kg/cm2(g)	Fill Hoses Nos./ Dispenser	Remarks
01.	Bus	Hi	75	200	Single	Inlet pressure 255 kg/cm2
02.	Car	Low/Hi/ Med.	15	200	Dual	

The CNG dispensing facilities should consist of standardised modules, which are assembled into a complete system. Each system should be designed in packaged frame, housing the dispensing system.

The design life of the CNG dispensing facilities should be 20 years as minimum. The entire valve operation etc. of dispenser shall be of by Instruments air/ electronically controlled Solenoid. Necessary provision shall be available in the dispenser.

Gas from storage cascade or compressor through priority panel is dispensed to CNG vehicles like Car/Auto, and Bus via dispenser. The CNG Car Dispenser shall have Twin Arms, each with a flow capacity of 15 kg/min and single arm for bus dispenser with a flow capacity of 75 kg/min for under discharge to atmospheric condition. Pneumatic actuated or electro valves shall be used, If Pneumatic actuated valve, Instrument air / Exe proof electronically controlled solenoid then Instrument Air shall use for pneumatic controls of Dispenser. For electro valves operation power requirement shall be provided by bidder during detail engineering.

Each unit to have fully automatic microprocessor based sequencing of 3 cylinder banks connected to dispenser through independent high pressure Stainless Steel (SS) tubes. Dispenser to have pressure control device to restrict fill pressure to 210 kg/cm2g at maximum allowable filling pressure for natural gas vehicle cylinder as per standard supply. Pressure control device to ensure complete shut off of gas flow at the pre-set pressure with dead band shift and shut off error within 2% of range. The preset fill pressure can vary from 150 kg/cm2g to 255 kg/cm2g. The pressure control device to have provision to manually set pressure between above range.

The supplier should prepare the design basis required to meet the requirement with respect to technical specification and liaise with PMC/Client to obtain necessary confirmation and approval.

6. APPLICABLE CODE & STANDARDS

The design, construction, manufacture, supply, testing and other general requirements of the dispenser equipment should be strictly in accordance with the data sheets, applicable codes, and should comply fully with relevant National & International standards, Indian Electricity Act, Indian Electricity Rules, regulations of Insurance Association of India and Factories Act while carrying out work as per this specification. The Vendor without any additional cost and delivery implications should carry out any

modification suggested by the statutory bodies either during drawing approval or during inspection, if any. The following codes and standards (versions/ revisions valid on the date of order) are referenced to & made part of specification:

NFPA52: Standards for CNG Vehicular Fuel Systems
NGV 4.1/ AGA 2-92: Requirements for CNG Dispensing Equipment for Vehicles
NGV 4.2/ AGA 1-93: Requirement for Hoses for NGVs and Fuel Dispensers.
ANSI / NGV1: Compressed Natural Gas Fueling Connection Devices Standard for Fueling Nozzles and Receptacles.
NGV4 / AGA: Requirements for Breakaway Devices for CNG Vehicle Fueling Dispensers and Fueling Hoses.
IS 5572: Classification of Hazardous areas (other than Mines) for Electrical Installations
IS5571: Guide for selection of Electrical Equipment's for hazardous area
OISD179: Safety requirements for Compression, Storage, Handling and Refueling of CNG for use in Automotive Sector.
OISD 113: Classification of areas for Electrical Installations at Hydrocarbon Processing and Handling facilities
NFPA-52: 1992, ANSI, ASTM, NEC, NEMA, ASNZ, OIML, Indian Electricity Rules, Indian Explosives Act., Australian / New Zealand Refuelling Standard. AG901 / NZS 5425
OIML TC8/SC7: Recommendation with regards to CNG dispensers,
The Standards of Weights and Measures Act
The Standards of Weights and Measures (Enforcement) Act,
The Consumer Protection Act, 1986.
The standards of Weights and Measures (General), Amendment Rules, 2009 – Part (Compressed
Gaseous Fuel (CNG) Measuring Systems for Vehicle.

Any other Codes & Standards mentioned elsewhere in this Job Specification / M.R. or which has required to be complied with as per the prevailing Government of India regulations shall also be followed. All Electrical devices shall meet the requirement for the area classification specified in the documents. Tubing & other devices shall be so arranged that there is proper access for Operation & Maintenances.

7. GAS COMPOSITION TO BE HANDLED BY DISPENSERS

Component	Design case Mole %
Methane	94
Ethane	1.2
Propane	1.0
i-Butane	0.4
n- Butane	0.00
i- Pentane	0.00
n- Pentane	0.00

Carbon Dioxide	1.8
Carbon Monoxide	0.00
Nitrogen	1.6
SUM	100

NOTE: -

- Oxygen: Not more than 0.5% mole.
- Total non-hydrocarbon: Not more than 2.0 mole%
- Total Sulphur including H2S: Not more than 100 ppm by weight.
- Expected H2S content not more than 4 ppm by volume
- Water content: Less than 112 kg/MMSCM specific gravity
- Mass density (kg/Sm3): 0.736
- Molar mass (kg/K-mol): 17.3551
- Apart from Gas composition, the proposed specification of the CNG is as follows:
- Gas Temperature: -10ºC to +70ºC
- Oil Content: 10 PPM
- Particulate matter: Less than 5 microns
- Odorant: ≤20 mg/sm3 (Ethyl Mercaptan).
- The CNG specification should meet the **ISO 15403:2000 (E)/ IS: 15958** natural gas quality designation for use as a compressed fuel for vehicles.

8. TECHNICAL SPECIFICATIONS OF MAJOR ITEMS

The specifications described herewith are intended to give vendor the technical & operating conditions the Dispenser must fulfill. These are to be referred along with relevant description including in earlier sections. Vendor may indicate in his offer, the additional features, which his dispenser has in terms of better design, enhance reliability etc., however such feature may be accepted subject to Client's review and approval.

FOR DISPENSER

The Bus dispensers shall be designed to handle flow rate of ≥ 75 kg/min under discharge to atmospheric condition and for car dispenser to handle flow rate of ≥ 15 kg/min. The dispensers shall be suitable for a turn down of not less than 10:1 on flow for Car and 20:1 for Bus. The normal operating pressure of CNG at dispenser inlet shall be 255 Kg/cm2(g). However, supply from dispenser to the Bus shall get positively cut off at outlet pressure of 200 Kg/ cm^2 (g) to ensure the safety of the vehicle. Dispenser shall be suitable for Outdoor installation with or without roof / shed.

Each Dispenser should have following specifications:

8.1 It should be fast fill electronic type and display the following key information on the dispenser with liquid crystal back-lit display for both day & night viewing showing:

8.2 Quantities of gas dispensed in kg (Min. 6 digits in 2 decimal points i.e., 0000.00) in one row.

8.3 Unit cost of gas dispensed in Rupees, R.s/kg (Min. 5 digits in 2 decimal points i.e., 000.00)

8.4 Complete transaction value in R.s (Min. 7 digits in 2 decimal points i.e., 00000.00) in one row.

8.5 There should be 4 displays, two on each side of the car dispenser (total 4 sets of 3 rows displays for each dispenser).

8.6 There should be 2 displays, one on each side of the bus dispenser (total 2 sets of 3 rows displays for each dispenser).

8.7 Displays must remain active for at least 15 minutes after power failure.

8.8 There should be provision for Manual pre-set of meter in dispenser unit by key pad or other methods with (Min. R.S. 00000.00) & (Min. kg. 0000.00) during fueling to vehicle.

8.9 The decimal point required being adjustable through software programmed.

8.10 The complete transaction value can be round off to nearest Rs (less than 0.5 considered to be 0 and ≥ 0.5 will be considered to 1 Rs) through software to avoid transaction related dispute.

8.11 The display should read previous batch reading even after power failure.

8.12 Dispenser electronics shall be so designed that it would always record flow detected by the flow meter irrespective of start stop of the dispenser. I.e., the dispenser totalizer and the mass flow meter totalizer shall record the flow.

8.13 On restoration of power, after power failure or on repeated switching "on & off" power, the dispenser control shall not take any command till the measurement circuit is fully activated (Measurement circuit includes mass flow meter, totalizers, dispenser display etc.). After the full activation of measurement circuit, the dispenser shall start normal dispensing operation after activation of neutral switch, i.e. even if the dispenser neutral switch is in "ON" position immediately after the power restoration, dispenser should not start until measurement circuit is fully energized.

8.14 Non-reset table and non-volatile inbuilt **totalizers up to 999999.99 for total CNG** sold in KGs with an independent battery backup. Since these dispensers are used for custody transfer purpose, the totalizers should not reset in any eventuality not even in case of electronic failure. Reset to zero of totalizer shall be performed by the dispenser electronics automatically when the maximum value reached. The Non-resettable Mechanical Type Totaliser Counter shall be provided which can be visible from front compulsorily if Mass Flow meter is not having integral display the vendor should provide suitable arrangement outside the flameproof electronic box (on the dispenser's body) for reading the totalizer.

8.15 Physical design should be of stainless steel body with doors/ panels to minimize corrosion and ongoing wear and tear. The dispenser should have tamper-proof locking arrangement. The cabinet should be suitably designed to accommodate all valves, fitting flow meter and all required electronic equipment. **Wire mesh net to be provided at the base of dispenser to avoid entry of rats, lizards etc.**

8.16 Front/side mounted nozzle come with lockable holder and safety lever / latch to firmly hold the nozzle when not in use. Two nos of holster/cradle for filling nozzles along with weather caps for the protection of nozzles. Holster / cradle shall be suitable for Sherex CT-5000 Nozzles or equivalent for Bus and NGV/NZS for Car and one each type for Cur cum Bus Dispensers.

8.17 Each dispenser side should be equipped with authorization / on-off switch and liquid filled 4 inches dial pressure gauge (0-400 kg/cm2) showing the vehicle filling pressure for each filling arm. Vendor shall provide a bypass isolation valve with associated tubing to facilitate routine servicing calibration of pressure gauges without shutdown of the dispenser.

8.18 The Dispenser shall have ready to start delay of around one minute after each Power On and to start next batch filling. (Adjustable on site).

8.19 One no. Bubble tight Manual Shut-off valve for each fill hose has to be considered.

8.20 For **Bus Dispenser** the gas tubing inside the dispensers shall be **SS316, 3/4" OD with a ¾'' SS 2 way ball valve at inlet and ¾'' OD end connection** suitable for connecting with **¾'' OD Tube.** For **Car dispenser SS 316, ½'' with ½'' to ¾'' adopter for Interconnecting tubing /piping, fittings, high flow valves** shall be used. NRVs shall be provided as required.

