



GAIL GAS LTD

(A wholly owned subsidiary of GAIL (India) Limited)

CNG AND CITY GAS DISTRIBUTION PROJECT

BID DOCUMENT FOR CNG DISPENSER PACKAGE VOLUME – II OF II (TECHNICAL)

(BID DOCUMENT NO: 110290/WGI/GAIL GAS/35-R0)

INTERNATIONAL COMPETITIVE BIDDING



DELIVERS. EVOLVES.

WHOLE LIFE SOLUTIONS FOR PIPELINE AND SUBSEA SYSTEMS

ISSUED BY





GAIL GAS LIMITED
CITY GAS DISTRIBUTION PROJECT
MEERUT – DEWAS – SONEPAT - KOTA



TECHNICAL SPECIFICATION
FOR BUS AND CAR DISPENSERS

CLIENT JOB NO. 110290

TOTAL SHEETS 37

DOCUMENT NO

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1.0 INTRODUCTION:

GAIL GAS LTD (GGL) is a wholly owned subsidiary of M/s GAIL (India) Limited. GAIL GAS (GGL) is in the process of installing CNG outlets across the Meerut, Dewas, Sonapat and Kota cities. For this GGL proposes to procure Bus and CAR dispensers to cater to the requirement.

2.0 SCOPE OF WORK:

2.1 The intent of this technical specification is to outline the requirement under which the vendor shall Design, Engineering, Manufacture, Calibration, Inspect & Test the equipments at Works, Painting, Packaging & forwarding, Insurance, supply to Sites / Stores, Installation testing, trial run, Commissioning and Performance Testing at Sites, with all auxiliaries & features required for efficient & safe operation. The quantities of dispensers required shall be as per SOR (Schedule of Rates) cited elsewhere in the tender document.

2.2 Since It is not possible to specify every piece of equipment/item, any item not specifically mentioned but required as per Good Engineering Practice and for the safe & trouble free operation of the dispensers shall deemed to have been specified & shall be in the scope of Vendor without any cost or time implication.

2.3 SCOPE OF SERVICES

- i. Design & Engineering.
- ii. Manufacturing & Assembling.
- iii. Procurement from Sub-vendors.
- iv. Inspection & Testing at Works Internal as well as third party certifications.
- v. Documentation and obtaining statutory approvals from the country of origin and in India.
- vi. Packing, Forwarding and Transportation up to Job Sites / GAIL GAS stores.
- vii. Testing and commissioning, of each Bus or Car Dispenser, individually.


EXCLUSION: Civil Foundation & Trenches for pipes / Tubes.

2.4 INSTRUCTIONS TO VENDOR

2.4.1 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 borne by the vendor. Unless the above formalities are cleared, supply part shall be deemed incomplete.

2.4.2 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.

2.4.3 The approval from concerned Govt. Bodies in respect of complete installation of a CNG Dispensing Station shall be obtained by the GAIL GAS. Necessary Information / Data as may be required by Govt bodies shall be furnished by vendor to facilitate GAIL GAS LTD in obtaining approval without any cost implication to the owner.

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- 2.4.4 The bidder shall provide necessary manpower, tools & tackle, transport, communication, cranes, scaffolding etc. required for simultaneous working at any site or more than one site to suit overall erection program within the scheduled time.
- 2.4.5 All safety and warnings notices, barriers, padlocks etc required during installation testing and commissioning for the safety of all site personnel and equipment shall also be provided by the bidder.
- 2.4.6 The bidder shall provide civil foundation drawing and Base frame within two weeks of placement of order.
- 2.4.7 The Bidder shall not vary the scope of work as detailed in tender and approved drawings without written permission of owner.
- 2.4.8 Loading, unloading, transportation to GGL store are in the bidder's scope. Receipt, storage and maintenance by GGL including watch and ward of material. Installation, commissioning & Field performance test of Dispensers and approval by Chief controller of explosive (CCOE) is in the bidders scope.

Dispenser destination shall be as follows:

DEWAS Car Dispensers: 4 ; Bus Dispensers: 1

KOTA Car Dispensers: 9 ; Bus Dispensers: 1

SONIPAT Car Dispensers: 11 ; Bus Dispensers: 3

GAZIABAD ... Car Dispensers: 12 ; Bus Dispensers: 0 ; Mandatory Spares: all.