8.21 NRV's Shall provided on each individual banking system for flow smoothness & zero reverse flow.

8.22 One set each of **(1/2'' for car with ½'' to ¾'' adopter)** & **isolation 2 way ball valves** complete with venting line valve and end plug should be installed on the inlet steel pipe of the dispenser. The valve should be located immediately before the dispenser and should be accessible to the maintenance personnel. Dispenser end **connections should be (1/2'' for car with ½'' to ¾'' adopter, ¾'' for bus. tube fitted with (1/2'' for car ¾'' for bus) union with nut and front and back ferrule.**

8.10 **Fast Fill 3 Bank sequencing System for Car (Low/Med./High) & BUS Dispenser have Single bank fill system.**

8.23 **Overfill protection** shall be through electronically programmed hose to terminate the fill after 200 Kg/cm²g. Vendor shall include 2 nos. transducers or one transducer with one no. pressure micro switch or one transducer with one no. pressure regulator per hose of suitable range for sensing the pressure. **Pressure relief valve shall be provided to avoid overfilling. Pressure Relief valve set pressure shall be at 220 kg/cm²g with resetting at 215 kg/cm²g. Relief valve setting has to be adjustable from 205 kg/cm²g to 240kg/cm²g with resetting at 200 to 235 kg/cm²g respectively.** 2 Nos. transducer or one transducer with one no. Pressure micro switch or one transducer with one no. pressure regulator per hose has been envisaged to terminate the filling. If due to some malfunctioning, transducers or switch are not working well, relief valve shall POP for safety purpose to avoid over filling.

8.24 Built-in coalescing unit of 3-5 microns at inlet of each bank to be able to trap particulate and carried over oil at the inlet with manual drain valve. Vendor has to provide Suitable differential pressure Gauge across each filter with indication to detect the filter status and to collect the drained oil outside the dispenser by necessary tubing.

8.25 Easy to read lighted display - explosion proof backlighting or LED to be provided. Display must be of IP 54. Display should show the proper error code during shutdown.

8.26 The components of the flexible hoses are to be factory tested after assembly and before use to at least 5,000 Psig. Copies of test certificates should be provided together before the delivery of the dispenser unit.

8.27 Connection for the flexible hose should be designed with a burst pressure of at least four times the most severe pressure and temperature conditions expected. Necessary certificate shall be submitted along with supply.

8.28 ESD button (ESD Button to be of Mushroom Type Only) to be mounted on both side of the dispenser front panel and to be easily reached during emergencies. This should close filling from each arm of dispenser.

8.29 Refuelling procedure / instruction complete with diagram or icons type figures should be installed on each side of refueling hoses for each dispenser unit.

8.30 Dispenser electrical equipment and instrumentation wiring should be approved to meet the hazardous area classification Class-I, Division I, Group D as per NEC or Zone I, Group II A/ II B as per IS/ IEC, certification required on all components.

8.31 Filling of vehicle from the dispenser (Car) should be of the following sequence:

1st sequence - from low bank and (high) initially
2nd sequence - from medium bank
3rd sequence - from high bank

8.32 Filling of vehicle from the dispenser (Car) should be of the sequence with 6 nos. of Valve (Electromagnetic type or Pneumatic type) per dual hose Car dispensers & make shall be as per approved list.

8.33 Filling of vehicle from the dispenser (Bus) should be of the following sequence:

1st sequence - from High bank (high) initially

8.34 Filling of vehicle from the dispenser (Bus) should be of the sequence with 1 nos. of Valve (Electromagnetic or Pneumatic type) per Single hose bus dispenser & make shall be as per approved list.

8.35 The following sequence shall automatic and controlled by microprocessor or PLC based.

8.36 The on-off solenoid shall have brass body & only in case of Namur mounting aluminum body. Venting of air should be passage in such a way that venting of air cannot be obstructed either in the solenoid or in the actuator. The valve with actuator assembly and its accessories like solenoid valve should be designed as per Fail to close / Air to open. The opening and closing time of the actuator should be well specified to Client/PMC and should be designed so that to operate with in minimum required time.

8.37 All Instrumentation shall equipped with Bleed valve or manifold valve for venting of gas on maintenance conditions.

8.38 All sequencing valve shall be designed to operate on Fail safe to close mode.

8.39 Dispenser equipment such as pressure gauge, authorization switch, emergency shut-off valve, filling nozzle, ESD button should be provided with **labeling / tagging.**

8.40 Temperature compensator to limit fill pressure to an adjustable value (the normal value 200 kg/cm2 (g)) equivalent at 15 deg C and pressure with normal value 200

kg/cm2g shall be provided. Temperature compensation provision shall be provided and the facility to enable or disable the same also to be available in dispenser.

8.41 Dispenser should be automatically and immediately & other condition for shut off CNG supply to each fill hose individually in case of:

I. Power failure or Excursion beyond permissible limit.
II. Loss of Display
III. Power Failure of Mass Flow Meter
IV. Flow beyond High and low limits
V. Failure of Metering
VI. Failure of Totalizer
VII. Overfill of quantity or pressure
VIII. Failure of pressure sensing transducer.
IX. Failure of Pneumatic ball valve / electro valve
X. Repeated operation of Reset or Start/ Stop switch. The number of start / stop of reset switch for starting gas refueling operation shall be counted. If it exceeds three times in a span of 20 seconds then the dispenser shall stop the further operation and display an error.
XI. Removal of any electrical wire connection to controller.
XII. Program step is in "HOLD" due to any error.
XIII. Flow meter signal shall be considered as the highest level of interrupt. Thus, it shall not be possible to fill any vehicle cylinders by repeated operation of reset switch. If reset switch is operated very frequently beyond the set value, it shall disable the dispensing operation.
XIV. The open circuit / short circuit faults in totalizers shall be detected and dispenser shall display an error and inhibit the operation.
XV. Dispenser shall start counting Gas as soon as gas flow is detected & should not wait for "ON" command. An error shall be generated on dispenser display in case of gas flow with Dispenser in "OFF" condition. The error shall be resettable only by Authorized personnel.
XVI. Designing of the dispensers would take into account severity of service. The dispensers shall be designed in such a way as to operate in cyclic (start, fill, stop, start …) round the clock basis with about ½ to 1 minute (typical) interval between stop and start modes.
XVII. Dispenser interlock deactivates & no gas flow occurs when nozzle return to original hanging position on that situation display must be return to zero automatically.
XVIII. Dispenser must be able to dispense the gas flow by pressing manual push button & similarly stop the sequence flow by pressing stop push button.
XIX. Total Price and Quantity of gas delivered shall be displayed in dispenser display at least 5 Min. until next transaction is initiated.

8.42 Vendor should indicate overall pressure loss of dispenser from inlet of the dispenser up to outlet probe including mass flow meter, interconnecting tubing, valves, hoses, nozzles etc.

8.43 Momentarily flow of gas shall be registered in mass flow meter totalizer and simultaneously in dispenser totalizer.

8.44 The dispenser shall be shipped in fully wired and assembled condition. Only gas supply, Inst. Airline connection and power supply connection shall be made on site.

8.45 Vendor should include in his scope provision of base frame & Foundation bolt to be embedded in the foundation. Base frame to be supplied during dispatch. Frames to be supplied in separate packing.

8.46 All the vents (e.g., Actuator, PSV, Vent hose) shall be taken out from top of the dispenser & height of vent tube shall as per PNGRB Guideline **INFRA/T4S/SC-6/4/18.**

8.47 The vertical portion of the vent pipe shall not be provided with any intermediate thread joint. And if vent tube fitted nut & ferrule arrangement then it shall be properly clamed through clamp support angle for wind & high gas velocity effects may bend the tubes.

8.48 Vendor should include necessary licensed system and application software for dispenser electronics one set each for Car and Bus, required for calibration and faultfinding diagnostics. (As applicable).

8.49 The normal operating pressure of CNG at dispenser inlet shall be 255 Kg/cm^2 (g). However, supply from dispenser to the Bus shall get positively cut off at outlet pressure of 200 Kg/ cm^2 (g) to ensure the safety of the vehicle.

8.50 Once the particular-cycle of filling has been completely stopped (on achieving the maximum fill pressure and/or minimum flow rate) then next filling can be started only after initialization.

8.51 The normal operating temperature of wetted parts of dispenser shall be (-) 10 ° C to +70° C.

8.52 Designing of the dispensers would take into account severity of service. The dispensers shall be designed in such a way as to operate in cyclic (start, fill, stop, start.) round the clock basis with about ½ to 1 minute (typical to be adjusted as per requirement) interval between stop and start modes. The dispenser also to work satisfactorily when the time between stop and start is indefinitely high, e.g., during fill time or when the dispenser is commissioned after it was decommissioned for prolonged period or in storage after initial commissioning. For this purpose, if any specific storage facility is required, the same to be indicated by the bidder.

8.53 Vendor shall include any other item required for safe and accurate operation of Dispenser.

FOR DISPENSER CABINET

8.54 Complete cabinet shall be of Stainless Steel (SS316) and shall have tamper proof locking arrangement. Cabinet wall thickness shall not be less than 1.6 mm. Cabinet shall be sized to accommodate all electrical, electronic and mechanical components for metering and display within the cabinet. Cabinet shall be designed to protect all tubing, pressure gauges, valves, fittings, electrical & electronics item from tampering, rain, dust, vermin etc. Dispenser cabinet shall be provided with adequate size bottom opening for the entry of gas supply line/lines and power supply connections. Adequate ventilation shall be provided so that there is natural convection current and cooling takes place inside. Cabinet shall be structurally robust and should not resonate at the frequencies emanated during normal flow or during choked flow through the nozzles, breakaway coupling or valves etc.

8.55 Appropriately plugged drain valves of the filter outside the dispenser housing with suitable arrangement to collect the drained oil to facilitate the operator to drain the oil on regular basis without requiring opening the lock of the dispenser cabinet. The layout of tubing & other component should be such too gives unhindered access to all parts & maintenance becomes easy. Common drain valve shall have lockable arrangement accessible to DSM for draining of dispenser. Each filter drain line should have NRV 1/4" OD SS with needle valve for manual draining by operator & Inlet Ball Valve arrangement in series.

8.56 Client's Logo and name to be displayed on both sides of dispensers, in Client approved color scheme. Client's Logo and name shall be painted on stainless steel panel with an appropriate colored background or alternatively, vendor shall provide self-adhesive PE film sheet with Client's Logo and name. The artwork shall be of three colours. The colours, Logo size and name size shall be informed to successful bidder during detailed engineering.

8.57 The dispensers shall be shipped in fully wired and assembled condition. Only gas, air supply and power supply connection shall be made at Site.

8.58 Hi-Mast shall be of appropriate height and shall allow free movement of flexible hose, prevent strain on the fill hose connection and avoid touching of ground.

8.59 Dispenser shall be supplied with Hardware required for Weights & Measures certification i.e., provision for sealing of Mass Flow Meter by Weights & Measures shall be provided.

8.60 Vendor shall include ball valves associated with pneumatic actuation / Exe proof electronically controlled solenoid for dispensing of gas. Three actuator valves / Exe proof electronically controlled solenoids per hose outlet (total of 6 valves per dual hose dispenser) and in addition to this there should be one main actuator valve / Exe proof electronically controlled solenoid per hose (After mass flow meter).

8.61 The number of start / stop of reset switch for starting gas refuelling operation shall be counted. If it exceeds 03 nos. in a span of 20 seconds then the dispenser shall stop the further operation and display an error in dispenser.

FILL HOSE & FILL NOZZLE

8.62 Electrically conducive (fill & Vent) hose shall be included for supply of Dispensers meeting the requirement of NFPA-52 / CSA NGV 4.2-2014 /CSA 12.52-2014 Fill hose shall have Sherex CT-5000 Nozzle or equivalent suitable to fill Sherex/OPW CL-5078 bus or Car receptacle. Nozzle shall be designed for high frequency use with a min. cycle of 1,00,000. The end connection for the main and the vent hose shall be SAE (JIC) 37 deg Female Swivel 1-1/16" - 12 UNF.

8.63 Specific Conductivity of Filling Hose shall be 0.512 Mega ohms for length Up to 180" (appx. 4.5 Meter) and, 3.5 Mega ohms for length Over 180" and up to 1200" (Appx. 30 Meter)

A) FOR CAR DISPENSER

8.63.1 Two CNG flexible electrically conductive twin (fill and vent) hoses with two nozzles and vent hose one with captive vent transit fill nozzle including 3 way valve for filling or venting are required along with weather caps for the protection of nozzles.

Out of two hose one should be fitted with NZS and other with NGV nozzle. However, the hose with NGV nozzle should have suitable adapters (NGV 1 Type 2 Class A / NZS 9/16" fill probe) attached with it to fill both type of filling systems i.e. NGV1 Type2 or NZS-5245 nozzles. Vendor should also include supply of breakaway coupling, suitable for NGV Industry, in each hose. Each hose should be 3/8" ID working pressure 255 kg/cm2 (g) and at least 4.0 Meter long.

I. Electrically conducive fill hose (Fill & Vent) meeting the requirement of NFPA-52 and NGV

II. The nozzles in the filling Hose in the CAR dispensers should be as per the following table: NZS-5425 fill nozzle in both arm with NZS fill probe nos.

III. Vendor shall also include supply of Breakaway coupling in the fill & vent hose as complete dispensing Arm. Hose shall be 3/8" ID 5000 psig. at least 4 m long.

IV. Hose shall be in two pieces both for fill & vent. Both pieces of the hose should be connected by the breakaway.

V. Long refilling Hose should be provided with protective guard.

VI. Hose crimp to be provided with protective sleeve.

VII. Hose crimp should be of SS and have protection sleeve over it to avoid short circuit with battery terminal.

VIII. Hose crimp with retainer springs shall be SS304 for avoid environmental corrosion and rusting.

NOTE: - Vendor to demonstrate the function of at least one breakaway coupling at Site to client Representatives.

B) <u>FOR BUS DISPENSER</u>

8.62.2 One CNG flexible electrically conductive twin (fill and vent) hoses with nozzles and vent hose with one Sherex CT-5000 (with captive vent) transit fill nozzle including 3 way valve including NGV valve for filling or venting are required with weather caps for the protection of nozzles. Vendor should also include supply of breakaway coupling, suitable for NGV Industry (NGV 1 Type-1 Class-A nozzle) in hose. Each hose should be 1/2" ID, 5000 psig, working pressure 255 kg/cm2 (g) and at least 4.0 Meter long. End connection of main and vent hose shall be SAE (JIC) 37° female swivel 1 1/16" -12 UNF.

i. Electrically conductive fill hose (Fill & Vent) meeting the requirement of NFPA-52 and NGV 4.2.

ii. Fill hose shall have Sherex CT-5000 Nozzle suitable to fill Sherex/OPW CL-5078 bus receptacle. Nozzle shall be designed for high frequency use with a minimum cycle of 1,00,000. Vendor shall also include supply of breakaway coupling in the fill & vent hose as complete dispensing Arm. Hose shall be ½'' ID 5000 Psi(g) and at least 4.0 m long.

iii. Hose shall be in two pieces both for fill & vent. Both pieces of the hose should be connected by the breakaway.

iv. Long refilling Hose should be provided with protective guard.

v. Hose crimp should be provided with protective sleeve.

vi. Hose crimp should be of SS and have protection sleeve over it to avoid short circuit with battery terminal.

viii. Hose crimp with retainer springs shall be SS304 for avoid environmental corrosion and rusting.

NOTE: - Vendor to demonstrate the function of at least one breakaway coupling at Site to client Representatives. Breakaway shall be as per the ANSI/IAS NGV 4.4 - 1999.

C) FOR NOZZLES

-Both hoses shall be fitted with NGV-I nozzle for filling of vehicles Specification for NGV1 nozzle is as follows:

Nozzle Type	NGV-1 TYPE 2, CLASS B
Normal working pressure	PN 200 bar
Temperature Range	0 deg C to +85 deg C
Max. Length	Max. 115 mm
Cv minimum	1.05
Max. weight	0.65 kg
Min flow rate	1500 SCFM @ 3000 Psig
Max nozzle body diameter	2 inches
Filling Line Male Thread	UNF 9/16"-18 Female or ¼" Male NPT

D) FOR 3-WAY VALVE

Vendor shall include the supply of 3-way valve with each hose for filling & venting of gas. Specifications are as follows:
Connection Size : ¼ "NPT Female (All three end)
Pressure Rating : 5000 PSI (Min.)
Temperature Rating : 0 to 70 deg. C
Minimum Life : 40000 cycles at site conditions (one on & off is considered as one cycle)

Material of construction
Body : SS 316 as per ASTM A276 or as per ASTM A479 or ASTM A 182
Ball : SS 316 ASTM A479 or Alloy S21800 as per ASTM A276
Stem : SS 316 ASTM A479 or as per ASTM A276
End connection : SS 316 ASTM A479 or ASTM A 276
Seat carrier : SS 316 as per ASTM A276
Seat springs : Alloy X-750 / AMS 5542 / 17-7 PH
Seat : PEEK
O-rings : BUNA-N or BUNA-C or Fluorocarbon FKM
Backup rings/bearings : PEEK / PTFE
Orifice Size / Cv : min 4.75 mm / min 0.62
Weight: Max. 350 grams.

Design Features
1. The valve should be of trunnion ball design.

2. Blow out resistant two-piece ball/stem.
3. Should have positive handle stoppers.
4. Flow direction indication must be there on handle.
5. Directional indication must be provided for panel mounting.
6. Complete repair kit must be available and comprises of (all internals

installed in valve body) following items:

a) Stem

b) Stem washer

c) All sealing rings for stem i.e., stem O-rings, primary backup rings, secondary backup rings etc.

d) All Seat with carrier

e) All Seat retainer O-rings, backup rings, guide, springs etc.

f) Connector end seals

g) Ball trunnion

h) Trunnion bearing

8.64 One number of holster/cradles for fills nozzles along with weather caps for the protection of nozzles. Front/Side mounted Nozzle with lockable holder and safety lever/latch to firmly hold the nozzle when not in use shall be provided.

8.65 Vendor has an option to supply the dispensers either with pneumatic operated ON-OFF control valve or with electrically operated full-bore bubble tight ball valve made valve made of ANSI 316 SS for ON-OFF control of flow. Vendor shall take approval of make of valve from Client/ Consultant. Vendor to Vendor shall ensure that the system design in such a way that in both options, any gas if passes, should be recorded by mass flow meter and there should not be any possibility of un metered gas supply through dispenser in case of malfunctioning of ball valves.

8.66 In case of pneumatic operated Ball valve, the actuator and Ball valve assembly shall be fatigue free and retain tight shut off characteristics at least for 8000 operation hours. These actuators would be air fail to close spring-loaded type. Linkage with ball valve would be tamper proof by providing a sealed sleeve so that ball valve stem is not accessible from outside easily. Also, the actuator cannot be mechanically rotated from outside even though position indicator would be provided on its body. Venting of air would be passage in such a way that venting of air cannot be obstructed either in the solenoid or in the actuator. The combination of SOV, pneumatic actuator and Ball valve would constitute power fail-safe valve. The whole system has to be very fast acting and response time fraction of second so that if the flow were terminated at any point of dispensing, the slippage would be always within the accuracy limit.

The Instruments air tubing inside the Dispenser shall be minimum ¼" OD and shall be of SS 316 material. The pressure gauge in inlet line of instrument air has to be provided.

8.67 Coalescent filter shall be provided at inlet of bank supply line with manual drain valve to ensure that the oil carryover in the **CNG being filled to Vehicle is <5 PPM. Filter elements made of paper shall not be accepted. For filter status, necessary Differential pressure gauge (DPG) shall be provided with indication marking.** Vendor to provide appropriately plugged drain valve outside the dispenser housing with suitable arrangement to collect the drained oil outside the dispenser by necessary tubing. Filter size shall be in accordance with max flow through the Dispenser.

8.68 **Vendor shall supply the application program, ladder logic, and list of error codes with description for programming the dispenser parameter used in Dispenser Electronics.**

8.69 After power on, the controller delay time to start filling be such that the Mass Flow Meter and Pressure Transmitter are initialized properly to void any un-metered gas.

8.70 Vendor shall ensure that the system design in such a way that in process, any gas if passes, should be recorded by mass flow meter and there should not be any possibility of unmetered gas supply through dispenser in case of malfunctioning of ball valves.

8.71 The offered Dispensers for dispensing CNG shall be Type/ Model approved by from Statutory Authority of Country of Origin and the Chief Controller of Explosive (CCOE), Govt. Of India as per Cylinder Rules, 2004. **The equipment's & their make for particular model shall be same as specified in the certificate issued by CCOE, for any change fresh CCOE certificate has to be obtained and submitted before commissioning.**

E) DATA RECORDER

8.62.3 The dispenser should have an inbuilt Automatic Refuelling Data Recorder unit for the each independent refueling line. The dispenser system should be capable of storing up to 1,250 refueling transactions data with date & time stamping and such data should be downloaded frequently into another portable computer with compatible Microsoft software (software in CD to be provided by Supplier together with the license) to store the transactions data. This information can either be down loaded as a report from a POS system of client through RS 485 communication. Vendor shall provide battery backup of 72 hrs. to the RAM of dispenser electronics.