2.5 PROJECT DETAILS & GUIDELINE FOR EQUIPMENT:

2.5.1 Feed Gas Specification

2.5.1.1 Gas Composition

The expected gas composition of the feed gas to the CNG dispenser is given below. The CNG equipment shall be designed to meet the changes in the gas compositions from gas fields, India.

S. No.	Component	% Mole
1	Methane	85-93
2	Ethane	4-7
3	Propane	0.8-3.8
4	Butane	0.04-1.4
5	Pentane	0.2-0.3
6	Nitrogen	0.05-0.15
7	Carbon Dioxide	3-4
	Total	100
8	Gross Calorific Value (Kcal/SCM)	9128.77-9733.378
9	Specific Gravity	0.5769-0.60810
10	Net Calorific Value (Kcal/SM3)	8225.66-8787.13

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2.5.1.2 Gas Delivery Parameter

1	The inlet gas pressure to the CNG dispenser is as follows	Maximum 255 bar (g)
2	Gas Delivery Temperature	Maximum 70°C Dependent on ambient temperature

2.5.2 CLIMATIC CONDITIONS

Maximum Wind Velocity: 160 Km/Hr
Minimum ambient temperature: 12 °C
Maximum ambient temperature: 50 °C
Maximum relative humidity: 100 %

All Electrical devices shall meet the requirement for the area classification specified in tender. 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.

2.5.3 Utility Specification

Electric Power Supply

230 Volt, 1 phase, 50 Hz AC

Note: Vendor shall confirm that supplied dispensers are suitable with the above power supply and indicate the maximum and minimum tolerable values of voltage for accurate metering and safe operation of dispenser. Vendor has to provide AC/DC convertor. Vendor shall indicate power consumption for each dispenser.


Instrument air

If required Instrument air is available at pressure range: 5-15 Kg/cm²g. Necessary air regulator with pressure gauges shall be in the scope of the vendor.

2.5.4 Pneumatic Control Air actuated / Solenoid Actuated valves shall be used for pneumatic actuation of the valve through solenoid valves or direct electronic controlled solenoid valves can be used; tap off for the same shall be taken from the upstream of the mass flow meter.

2.5.5 Design, Operations & Control Philosophy

The CNG dispensing facilities shall be designed with minimum operator intervention. Routine maintenance work will be carried out during normal working hours and outside the scheduled refueling activities. The control system will be fully automated, only requiring manual intervention for connection of the hose and to initiate the filling operations. The dispensing facilities shall be designed to operate for a four-years or 26,000 hrs whichever comes first, without major overhaul of the gas dispensers.

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Design Philosophy: It is anticipated that the natural gas feed composition, flow rate and pressure will be fluctuating. Hence, Supplier shall design the CNG dispensing facilities with optimum degree of flexibility, reliability, and operability to accommodate the varying composition of feed gas, other unexpected contaminants, flow rate and pressure. The CNG dispensing facilities shall consist of standardized modules, which are assembled into a complete system. Each system shall be designed in packaged frame, housing the dispensing system. The design life of the CNG dispensing facilities shall be 20 years as minimum.

Applicable Standards and Codes

The design, construction, manufacture, supply, testing and other general requirements of the dispenser equipment shall be strictly in accordance with the data sheets, applicable codes, and shall 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 shall 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:

- i. NFPA 52 Standards for CNG vehicular fuel systems
- ii. NGV 4.1/ AGA 2-92 Requirements for CNG Dispensing Equipment for vehicles
- iii. NGV 4.2 / AGA 1-93 Requirement for Hoses for NGVs and fuel dispensers
- iv. ANSI / NGV1 Compressed Natural Gas Fuelling Connection Devices: Standard for fuelling nozzles receptacles.
- v. NGV4 / AGA Requirements for Breakaway devices for CNG vehicle Fuelling dispensers and fuelling hoses.
- vi. IS 5572 Classification of hazardous areas (other than mines) for electrical installations.
- vii. IS 5571 Guide for selection of electrical equipments for hazardous area
- viii. OISD 179 Safety requirements for compression, storage, handling and refueling of CNG for use in automotive sector.
- ix. OISD 113 Classification of areas for electrical installations at hydrocarbon processing and handling facilities
- x. NFPA-52: 1992, ANSI, ASTM, NEC, NEMA, ASNZ, OIML, Indian Electricity Rules, Indian Explosives Act. , Australian / New Zealand Refueling Standard. AG901 / NZS 5425
- xi. OIML TC8/SC7 Recommendation with regards to CNG dispensers.
- xii. The Standards of Weights and Measures Act 1976.
- xiii. The Standards of Weights and Measures (Enforcement) Act, 1985.

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xiv. The Consumer Protection Act, 1986.

Any other Codes & Standards mentioned elsewhere in this Technical Specification / M.R. or which are required to be complied with as per the prevailing Government of India regulations shall also be followed.


Precedence

In case of any conflict between Job Specification & other documents, the following order of precedence shall apply:

- Data sheets.
- Technical Specifications.
- Indian Standards / Codes as applicable
- International Standards / Codes as applicable.

3.0 SCOPE OF SUPPLY FOR BUS AND CAR DISPENSERS

- 3.1** The BUS and CAR Dispensers shall be complete with all required auxiliary equipment for efficient & safe operation as a whole. Vendor shall be responsible for furnishing all electrical, instrumentation, inter connecting Piping & Safety Items as required to make the Dispensers complete and functional
- 3.2.** Supply of CNG BUS Dispensers, single arm type having min. flow capacity > 75 kg/min at 250 bar inlet under discharge to atmospheric condition. The dispensers shall be suitable for a turn down of not less than 20:1 on flow. Bus Dispenser shall be as per the specification defined in this document. Bidder shall indicate the minimum, normal and maximum flow rate achieved for each hose for the offered dispenser.
- 3.3** Supply of CNG CAR Dispensers, double arm type having min. flow capacity > 15 kg/min at 250 bar inlet under discharge to atmospheric condition. The dispensers shall be suitable for a turn down of not less than 50:1 on flow. Car Dispenser shall be as per the specification defined in this document. Bidder shall indicate the minimum, normal and maximum flow rate achieved for each hose for the offered dispenser.
- 3.4** Standard Meter shall be selected so that the same can be used as standard meter for all makes of BUS & CAR dispensers for calibration. The Meter for Calibration must have traceability to International standard.
- 3.5** Any other items required for safe and accurate operation of Dispenser including special tools and tackles and programming terminal shall be included by the supplier even the same is not specifically mentioned in this document.
- 3.6** To commence refueling of CNG vehicles, the drivers / operators need to unhook the filling Probe connector from the dispenser and hook-up to the inlet of the CNG vehicles. Thereafter, the refueling shall commence upon activation through manual reset switch. The dispenser will

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automatically stop the refueling process at 200 bar (g) and all such refueling transaction data shall be stored and subsequently downloaded into a computer.

3.7 Any spare required during commissioning shall be in the scope of vendor. If any spare during commissioning borrowed from Mandatory spare the same shall be replenished by vendor free of cost.

3.8 Mandatory spares as specified in the documents shall be supplied.

3.9 Supply of drawings & documents as per Drawing & documents Schedule at S.No.19.

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.

3.10 Supply of application program, ladder logic, list of error codes with description for programming the dispenser parameters.

3.11 Supply of Instrumentation & Electrical items required as per Specification. All cable shall be supplied with double compression type of cable glands tested & certified to be used in hazardous area classified as Zone-I. All trays, Ex. Proof JB and accessories also to be supplied and erected as per requirements.

3.12 The supplier shall quote for On-Site Training to GAIL GAS personals for Four days.


4.0 TECHNICAL SPECIFICATIONS OF MAJOR ITEMS FOR BUS AND CAR DISPENSERS

The specifications described herewith are intended to give vendor the technical & operating conditions, the Dispenser must fulfill. These are to be referred to along with relevant description including in earlier sections.

Each dispenser shall adhere to following specifications:

4.1 It should be fast fill electronically controlled operation type and display the following key information on the dispenser with - Intrinsic Safe backlighting or LED display for night viewing showing:

- Quantities of gas dispensed in kg (6 digits including 2 decimal points i.e., 0000.00)
- Unit cost of gas dispensed in Rupees, Rs/kg (5 digits including 2 decimal points i.e., 000.00)
- Complete transaction value in Rs (6 digits including 2 decimal points i.e., 0000.00)
- 1 set of numeric Display shall be visible in Day / Night and shall not be less than 4” for bus dispensers.
- 2 set of numeric Display one on each side of the dispenser shall be visible in Day / Night and shall not be less than 4” for car dispensers
- Displays must remains active for at least 15 minutes after power failure


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- Provision for adjusting the intensity of the digits in decimal points
- Easy-to-read backlit displays for maximum visibility -Power conditioning and protection.