8.62.4 The dispenser electronics software should be capable to print all alphanumeric refueling data (as stated below) of each fill point of the dispenser as a receipt for the respective vehicle through the point of sale (POS) Computer / printer (both of client) and shall generate the cash receipt for each refueling operation. The Communication port for the interconnection of dispenser to POS shall be available in the dispenser and shall be intrinsically safe. Following information required on the receipt for each refueling:

-Vehicle Identification Number.
- Quantities of gas dispensed in kg (6 digits in 2 decimal points i.e., 0000.00).
- Unit cost of gas dispensed in Rupees, Rs/kg (5 digits in 2 decimal points i.e., 000.00).
- Complete transaction value in Rs (7 digits in 2 decimal points i.e., 00000.00).

8.62.5 One number non-resettable and non-volatile inbuilt totaliser up to 999999.99 (8 digit and a decimal) for total CNG sold in KGs (Total refuelling

transaction) with an independent battery backup shall be provided for each dispenser. The display should have facility to read previous batch reading even after power off/ failure. **The dispenser electronics totalizer shall get updated continuously with each batch filling and must retain the transaction value even after power supply off/failure any time during online filling cycle.**

8.62.6 The dispenser parameter setting shall be password protected. Facility of change of password also to be provided to enhance the security of password.

F) INSTRUMENTATION & CONTROL

- All the Electrical and Electronics Instruments shall be installed in accordance with NFPA 70, IEC for gas Group II A, II B & Temperature Class T3 and shall have approval of a recognized certifying authority. For all intrinsically safe /flame proof equipment / instruments the certifying authority will be BASEEFA, FM, UL, PTB, LCIE and in India CCOE, India, Nagpur. The applicable certificate shall be provided at the time of Inspection & Testing at works.

- All the auxiliary instruments like Mass Flow Meter, Pressure Transducer / switch, ESD, SOV etc. shall be on 24 V DC supply only. Vendor shall provide suitable power conditioning unit / Stabilizer, barrier / isolator etc. for fail safe operation in Hazardous areas, class 1 div 1 Group D as per NEC. Vendor shall provide the power & utility consumption for the instruments used in the Dispensers.

- All tubes, Valves and fitting shall be leak proof & shall be Swagelok / Parker make and suitable for respective

- pressure rating. The tube shall be of Sandvik Make & suitable for respective pressure rating.
- Complete control loop would be so fast that if filling were terminated at any point of filling, the flow would stop immediately. Reset Switch assembly should be suitable for failure free operation.

- In case the power supply is beyond acceptable limit the dispenser shall not start at all. The controller shall provide an operational alarm and it shall be displayed on LCD display.

G) DISPENSER ELECTRONICS

- The Dispenser Electronics shall be Microprocessor based and inbuilt with the dispenser. All the electronic cards shall be located in flameproof boxes inside the dispenser cabinet. The controller electronics shall be immune to EMI interference. The dispenser electronics shall have self-diagnostics features and should generate error code accordingly. The error code shall be display (for some time for even power failure).

- Vendor should define such error codes and procedure for their rectification in Maintenance manual. Password protection should be provided for entry of data through keypad. The keypad shall be provided inside the display electronics cabinet and can't be accessible from outside. The change in dispenser setting shall be done through laptop computer or hand held communicator through the port provided for this purpose with security lock.

- For downloading the CNG refuelling transaction data to Client's POS computer, RS 485 serial port (for RS 232 port, provide with Converter for RS 232 to 485 including all hardware and software) shall be provided. The programming, tuning, adjusting of the controller would be through dedicated software residing to a PC with the window Operating System.

- Dispenser shall be capable of communicating with outside system using the open system architecture / Protocol. It is possible to transfer the data through twisted pair wires, transaction data, flow meter data to RTU of SCADA. All the flow data, trip status and power supply status shall be available.

- The client shall provide SCADA and RTU. The Dispenser shall have facility to read & write the data from remotely through SCADA. The dispenser should have provision and dedicated communication card & port for connection to RTU for monitor and control the transaction parameter through serial communication.

- The detail requirements of SCADA will be communicated to the successful vendor during detail engineering. For selection of equipment's compatibility for SCADA system vender shall considered the Modbus RTU protocols, FCC-68 RJ 45 connection type, RS 232 D communication standard, Baud rates up to 19.2K, with configurable software.

- Emergency shut down (ESD) system shall be provided in both side of dispenser and this device, when activated, shall shut off the power supply to the dispenser and gas supply to the dispenser immediately;

  The configuration data for the Mass Flow Meter should be stored in a non-volatile memory or in a dedicated battery backed RAM to protect the data from power off or fluctuations.

H) MASS FLOW METER

- Coriolis True Mass Flow Meter with Integral Display Unit should be provided to ensure accuracy and direct Mass Flow measurement shall confirm to AGA 11 standard and approved for custody transfer metering of CNG at each of the refuelling hose. The microprocessor based control system should be provided to sense, monitor and control complete filling operations on a continuous, uninterrupted basis. The integral display unit shall be mounted inside the dispenser body. The difference in reading between this integral display unit and non-resettable type totaliser shall not be > 1.0%. Each and every Mass Flow Meter "Zeroing" shall be done before delivery from works.

  The Mass Flow Meter design consideration, piping, meter installation, zero verification and proving facility shall confirming to AGA 11 standard. Mass flow meter (Indicating Type) should be designed for custody transfer metering of CNG and meet the following requirements:

  Principle of metering - Coriolis
  Flow Rate - >= 75 kg/min for Bus and >=15 kg/min for Car
  Accuracy - + 0.5% (inclusive of linearity, hysteresis Repeatability
  Repeatability - + 0.3 % or better
  Totaliser - Non resettable Type
  Enclosure - IP65, NEMA 4 & Ex. Proof
  Pressure & Temp influence - Nil

Calibration Traceability - NIST
Pressure Rating of wetted parts - 5365.605 (5200 psi) at 25°C as per ANSI BV 31.3/ASME
EMF effect on sensor and Transmitter - To the requirement of EMC to latest IEC/EN standard
Vibration effect - As per IEC 68.2.6 / SAMA PMC 31.1 (1980) or latest standard
Approval - CE Marking,ATEX , EXi / Exd & CSA-Class I,Div. I
W& M - Statutory authority of Country of Origin and From Ministry of Consumer Affairs, Govt of India
Output to Dispenser Electronics - RS 485/ frequency
Output to be available - RS485/frequency/Analog duly programmed
Inlet to Outlet connection - In line with process connection

- Each flowmeter should be provided with a liquid crystal display (LCD) for ongoing flow monitoring and totalizer. Flow meter signal shall be considered as the highest level of interruption. It shall not be possible to fill any vehicle cylinders by repeated operations of reset switches. Reset time delay is required with adjustable time. Mass Flow Meter shall have diagnostic facility to check live zero, configurable parameter, constants etc. through Laptop.

- Provision for sealing/locking of Mass Flow Meter / Transmitter shall be provided to avoid possibility of tempering during use of Dispenser.

- Vendor should include one set necessary system and application software with hardware including communication cable / converter etc. with licensed required for calibration and fault finding diagnostics of Mass Flowmeter Electronics through Clients Laptop.

- The Mass Flow Meter shall be Coriolis type and shall confirm to AGA 11 standard.

- The Mass Flow Meter shall be ATEX Certified (EXd, Exi) for Zone-I gas environment & CE marked.

- The Mass flow meter Sensor & Transmitter units both shall have CCOE approval certificates.

- The Bidder shall only use Approved mass make mass flow meter as mentioned in vendor list.

- The measuring devices comply with the applicable standards and regulations in accordance with EN 61010-1, "Safety requirements for electrical equipment for measurement, control and laboratory use" and with the EMC requirements of IEC/EN 61326. The measuring system described in these Operating Instructions thus complies with the statutory Requirements of the EC Directives.

I) UTILITY SPECIFICATIONS

Electric Power Supply

- Single phase, AC, 230 Volts ± 10%, 50Hz ± 3% will be provided by Client. Surge protector is to be provided by the vendor at the 230 VAC inlets. All instrument (such as mass meter, solenoid, pressure transmitter/ switch etc.) supply as approved by PESO & ATEX. Suitable voltage conditioning unit shall be in the scope of vendor wherever required & System Earthing shall Solidly Earthed.

Note: Vendor to confirm that supplied dispensers are suitable with the above power supply. Vendor to include suitable voltage conditioning unit in their scope, if required. Instrument air supply @ 5-7 Bar(g) will be provided by client.

- For further details, refer Electrical Specification, attached with this job specification.

J) CODES & STANDARDS

- All electrical equipment and complete package shall meet the requirement of relevant Publications and Codes of Practice of Bureau of Indian Standards, statutory regulations and good engineering practices. Complete system must conform to the latest revisions of the following:

  a. Indian Electricity Act and Rules framed there under.
  b. Fire Insurance Regulations.
  c. Petroleum Rules and any other regulations laid down by Chief Controller of Explosives.
  d. Regulations laid down by local statutory authorities and Electrical Inspectorate.

- Vendor shall provide all assistance required for obtaining approvals from statutory authorities for materials, plant design/drawings and complete installation.

- Where Indian Standards do not exist, the relevant IEC/British/ German (VDE) standards shall apply. Any Other international standard may also be followed provided it is equivalent to or more stringent than the standards specified above.

- In case of any discrepancy/conflict between the specified codes and standards, Owner's confirmation shall be sought before considering of any decision for execution of work.

K) PIPE WORK, VALVES & FITTINGS

- Pipe work should be designed, tested and installed to ensure its safe operation at the worst conceivable conditions of flow, pressure and temperature. All tube fitting and pipefitting shall be leak. proof All the SS fittings shall be double compression ferrule fittings.

- All high-pressure tubing work should be of (1/2"OD SS for car and ¾" OD SS for bus) fully annealed (Bright annealed) seamless conforming to ASTM 316. The piping/tubing, valves, fittings shall be of Parker, sandvik, Tubacex , Swagelok. The system should be "go-no-go"

- gaugeable to demonstrate that fittings are properly tightened. Where ever possible valves and control devices should incorporate the same end connector system. The number of fittings used should be minimised. The Supplier should ensure that personnel assembling the pipe work should be competent in the system employed.