4.2 Non-reset-table and non-volatile totalizers' upto 999999.99 for total CNG sold in kg with an independent & suitable battery backup (Battery life shall be minimum of 10 years) for each filling arm. Since these dispensers are used for custody transfer purpose, the totalizers shall not reset in any eventuality not even in case of electronic failure. The vendor shall provide suitable arrangement outside the flameproof electronic box (on the dispenser's body) for reading the dispenser totalizers.


Separate non-re-settable straight forward reading totalizers will be at dispenser. (The totalizers shall be displayed on the Alpha Numeric Display at the press of a single button on the Keypad).

- 4.3** Easy to read lighted display - explosion proof backlighting (Intrinsic Safe Backlighting) or LED.
- 4.4** Physical design shall be of stainless steel body with doors / panels to minimize corrosion and on-going wear and tear. The dispenser shall have tamper-proof locking arrangement of the flow meter-transmitter configuration as per requisite of W&M for any custody meter used for Public. The cabinet shall be suitably designed to accommodate all valves, fitting flow meter and all required electronic equipment.
- 4.5** Dispenser shall be supplied with front / side mounted nozzle fitted with lockable holder and safety lever / latch to firmly hold the nozzle when not in use.
- 4.6** Each dispenser side shall be equipped with authorization / on-off switch and 4 inches dial pressure gauge (0-400 bar) c/w red sectors. Vendor shall provide a bypass isolation valve (2 Valve Manifold) with associated tubing to facilitate routine servicing calibration of pressure gauges without shutdown of the dispenser. Display shall be visible 24 hours of the day.
- 4.7** Each dispenser unit shall have 2 flexible electrically conductive connector hoses, CSA approved and vent hose. Vendor shall also include supply of Breakaway coupling in the hoses. Hose shall be of 3/8" ID for Car dispenser and 1/2" for Bus dispenser.
- 4.8** One no. Manual Shut-off valve for each fill hose has to be considered.
- 4.9** Interconnecting 3/4" tubing / piping, fittings, high flow valves as required shall be provided for NGV type nozzles for bus dispensers and Interconnecting 1/2" tubing /piping, fittings, high flow valves as required shall be provided for NZS type nozzles for car dispensers
- 4.10** Overfill protection shall be through electronically programmed hose to terminate the fill after fill pressure reaches 200 bar (g). Vendor shall include 2 nos of pressure transmitter out of which the Primary sensing Pressure Transmitter shall be SIL Certified, a pressure transducer of suitable range for sensing of pressure. Pressure relief valve shall be provided to avoid overfilling in case of failure of control system.
- 4.11** The normal operating temperature of wetted parts of dispenser shall be (-) 1° C to 60° C.
- 4.12** Vendor to provide means of temperature compensation the final limit fill pressure to 200 bar (g) equivalent at 15 degree C, if ambient temperature is below 15 degree C. There shall be an option

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of activating and deactivating Temperature Compensation in the filling Logic and the same shall be password protected.


- 4.13 Built-in coalescing filter at inlet of each bank and carried over oil at the inlet with manual drain valve with locking arrangement. Vendor to provide suitable arrangement to collect the drained oil outside the dispenser by necessary tubing. Oil content shall be < 5 ppm in the filtered gas.
- 4.14 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 shall be provided together before the delivery of the dispenser unit.
- 4.15 Connection for the flexible hose shall be designed with a burst pressure of at least four times the most severe pressure and temperature conditions expected.
- 4.16 Isolation valves complete with venting line valve and end plug shall be installed on the inlet steel tube of the dispenser. The valve shall be located immediately before the dispenser and shall be accessible to the maintenance personnel.
- 4.17 Refueling procedure / instruction complete with diagram or icons type figures shall be installed on each side of refueling hoses for each dispenser unit.
- 4.18 Filling of vehicle from the dispenser shall follow single bank sequencing system for Bus dispensers and filling of vehicle from the dispenser shall follow three bank sequencing system 1st sequence from low bank 2nd sequence from medium bank and 3rd sequence from high bank for CAR dispensers & one number of three banks electronic software and controller including hardware.
- 4.19 Electrical equipments and instrumentations wiring shall be approved to meet the hazardous area classification Class-I, Division I, Group D as per NEC or Zone I, Group II A / IIB as per IS / IEC, certification required on all components.
- 4.20 ESD button to be mounted on both side of the dispenser front panel and shall be easily accessible during emergencies.
- 4.21 Dispenser shall be automatically and immediately shut off CNG supply to each fill hose individually in case of:
 - i. Power failure
 - ii. Failure of metering
 - iii. Failure of Totalizers
 - iv. Overfill.
 - v. Failure of pressure transducer.
 - vi. Bursting of the Hose
 - vii. Snapping off the filling Hose when the Break Away Mechanism comes in to effect