- The preferred valve types for isolation are ¼" turn ball valves. Such valves have similar material to the tube they are attached to. Ball valves must be of good quality and be appropriately selected frequency of use. Ball seats must be suitable for natural gas operation of the gas composition indicated.

- Valves and fittings subject to corrosion must be either inherently resistant, or be coated with a corrosion inhibiting paint or surface treatment.

9. HAZARDOUS AREA CLASSIFICATION & EQUIPMENT SELECTION

9.1 In case of storage, handling or processing of flammable materials within the battery limits of the package, area classification shall be carried out in line with IS: 5572 & Petroleum Rules and 0ISD-179 guidelines where applicable.

9.2 Selection of the type of equipment for use in hazardous areas shall be done in accordance with IS: 5571 and other safety regulations as applicable. The electrical equipment shall meet the requirements of relevant IS, IEC or NEC standards. Increased safety type Ex (e) equipment shall not be permitted for use in Zone-1 areas. For Zone-2 areas, Increased safety type Ex (e) or Non-Sparking Type Ex (n) equipment shall be provided as a minimum, subject to the same being acceptable to statutory authorities. Ordinary safe area type electrical equipment shall not be used in Zone-2 areas (even though this may be permitted by NEC for Div.2 areas).

9.3 Electrical equipment for hazardous areas shall be certified by CMRI and approved by CCOE (or equivalent statutory authority of the country of origin) for installation and use in the specified hazardous area. Flameproof equipment of indigenous origin shall be BIS marked. Vendor shall furnish the necessary certificates indicating such approvals.

9.4 All the electrical and electronic component shall be in flame/explosion proof housing suitable for area classification: Hazardous area, Class 1, Division 1, Group D as per NEC or Class 1, Zone 1, Group IIA/IIB as per IS/IEC, Temperature Class T3, and completely enclosed in a securely lockable dispenser cabinet. No component of the dispenser shall be installed outside the cabinet.

9.5 The Supplier should specify the hazardous area in accordance with the IS 5572 / Australian Refueling Standard AG901 / NZS5425.

9.6 All Instruments should be suitable for an area classification of "Class 1, Group D, Division 1 as per NEC"

9.7 OR "Zone 1, Group IIA /IIB as per IS/ IEC" .

9.8 All dispenser mounted transmitters & pressure, temperature element should be intrinsic safe **"Exia" as per IEC 79** latest version and solenoid valves, switches and related junction boxes should be flame proof **"D" as per IEC 79** latest version. Other special equipment's/instruments, where intrinsic safety is not feasible or available, should be flame proof as per IEC 79-1 latest version.

9.9 A complete dossier of all electrical equipment will be provided, showing area classification and certification of equipment.

EQUIPMENT SPECIFICATIONS

9.10 All equipment shall be complete with all necessary weather protection including tropicalization to prevent damage due to climate, dust and corrosive vapours. The enclosure protection of all equipment's shall be IP: 55 as per IEC specifications.

9.11 Vendor shall be responsible for any damage to the equipment during transit. All packages shall be clearly, legibly and durably marked with uniform block letters giving the relevant equipment material details. Each package shall contain a packing list in a waterproof envelope.

9.12 All electrical components and equipment shall be sized to suit the maximum load under the most severe operating conditions.

9.13 All electrical equipment's shall be supplied with double-compression cable glands, made of nickel-plated brass, tested and certified to use in zone-1, hazardous area. Although the supply is being arranged through UPS System, but in some remote occasions, the power supply may be from DG sets with poor regulations and thus power supply available from Client may contain harmonics, transients and surges etc. The Electronics shall be compatible to the supply system as no transient, surge or harmonics protection has to be provided by Client. Bidder to include suitable voltage protection device/ conditioning unit / voltage stabilizer, as required, in their scope for accurate and safe operation of dispenser.

9.14 We have envisaged solid earthing for the system. However, if specific earthing is required for the system - electronics, the same to be highlighted by bidder; otherwise, the successful bidder shall provide system earthing including making of earth-pits etc.

9.15 Name of the manufacturer, type of enclosure protection and certificate no. with name of testing/Certifying agency shall be furnished with bids / for approval.

GENERAL REQUIREMENTS

9.16 All power supply J.B.'s shall be flame-proof type as per area classification.

9.17 Fill hoses should be conductive type to mitigate the static charges.

9.18 Provision for connecting earth strip at two points inside the dispenser.

9.19 Supply cable entry to dispenser shall be suitable for armoured 2.5sq.mm. 4 cores.

9.20 There should be effective static charges (as generated in hoses) mitigation design. All hoses shall be

9.21 conductive so that auto earthing of static charges (as generated in system) could be ensured. Vendor shall

9.22 submit the requisite documents/demonstration against the same at vendors shop.

10. CALIBRATION & CERTIFICATIONS

- **Mass flow meter, instrument gauges, etc should be calibrated** and such calibration certificates should be presented upon at the time of delivery to site. If any of the calibration certificates is not in order, the Supplier's should replace the affected equipment with valid certificate at Supplier cost. Documentation and obtaining statutory approvals from the country of origin is in Vendor's scope.

- **The offered** Dispenser Model and Mass Flow Meter **must be approved and certified for specified flow & accuracy by recognized authority, i.e.," Weights** and Measures" **or other statutory authorities (of the Country of Origin. Vendor should also get the** Dispenser Model & Mass Flow Meter certified from Weights and Measures, India. (Ministry of Consumer) **. The** Calibrator Master Meter **for calibration purpose must also be certified from** Weights and Measures, Country of origin **or other statutory authorities** (such as PTB, NMI, PISGAR, CEESI etc) and for India from FCRI. **The offered** Dispenser Model **must be approved from** Chief Controller of Explosive **(CCOE) Nagpur as per Gas Cylinder Rules, 2004.**

- All the certificates(s) shall be in English language or in the language of originating country along with English translation.

11. INSPECTION & TESTING

Inspection will be done by client/ consultant in the works of vendor as per the approved QAP. At Vendor's Works

- All the dispensers shall be subjected to Inspection ("Stagewise" if required by Client) by Client's or their Authorised Representative.
- The following activities shall be covered under inspection:
  a) Review of Q.A. documents.
  b) Review of calibration certificates for Mass Flow Meter, dispenser, pressure transmitters, pressure gauges and all instruments.
  c) Review of all statutory certificates including W &M and CCOE certificate.
  d) Review of area classification compatibility of all items including bought out items.
  e) Review of bought out sub-assemblies/major components, test/inspection certificates.
  f) Safety shutdown features as per technical specification.
  g) Automatically and immediately shut-off CNG supply due to abnormalities.
  h) Dimensional checks as per approved drawings and data sheets.
  I) Functional Test All the dispensers shall be tested to demonstrate the functioning of all the components and controls. The simulation test for all the Instrumentation shall also be carried out.
  J) Leak Test of complete dispenser package including final assembly of hoses, PT, PG, manifold block & Safety valves etc.

Performance Test

- All the dispensers shall be performance tested for flow capacity, measuring accuracy and dispenser functioning with CNG or Nitrogen. Vendor shall arrange CNG or Nitrogen as required. Seat leakage test for the Valves and setting of safety valves shall be check.

- During the shop test of dispenser, the dispenser flows capacity from inlet of dispenser to the outlet of filling nozzle is found below the specified capacity the dispenser shall stand rejected.

- During factory inspection & testing vendor shall do the calibration / set point check of all major instruments including Mass Flow Meter and Valves. The calibration of Dispenser Mass Flow Meters shall be done at factory with certified valid Master Meter with accuracy better than supplied MFM with CNG / Compress air at 200 Bar pressure

with at least 10 readings of filling. The accuracy shall be within the range of +/- 0.5 %.

- All the functional testing as per approved QAP shall be done and recorded. During the shop testing if the dispenser batch accuracy is found beyond ± 1.5 % dispenser shall stand rejected.

- In case, during the shop testing, the tests for dispenser performance to stabilize the flow capacity, calibration / set point check of all major instruments & batch accuracy cannot be done, then same shall be executed during site performance test. The dispensers shall be accepted based on the satisfactory results of all the parameters as per tender.

- Functioning with CNG/Nitrogen. CNG/Nitrogen shall be arranged by vendor.

12. DISPENSER PERFORMANCE

The vendor shall guarantee the satisfactory performance of each dispenser as per the operating parameters indicated in data sheets. The dispensers shall be performance tested after installation at site by vendor. Vendor shall carry out tests as required by Govt. Statutory Agencies. Guaranteed performance for Dispensers shall be as follows:

1. Capacity of the car dispenser shall be 15 kg/min and that of bus dispenser shall be 75 kg/min. with design case gas composition, temperature of 550 C with no negative tolerance for errors in instruments and measurements.

2. Batch Accuracy of ±1.5 % or better. The Mass Flow Meter Accuracy shall be + 0.5% (inclusive of linearity, hysteresis & Repeatability error) and the Repeatability will be + 0.3 % or better.

In case above guaranteed parameters are not achieved at site, vendor shall carryout necessary rectification/modification to achieve the guaranteed parameters, without cost & time implication to the purchaser.

COMISSIONING AT SITE

All the dispensers have to be tested for functioning & performance by vendor in presence of Client authorized representative. Any part or component, which is not functioning to the satisfaction of Client, shall be repaired or replaced by the vendor without cost & time implication to purchaser and performance test again carried out. Vendor has to execute performance test of all the dispensers after commissioning for accuracy, repeatability and safety parameters. Vendor to make all arrangements for carrying out performance test viz. Std. Mass Flow Meter, Laptop etc. Vendor shall carry out tests as required by Govt. statutory agencies.

DEMOSTRATION OF OVERFILL PROTECTION

Vendor shall demonstrate the Overfill protection at site and it shall be through electronically programmed so that the hose has to terminate the fill after 200 Kg/cm^{2}g. The performance of 2 nos. transducers or one transducer with one pressure micro switch / Regulator per hose and the Pressure relief valve shall be to be monitored to avoid

overfilling. Relief valve set pressure shall be checked after final installation and demonstrate during trial run of dispenser.

Calibration certificate for all instruments shall be provided at the time of inspection.

13. TECHNICAL SUPPORT

The Supplier's should be responsible to maintain a workshop / warehouse and a team of competent technical support personnel in India to rectify and trouble shoot the problems encountered during the operations of the CNG dispenser. Upon receiving a call from the Company's, the Supplier is expected to response within a 4 hour from the time of call during an emergency situation. During normal maintenance situation, the Company expects the Supplier to response at the earliest from the time of call.

14. REQUIREMENT FOR AUTOMATION SYSTEM IN DISPENSER

It is intended to monitor / control following parameters through automation system: Vendor shall ensure availability of following parameters at communication port of dispenser to connect with automation system for monitoring & control purpose.

These parameters shall also be checked during inspection at vendor's works.

a. Mass Totalizer from Dispenser Motherboard.

b. Mass Flow per Filling. (Note that Gas sale data- the reading which is visible to customer and used for billing purpose is mandatory to be transmitted to server whether it is from flow meter or motherboard or from both)

c. To Read Gas Selling Price from Dispenser.

d. To download the gas selling price into the dispenser from Server system.

e. Mass Flow Meter Status.

f. Tripping Status Dispenser.

g. Reset Switch Operation Status.

h. Dispenser Power Supply Status.

i. Identity of vehicle using RFID (In-built option to be provided).

In addition to above bidder shall make provision for monitoring and control of following parameters as well

A. Shift Reports
(Shift – A: 6:00 to 14:00)
(Shift – B: 14:00 to 22:00)
(Shift – C: 22:00 to 06:00)

a) Showing Date /Start time/ Finish time of every shift

b) Individual Arm-wise and Dispenser-wise totals.

c) Total sale for each shift in Kgs and Rs.

d) Total sale with variable pricing.

e) Full day report with total Sale for the 24 Hr. period.

B. Remote Price Change facility to facilitate

- Station-wise sortable and selectable
-Time-wise selectable
-Area-wise selectable
-Variable price change in a day

C. Transaction reports

Remotely the following parameters can be viewed in transaction reports
• Station Name and Dispenser serial number.
• Showing Date /Start time/ End time of every filling.
• Individual Arm-wise and Dispenser-wise totalizer at start of filling and end of filling.
• Transaction number totals for individual Arm-wise, Dispenser-wise and Station-wise to count number of
fills in selectable particular duration. (Monthly and daily basis)
• Batch reading of fill.
• Sale for each batch in Kgs and Rs.
• Unit price Data.
• Dispenser power ON/OFF count.
Pressure during last fill
• Vehicle pressure at start of filling
• Vehicle pressure at end of filling
• Temperature during the last fill
• End of sale indicator (Code number showing the reason that the last sale stopped.
• This is useful if a dispenser stops during a fill for no apparent reason).

The remote monitoring and automation will consist of reading, transferring and controlling all the data/parameter from the dispensers to RTU and then to any centralized remote server in India as per OWNER requirement.

The above list is tentative and final list shall be decided during execution phase.

15. TRAINING REQUIREMENTS

-The training program should be phased to suit the construction program such that the Client's personnel are fully conversant with all aspects of the operations and maintenance of the overall system including all aspects of operations, including operation, maintenance CNG, of the overall system. The duration of training will be defined in the MR specification.

-Commissioning will not be deemed to have completed and formal acceptance will not be granted until training has been completed to the satisfaction of the Company's. The training program should cover but not limited to the following subject areas:

- The physical characteristics of the gas and the procedure and precautions to be observed in handling and control.

- Start-up, operations and maintenance, Troubleshooting during problems procedures for the CNG dispenser and equipment.

- Filling Procedure, safety and preventive daily maintenance.

- CNG system management & Record keeping.

16. PACKAGING & PROTECTION DURING SHIPPING

- The dispensers shall be packaged to withstand rough handling during ocean shipment and in-land journey. It shall be vendor's responsibility to make good any deterioration that occurs during shipment. Sling points shall be clearly indicated on crates.

- During shipping of dispensers, the dispensers shall pack with wooden pallets & bolted with base frame.

- Dispenser display unit area covers by Foam or Polystyrene Thermo-col for any damages & Hose shall properly clamed in cradle bars.

17. PERFORMANCE GUARANTEE

The vendor shall guarantee the satisfactory performance of dispensing unit as per the operating parameters indicated in data sheets. The dispensers shall be performance tested after installation at site. Vendor shall carry out tests as required by Govt. Statutory Agencies.

a. Guaranteed Performance for the Dispensers shall be as follows: Flow Rate (15 kg/min for Car Dispenser) Flow Rate (75 kg/min for Bus Dispenser) Batch Accuracy of +/- 1.5%.

Note:

i. All the dispensing units shall be tested by Vendor for their function & performance in presence of Client's authorized representative.

ii. Vendor to execute performance test of all the dispensing unit after commissioning for accuracy and repeatability and safety parameters.

iii. Vendor to make all arrangements for carrying out performance test viz. Std. Mass Flow Meter, Laptop etc., and Vendor shall also carry out tests as required by Govt. statutory agencies.

iv. Any part or component, which is not functioning to the satisfaction of Client, shall be repaired or replaced by the vendor without cost & time implication to purchaser and performance test shall be carried out all over again.

18. DATA & DRAWING DETAILS

Vendor data requirement shall be as per document number: -**1023-GA-ME-VDDR-3010.**

19. ENVIRONMENTAL & SITE CONDITION

Minimum Temperature: 1°C
Maximum Temperature: 49°C
Maximum Shed Temperature: 47.5°C
Relative humidity 98% non-condensing
Wind Velocity 160.0 Km/Hr

Energising Quality	**PROJECT NUMBER: VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

VENDOR DRAWING AND DATA REQUIREMENT – CNG DISPENSER AND BUS DISPENSER			Total Sheets		15
Document No	1023	GA	ME	VDDR	3010

GOA NATURAL GAS PVT. LTD.

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C1	05.08.2022	Issued For Client Review	RKP	RZ	MC
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHKD**	**APPR**

S. No.	DESCRIPTION	To be submitted with Bid	To be submitted for Approval		To be submitted for Shipment		Submit as certified Final / As Built	
			Required	Days after PO	Required	Days after PO	Required	Days after PO
1.0	**GENERAL**							
1.1	Filled in Material Requisition Compliance Schedule & checklist							
1.2	Filled in Deviation Schedule.							
1.3	Duly filled up "Experience Record Schedule". Vendor to note that information furnished by them shall be used to assess the provenances of offered Dispensers and Qualificationof vendor, accordingly vendorto furnish references of those cases which are matchingwith offered Dispensers.							
1.4	Installation manual							
1.5	List of components of Dispenser with Make & Specification of components. Vendor shall also submit "Technical Catalogues" of components							
1.6	Start-up, (SOP) operation & maintenance manual showing assembly details and critical tolerances. A copy of all certified drawings & documents to be enclosed.							
1.7	Lubricant list with specification							

S. No.	DESCRIPTION	To be submitted with Bid	To be submitted for Approval		To be submitted for Shipment		Submit as certified Final / As Built	
			Required	Days after PO	Required	Days after PO	Required	Days after PO
1.8	Battery limit (interface) drawing/ information	▯	▯	21				
1.9	Drawing list and submission schedule		▯	14				
1.10	Project implementation schedule, ordering and inspection schedule for long lead and major items		▯	14				
1.11	Pre-commissioning & commissioning procedure		▯	21				
1.12	Performance guarantee test procedure		▯	21				
1.13	Weights & Measures Certificates from the country of origin for offered models of CNG Dispensers unit model/mass flow meter model for dispensing specified mass flow rate at specified overall batch accuracy.		▯	14			▯	
1.14	The "Test Certificate" for mass flow meter.		▯	21			▯	
1.15	Weights & Measures approval from Indian Authorities.		▯				▯	
1.16	Type approval for the offered dispenser from Petroleum& Explosive safety organization, Govt. of India	▯	▯				▯	

S. No.	DESCRIPTION	To be submitted with Bid	To be submitted for Approval		To be submitted for Shipment		Submit as certified Final / As Built	
			Required	Days after PO	Required	Days after PO	Required	Days after PO
2.	**DESIGN**							
2.1	Process flow diagrams (PFDs) and Piping &Instrumentation diagrams (P&IDs) of sub systems and complete system with write-up on operation		□				□	
2.2	Data sheets of Bus & Car CNG Dispensers, Mass flow meter duly filled up.	□	□				□	
2.3	Basic design calculations for system design, equipment selection		□				□	
2.4	Performance data, vendor literature for equipment selection, performance curves with duty point marked for individual equipment		□				□	
2.5	Specification for piping material & valves.		□				□	
2.6	Utility requirement	□	□				□	
2.7	Detail of control wiring diagram, interlock/ shutdown/control scheme with write up on operation. Sizing calculation for instrument items.		□				□	

S. No.	DESCRIPTION	To be submitted with Bid	To be submitted for Approval		To be submitted for Shipment		Submit as certified Final / As Built	
			Required	Days after PO	Required	Days after PO	Required	Days after PO
2.8	Dispenser communication port details and requirement information as per specification and list of signals							
3.0	**CONSTRUCTIONAL FEATURES**							
3.1	G.A. drawing of Dispensers showing maintenance clearances required.							
3.2	Cross section drawings of individual equipment/ skid, material & parts list.							
3.3	Termination & Wiring Diagrams							
4.0	**SPARES**							
4.1	List of spares with rates for two years normal operation per CNG Dispensers.							
4.2	Drawings, documents, data as asked under Electrical & Instrumentation specifications of this Material Requisition.							

VENDOR DATA REQUIREMENT (INSTRUMENTATION)

S. No.	DESCRIPTION	To be submitted with Bid	To be submitted for Approval		To be submitted for Shipment		Submit as certified Final / As Built	
			Required	Days after PO	Required	Days after PO	Required	Days after PO
1.	Drag and Document Schedule	▯						
2.	Piping and Instrument Diagram	▯	▯				▯	
3.	Instrument Index	▯					▯	
4.	Sub- Vendor List for Instruments and Accessories		▯					
5.	Instrument Sizing calculations		▯	21			▯	
6.	Utility requirements	▯	▯		▯		▯	
7.	Level Sketches	▯						
8.	Functional schematic	▯						
9.	Logic diagrams		▯	21			▯	
10.	Instrument loop drawings		▯				▯	

S. No.	DESCRIPTION	To be submitted with Bid	To be submitted for Approval		To be submitted for Shipment		Submit as certified Final / As Built	
			Required	Days after PO	Required	Days after PO	Required	Days after PO
11.	Control room layout		▯	14			▯	
12.	Panel front arrangement		▯	21			▯	
13.	Power Supply Distribution		▯				▯	
14.	Wiring diagram for panels		▯				▯	
15.	Configuration diagram		▯					
16.	I/O assignment	▯					▯	
17.	Details of OPC, configuration port, signals details etc		▯				▯	
18.	Instrument Duct/Tray layout		▯				▯	
19.	Instrument Cable schedule		▯				▯	
20.	Instrument location plans		▯				▯	
21.	Instrument installation drawings		▯				▯	

S. No.	DESCRIPTION	To be submitted with Bid	To be submitted for Approval		To be submitted for Shipment		Submit as certified Final / As Built	
			Required	Days after PO	Required	Days after PO	Required	Days after PO
22.	Bill of material for installation items		□				□	
23.	Spare part list for							
24.	(a) 2 years operation						□	
	(b) Start up and commissioning						□	
	(C) Spare instruments (10%).				□		□	
25.	Inspection and test procedures		□		□			
26.	Complete catalogues with part list for all vendor supplied instruments, controls etc.	□					□	
27.	Installation, operation and maintenance manuals						□	

Note: -
This list indicates the minimum drawings and document requirements. However, vendor shall submit a complete list of documents and drawing schedule listing all drawings and documents to be submitted by them during the course of execution of the job. The schedule shall list all drawings and documents alone with their number and expected date of submission.