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- 4.22 Vendor shall indicate overall CV of dispenser from inlet of the dispenser up to outlet probe including mass flow meter, interconnecting tubing, valves, hoses, nozzles etc.,
- 4.23 The dispenser shall be shipped in fully wired and assembled condition. Only gas supply and power supply connection shall be made on site.
- 4.24 Dispenser end connections shall be 1/2" & 3/4" tube respectively for bus and car fitted with 1/2" & 3/4" union with nut and front and back ferrule respectively. One set of valve to be provided immediately before the dispenser at the inlet of the piping
- 4.25 All the vents (e.g. Actuator, PSV, fill hose) shall be taken out from top of the dispenser in a single header.
- 4.26 The normal operating pressure of CNG at dispenser inlet shall be 255 Kg/cm² (g). However, supply from dispenser to the BUS & CAR shall get positively cut off at outlet pressure of 200 Kg/cm² (g) to ensure the safety of the vehicle.
- 4.27 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.
- 4.28 Designing of the dispensers shall 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 1-10 seconds 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 full 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.
- 4.29 Dispenser equipment such as pressure gauges, authorization switch, emergency shut-off valve, filling nozzle, ESD button shall be provided with labelling / tagging
- 4.30 Dispensers shall be ergonomically designed.
- 4.31 Dispenser hoses shall ensure the earthing of vehicle to the dispenser system to eliminate any incident due to spark across the gap at filling nozzle.
- 4.32 Certificate of W&M for Dispenser / Mass Flow Meter from statutory authority for offered model of bus and car dispenser shall be furnished.

4.33 Cabinet

4.33.1 Complete cabinet shall be of Stainless Steel (SS-304) and shall have tamper proof locking arrangement. Cabinet wall thickness shall be min 1.0 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 shall not resonate at the frequencies

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emanated during normal flow or during choked flow through the nozzles, breakaway coupling or valves etc.

- 4.33.2 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 and other component shall be such that it gives unhindered access to all parts and maintenance becomes easy.
- 4.33.3 GAIL GAS Logo and name shall be displayed on both sides of dispensers, which shall be made available to the vendor, on stainless steel panel with an appropriate coloured background or alternatively, vendor shall provide self-adhesive PE film sheet with GAIL GAS 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.
- 4.33.4 The dispensers shall be shipped in fully wired and assembled condition. Only gas, supply and power supply connection shall be made at Site.
- 4.33.5 Wherever provided, 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.
- 4.33.6 Vendor shall include in his scope provision of base frame to be embedded in the foundation. Bidder shall supply base frames in separate packing.

4.34 Fill Hose & Fill Nozzle


BUS DISPENSER

- a. Electrically conducive fill hose (Fill & Vent) meeting the requirement of NFPA-52 and NGV 4.2.
- b. Fill hose shall have Sherex CT-5000 Nozzle or WEH TK-25 or Equivalent suitable to fill Sherex / OPW C- 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, suitable for NGV Industry, in the hose as complete dispensing Arm. Hose shall be 1/2" ID working pressure 250 bar (g) and 4 m long.

CAR DISPENSER

- a. Electrically conducive fill hose (fill & Vent) meeting the requirement of NFPA-52 and NGV 4.2.
- b. One fill hose shall be fitted with NGV-I and second hose fitted with NZS-5425 fill nozzle for filling of vehicles. The nozzle shall meet the requirements of NGV-1 Type-2, Class A nozzle.