CHECKLIST – TECHNICAL

Bidder confirms following, as a minimum, has been enclosed in the offer.

S.NO.	Requirements	Compiled by Bidder(Tick)
1	Reference List of previous supply of Procured item	☐
2	Filled – up Data Sheets, duly signed and stamped by bidder enclosed.	☐
3	List of recommended commissioning spares and accessories for Procured item.	☐
4	List of recommended spares and accessories for two year normal operation for procured item.	☐
5	Compliance statement duly filled and stamped enclosed.	☐
6	GA & assembly drawings, cross section drawings including part list & material list enclosed.	☐
7	Other technical details & vendor's product catalogues enclosed.	☐

COMPLIANCE STATEMENT

S.No	Requirement	Bidder's Confirmation
1	Bidder confirms that all materials proposed by the bidder are same/ superior to those specified in specification/ data sheets enclosed.	
2	Bidder confirms that the offer is in total compliance with the Technical requirements of the Material Requisition. Bidder confirms that deviation expressed or implied anywhere else in the offer shall not be considered valid.	
3	Bidder confirms that all spares and accessories required for two years of normal operation have been quoted separately.	
4	Bidder confirms that prices for start-up/commissioning spares and accessories have been included in the quoted items.	
5	Bidder confirms that in the event of securing order for the requisitioned item(s), good for manufacturing drawings of ordered item(s) shall have complete details with dimensions, part list and material list including back-up calculations in the first submission, failing which the vendor shall be solely responsible for any likely delay in delivery of item(s).	

Bidder's Signature with Stamp

	DEVIATION SHEET	VCS-SD-DS-001

DEVIATION/ EXCEPTION/ CLARIFICATION SHEET

Sr. No.	Contractor's Inquiry Reference	Contractor's Requirement	Proposed Deviation by Supplier, with Technical Justification	Cost Impact, if any	Contractor's Conclusions

NOTES

1- Bidder confirms that apart of from the deviations/exceptions/clarifications listed above, the bid is in full compliance with Inquiry requisition.
2- Bidder shall submit this sheet duly filled up and signed by him along with his bid. In case there is no deviation, then also supplier shall submit this sheet along with his bid indicating NIL deviation.

(Contractor's Name and Signature with Seal)

REV	DATE	DESCRIPTION	PREP	CHK	APPR
0	25.05.2017	ISSUED AS STANDARDS	AS	GS	AD

	DRAWINGS & DOCUMENTS	VCS-SD-DD-001

INFORMATION/ DOCUMENTS / DRAWINGS TO BE SUBMITTED BY SUCCESSFUL BIDDER

Successful Bidder shall submit four copies unless noted otherwise, each of the following:

1. Inspection & test reports for all mandatory tests as per the applicable code as well as test reports for any supplementary tests, in nicely bound volumes.

2. Filled in Quality Assurance Plan (QAP) for Purchaser's/ Consultant's approval. These QAPs shall be submitted in two copies within 15 days from LOI/ FOI.

3. Detailed completion schedule activity wise (Bar Chart), within one week of placement of order.

Note : All drawings, instructions, catalogues, etc., shall be in English language and all dimensions shall be metric units.

0	25.05.2017	ISSUED AS STANDARDS	AS	GS	AD
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

	INSTRUCTION TO BIDDER	VCS-SD-ITB-001

INSTRUCTION TO BIDDERS

1. Bidder to note that no correspondence shall be entered into or entertained after the bid submission.
2. Bidder shall furnish quotation only in case he can supply material strictly as per this Material Requisition and specification/data sheet forming part of Material Requisition.
3. If the offer contains any technical deviations or clarifications or stipulates any technical specifications (even if in line with MR requirements) and does not include complete scope & technical / performance data required to be submitted with the offer, the offer shall be liable for rejection.
4. Bidder must submit all documents as listed in checklist with his offer.
5. Supplier must note that stage wise inspection for complete fabrication, testing including the raw material inspected to be carried out.
6. Vendors for bought out items to be restricted to the approved vendor list attached with bid document. Approval of additional vendor if required, for all critical bought out items shall be obtained by the supplier from the purchaser before placement of order. Credentials/PTR of the additional vendor proposed to be submitted by supplier for review and approval of Purchaser/ Purchaser's representative

0	25.05.2017	ISSUED AS STANDARDS	AS	GS	AD
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

	LIST OF SPARES	VCS-SD-LS-001

LIST OF SPARES

S.No.	Part No.	Description	Quantity (Minimum)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

0	25.05.2017	ISSUED AS STANDARD	AS	GS	AD
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

	REFERENCE LIST	VCS-SD-RL-001

REFERENCE LIST

Sl No.	Project	Year of Supply	Client, Address and Contact No.	Email	Size and Rating / thk	Service	‖ Bidder's Signature with stamp

REV	DATE	DESCRIPTION	PREP	CHK	APPR
0	25.05.2017	ISSUED AS STANDARDS	AS	GS	AD

Energising Quality	**PROJECT NUMBER:** **VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL
QUALITY ASSURANCE PLAN **OF** **CNG CAR AND BUS DISPENSER**	**TOTAL SHEET NO.**	04

DOCUMENT NO.	1023	GA	ME	QAP	3010

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT

NORTH GOA GA

C1	05.08.2022	ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

S.NO.	OPERATION / PARAMETER	CHARACTERISICS / PARAMETERS	ACCEPTANCE CRITERIA &CERTIFICATION	VENDOR	TPIA	CLIENT/PMC	REMARKS
Bought Out items & Equipment details							
1.	Dispenser Outer body cabinet	Visual, Thickness check, Fitment & Alignment, Material Test certificates, Chemical Test	As per Technical specification	P	W/R	R	
2.	Dispenser Inside frame & support structure	Visual, Thickness check, Fitment & Alignment, Material Test certificates, Chemical Test	As per Technical specification	P	W/R	R	
2.	Mass flow meter	Visual, Functional & operational of flow meter totalizer, Fitment & Alignment, Test certificates for Bought out items, Calibration reports	Calibration report/Test report & other parameters as per approved data sheet & Technical specifications	P	W/R	W/R	
3.	Actuator valves/Electro-magnetic solenoid valve	Visual, Functional & operational, Fitment & alignment, leak test, Test certificates for Bought out items, supply voltage, Output signal voltage, Flow sequencing check as per P&ID & control philosophy.	Test Report, Conformity report & Model verifications as per Approved data sheet	P	W/R	W/R	
4.	Filling hose	Visual, Dimensional, Sizing verifications, Fitment & Alignment, Physical Test, Chemical Test, Hydrotest Report, Leak test reports, Hose conductivity test, Compliance report.	Technical specification & Approved data sheets	P	W/R	W/R	
5.	Mechanical & electronics totalizer	Operational & functional test, Accuracy match, calibration report Test certificates for bought out items	Technical specification	P	W/R	W/R	
6.	Software	Latest software version, Modbus register, Communication protocol, Baud rate, check single & three bank sequencing system, Check sequencing rate of each bank w.r.t flow rate(kg/min.)	Approved data sheet	P	W/R	W/R	
7.	Pressure gauge	Visual, Size verification, Fitment & alignment, Functional & operational, Calibration report, Test certificates for bought out items, Hydrotest, pressure test	Technical specification & Approved data sheets	P	W/R	W/R	

8.	Differential pressure gauge	Visual, Size verification, Fitment & alignment, Functional & operational, Calibration report, Test certificates for bought out items, Hydrotest, pressure test	Technical specification & Approved data sheets	P	W/R	W/R	
9.	Pressure Transducer & Transmitter	Location as per P&ID, Fitment & alignment, calibration report, Test certificates of bought out items, pressure test, Leak test, Operational & functional, current consumption w.r.t pressure, IP ratings, supply voltage, Output signal voltage	Technical specification & Approved data sheets	P	W/R	W/R	
10.	Emergency Shut-off valve	Visual, Dimensional, Fitment & Alignment, Physical Test, Chemical Test, Operational & functional, Leak test, Test certificates of bought out items, C_v verification w.r.t data sheet	Technical specification & Approved data sheets	P	W/R	W/R	
11.	Isolation Ball valve	Visual, Dimensional, Fitment & Alignment, Physical Test, Chemical Test, Operational & functional, Leak test, Test certificates of bought out items, Cv verification w.r.t data sheet	Technical specification & Approved data sheets	P	W/R	W/R	
12.	Three way Valve	Visual, Dimensional, Fitment & Alignment, Physical Test, Chemical Test, Operational & functional, Leak test, Test certificates of bought out items, Cv verification w.r.t data sheet	Technical specification & Approved data sheets	P	W/R	W/R	
13.	SS Needle & Bleed valve	Visual, sizing verifications, Fitment & Alignment, Operational & functional, Leak test, Test certificates of bought out items	Technical specification & Approved data sheets	P	W/R	W/R	
14.	SS Tubing & Fittings	Visual, Dimensional, Fitment & Alignment as per P&ID shown, Physical Test, Chemical Test, Operational & functional, Leak test, Test certificates of bought out items	Technical specification & Approved data sheets	P	W/R	W/R	
15.	SS Non-return Valve	Visual, sizing verifications, Fitment & Alignment, Operational & functional, Leak test, Test certificates of bought out items, Flow direction as per P&ID	Technical specification & Approved data sheets	P	W/R	W/R	
16.	SS Manifold	Visual, sizing verifications, Fitment & Alignment, Operational & functional, Leak test, Test certificates of bought out items, Flow direction as per P&ID	Technical specification	P	W/R	W/R	

17.	Inlet filter	Visual, Dimensional, Fitment & Alignment, Physical Test, Chemical Test report, Operational & functional, Leak test, Hydro test, filter sizing calculation	Technical specification / Approved data sheets/ Filter Sizing calculation sheet	P	W/R	W/R	
18.	Filter Elements	Visual, Dimensional, Fitment & Alignment, Test certificates of bought out items Operational & functional, Leak test, Hydro test, filter sizing & pressure drop calculation with elements	Technical specification / Approved data sheets/ Filter Sizing calculation sheet	P	W/R	W/R	
19.	Display card	Visual, Functional and operational, Bakelite function, Supply voltage, digit segments functional test, Display cable crimping, Test certificates of bought out items, Number of display Rows, Digits shown.	Technical specification & Vendor data sheets	P	W/R	W/R	
20.	Micro-processor base Electronic Mother board	Visual inspection of Battery, fuse, SMPS, SPD, Relay, Coupler communication, all mass flow meter communication, RS485, SCADA port, UPS & Main power supply and Bench test certificates, Functional & Operational test	Technical specification & Electrical wiring Circuit diagram	P	W/R	W/R	
21.	FLP/WP junction Box	Visual, Dimensional, Fitment & alignment, Test Certificates of bought out items, Junction Box Body earthing & all extra termination point with FLP dead plug & other are with Hood cap for cables.	Technical specification & Electrical wiring Circuit diagram	P	W/R	W/R	
22.	Fill & Vent break-way	Visual, Fill & vent Hose size verification & Pressure ratings Pneumatic leak test, De-coupling functional test at low pressure < 5kg/cm2, Test Certificates of bought out items.	Technical specifications	P	W/R	W/R	
23.	Safety Relief valve	Visual, Verification of Tag plate, Set pressure, Leakage rate (BPM) from Vent line if any, Test Certificates of bought out items, Leak Test @ 250 Bar(g.)	Technical specifications & Data sheet.	P	W/R	W/R	
Complete Assembly Testing Details							
24.	**Complete Assembly Leak Test**	Leak Test Throughout on all Joints By using Soap solution and Holding Time up to 30 Min. @ Pressure 250 Bar(g) Media-Nitrogen	Technical specifications & Data sheet.	P	W	W/R	
25.	**Performance (Batch Accuracy Test)**	Overall Batch Accuracy to Be +/-1.5 % otherwise Complete assembly to be Rejected	Factory Test procedure & Technical specifications	P	W	W/R	

25.1		Review of Weight scale, Mass flow meter, Electronics Totalizer, Mechanical Totalizer Reading to be match during sample records.	Factory Test procedure & Technical specifications	P	W	W/R	
25.2		Calibration Report of Master Meter or Weight scale, Tare procedure before inspection, Calibration of Mass flow meter	Factory Test procedure & Technical specifications	P	W	W/R	
25.3		Review of Dispenser Flow capacity during Filling of Cylinder @ Pressure between 120 Bar(g) to 80 Bar (g) during Performance Test at facilities.	Factory Test procedure & Technical specifications	P	W	W/R	
26	**Dispenser Response Test**	**Dispenser should shut off immediately & automatically on following conditions**					
26.1		Power failure or Excursion beyond permissible limit.	Technical specifications	P	W	W/R	
26.2		After power Loss of Display Backup up to 15 min.	Technical specifications	P	W	W/R	
26.3		Power Failure of Mass Flow Meter	Technical specifications	P	W	W/R	
26.4		Flow beyond High (15 kg/min.) and low limits (0.1 kg/min.)	Technical specifications	P	W	W/R	
26.5		Failure of Metering	Technical specifications	P	W	W/R	
26.6		Failure of Totalizer	Technical specifications	P	W	W/R	
26.7		Overfill of quantity of gas or pressure	Technical specifications	P	W	W/R	
26.8		Failure of pressure sensing transducer.	Technical specifications	P	W	W/R	
26.9		Failure of Pneumatic ball valve / electro valve	Technical specifications	P	W	W/R	
26.10		Repeated operation of Reset or Start/ Stop switch.	Technical specifications	P	W	W/R	
26.11		Removal of any electrical wire connection to controller.	Technical specifications	P	W	W/R	
26.12		Program step is in "HOLD" due to any error.	Technical specifications	P	W	W/R	
26.13		The number of start / stop of reset switch for starting gas refueling operation shall be counted. If it exceeds three times in a span of 20 seconds then the dispenser shall stop the further operation and display an error in dispenser.	Technical specifications	P	W	W/R	

Notes:

1. The above testing and acceptance criteria are minimum requirements; however, manufacturer shall ensure that the product shall also comply tothe additional requirements as per particular Technical Specification (PTS) and Data Sheet.
2. The supplier shall submit their own detailed QAP prepared on the basis of above / Technical specification for approval of Owner/Owner's representative.
3. Supplier shall submit calibration certificates of all instruments/Equipment to be used for inspection and Testing to TPIA with relevant procedures and updated standards for TPIA review/Approval. All reference codes / documents shall be arranged by vendor for reference of TPIA at the time of inspection.
4. Owner / Owner's representative include TPIA will have the right to inspect activity of manufacturing at any time.
5. TPIA along with Owner / Owner's representative shall review/approval all the documents related to QAP/Quality manuals/Drawings etc., submitted by supplier.
6. Contractor shall in coordination with supplier/sub vendor shall issue detailed production and inspection schedule indicating the dates and the location of facilities Owner/Owner's representative and TPIA to organize inspection.
7. Special manufacturing procedure have to be specially approved or only previously approved procedures have to be used, in case of conflict between specification more stringent condition shall be applicable.

ENERGISING QUALITY	**PROJECT NUMBER: VCS-GNGPL-1023**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

VENDOR LIST FOR BOUGHT OUT ITEMS

DOCUMENT NO	1023	GA	ME	APV	3010

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C1	05.08.2022	ISSUED FOR CLIENT REVIEW	RKP	RZ	MC
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

Bought Items Name	Vendor Name
Mass Flow meter	All MFM certified by W &M India for CNG application & CCOE approval of sensor & transmitter Units some are: - -Micro Motion (CNG 50) with integral display -E&H (CNG Mass DCI) with integral display
Pressure Transmitter	-Druck -Wika -Honeywell -ABB -Rosmount
Pressure Regulator	- Pietro Fiorentini S.p.A. (Italy) - Emerson Process Management -RMG-Regel Messtechnik (Germany) -Mokveld Valves BV (Netherlands) -NIRMAL (UPTO # 600)
Ball Valve	- Hopkinsons Limited (UK) - O.M.S. Saleri (Italy) - Pibi Viesse SPA - Perar SPA (Italy) - Larsen & Toubro Ltd. (Audco India Ltd Chennai) - Microfinish Valves Ltd. (Hubli) - Pietro Fiorentini (Italy) - Nuovo Pignone (Italy) - Parker (USA) - Swagelok (USA)
Pressure Safety Valve	- BHEL, -OFE & OE Group (New Delhi)/ -M/s Keystone Valves (India) Pvt. Ltd. -Baroda M/s Sebim Sarasin Valves India (P) Ltd. (New Delhi) -M/s Tyco Sanmar Ltd. (New DELHI) -Parcol SPA, Italy - M/s Nuopignone, Italy - M/s Sarasin, France -M/s Tai Milano SPA, Italy - M/s Fisher Rosemount (Now M/s Emerson) -Parker -Swagelok

Bought Items Name	Vendor Name
SS Valves, Fittings	-M/s Swagelok (USA) - M/s Parker (USA) -M/s Sandvik -TUBACEX
SS Tubing's	-M/s Sandvik -TUBACEX -PARKER
Solenoid & Electromagnetic Valve	-M/s ASCO - M/s Rotex -M/s parker Hanifen -M/s Eugen Seitz
Actuators / On off Pneumatic Valve	-M/s Parker -M/s Swagelok -M/s Rotex
Cables & Wires	-INCAB -Universal -ASEAN/CCI -FORT Closter -Finolex -KEI
Barrier / Isolators/Surge protector	-MTL -Phoenix -P&F
Fuelling Nozzle(NGV nozzle)	-NGV -NZS -OPW 500 series -WEH -STABULI -COMPAC
Hoses	-Eaton Synflex -Parker
Pressure & Temperature gauge	-M/s AN Instruments Pvt. Ltd., New Delhi -M/s Altop - M/s General Instruments Ltd., Mumbai -M/s WIKA,

NOTES: -

1) Successful bidders shall take prior approval of the Makes / Items not covered above for which complete technical credentials (must be for CNG applications) of the proposed vendors shall be submitted for evaluation by Purchaser/Consultant.

2) Some Items indicate only Indian Makes. Successful Foreign bidders / also Indian bidder may take prior approval of any other makes for which complete technical credentials (must be for CNG applications) of the proposed vendors shall be submitted for evaluation by Purchaser/Consultant.

3) The Dispenser Manufacturer having / develop the specific products for the use with their own brand name are also accepted subjected to submission of proven track record and the acceptance/ testing /certification. Decision of the client / consultant will be final.

Energising Quality	**PROJECT NUMBER: VCS-0400**	Goa Natural Gas Pvt.Ltd. A Joint Venture of GAIL Gas Ltd & BPCL

LIST OF RECOMMENDED THIRD PARTY INSPECTION AGENCY (TPIA)-CNG CAR & BUS DISPENSER			Total Sheets		02
Document No	1023	GA	ME	TPIA	3010

GOA NATURAL GAS PVT. LIMITED

CITY GAS DISTRIBUTION PROJECT AT NORTH GOA GA

C1	29.07.2022	Issued For Client Review	RP	RZ	MC
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHKD**	**APPR**

LIST OF RECOMMENDED THIRD PARTY INSPECTION AGENCY (TPIA)	
Sl. No.	NAME OF TPIA
01.	Det Norske Veritas (DNV)
02.	Germanischer Lloyd
03.	Bureau Veritas
04.	Moody International
05.	SGS India Pvt. Ltd.
06.	Certification Engineer International Ltd (CEIL)
07.	Technischer Überwachungs verein (TUV)
08.	TUV-SUD
09.	American Bureau Services (ABS)
10.	AB-Vincotee
11.	LIoyd Register of Industrial Services
12.	Meenar Global Consultant LLP.
13.	Lloyds Register

NOTE: -

-Inspection will be done by client/ consultant in the works of vendor as per the approved QAP.

- In case of Indian representative / Indian Authorized agent of foreign manufacturer having manufacturing unit outside India, TPI inspection at manufacture's works has to be consider as define above.

- TPI/PMC/OWNER have right to inspect minimum 10% of all manufacturing activities as specified above.

- At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

- All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA/OWNER at the time of Inspection.