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. Hose shall be 3/8" ID 5000 psig, at least 4m long. Vendor shall demonstrate the function of breakaway coupling during performance test.

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4.35 One number of holster / cradle for fills nozzles along with weather caps for the protection of nozzles.

4.36 Vendor has to supply the dispensers with pneumatic operated full-bore bubble tight ball valve made of SS for ON-OFF control of flow. Vendor to ensure the system design in such a way that any gas if passes, shall be recorded by mass flow meter & there shall not be any possibility of unmetred gas supply through dispenser in case of malfunctioning of ball valves.

Linkage with ball valve shall 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 shall be provided on its body. The combination of SOV, pneumatic actuator and Ball valve shall 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 shall be always within the accuracy limit. The Solenoid Valves shall have Intrinsic Safe Coil.

4.37 A) Mass Flow Meter

- i. The offered mass flow meter model shall have certification for specified flow and accuracy from the Weights & Measurement Department or any other statutory authority; Bidder shall also get the offered Mass Flow Meter model certified by the Weights and Measures, India. (Ministry of Consumer affairs). The certificate(s) shall be in English language or in the language of originating country along with English translation. Bids received without copy of following certificate(s) shall be liable to be rejected.
- ii. Mass flow meter with integral display unit shall be provided to ensure high accuracy and direct mass flow meter approved for custody transfer metering of CNG at each of the refueling hose. The microprocessor based control system shall be provided to sense, monitor and control complete filling operations on a continuous, uninterrupted basis. The integral display unit shall be mounted in side the dispenser body. There shall not be any difference in reading between this integral display unit and non re-settable display in the Electronic control unit.
- iii. Mass flow meter shall be designed for custody transfer metering of CNG and meet the following requirements:
 - Batch Accuracy $\pm 0.5\%$ of Measured Value
 - Repeatability $\pm 0.3\%$ of Measured Value
 - Enclosure - IP65
 - Pressure influence - Nil
 - Surge and frequency - Shall be in compliance with ANSI / EEE (EFT) transient effect c 62.41v (1991)
 - EMI effect on sensor and transmitter - To the requirement of EMC direct 89/336/ EEC , EN 50081-1
 - Vibration effect - As per SAMA PM31.1-1980 condition2.
 - Mass flow meter model shall have Indian W&M certification.
 - Custody transfer certificate of Mass flow meter testing must be in accordance with OIML.

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- The offered model must have CCOE approval
- iv. The flow meter shall be provided with a liquid crystal display (LCD) for ongoing flow monitoring and totalizers.

B) Dispenser


- i. In case certificates are not available for mass flow meter then offered dispenser unit's model shall have required certification - from the Weights & Measurement Department or any other statutory authority; Bidder shall also get the offered Dispenser model certified by the Weights and Measures, India. (Ministry of Consumer affairs). The offered Dispenser model must also be approved by the Chief Controller of Explosive (CCOE) Nagpur. Bids received without copy of following certificate(s) shall be liable to be rejected.
- Certification from the Weights & Measurement Department of the India
 - CCOE approval for explosion proof enclosure for all electrical & electronic instruments.
 - Type approval certificate from Chief Controller of Explosives, Govt. of India.
 - Equipment / instrument / systems shall be certified for use by statutory authorities for their use in area of their application
 - For all intrinsically safe / flame proof equipment / instruments / systems, certification by any approving authority like BASEEF A, FM, UL, PTB, LCIE, Chief Controller of Explosives (CCOE), India is mandatory.
- ii. Dispenser shall be designed for custody transfer of CNG and meet the Batch Accuracy \pm 1.0 % of Measured Value

C) Automatic Refueling Data Recorder:

The dispenser shall have an automatic refueling data recorder unit for the each independent refueling line. The dispenser system shall be capable of storing up to 1,250 refueling transactions data and such data shall be downloaded frequently into another portable computer with compatible Microsoft and Linux software (Software for downloading the data 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.

D) PIPE WORK, VALVES AND FITTINGS

Pipe work shall be designed, tested and installed to ensure its safe operation at the worst conceivable conditions of flow, pressure and temperature.

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All high-pressure tubing work shall be of 1/2", 3/4" & 1" OD SS fully annealed (Bright annealed) seamless conforming to ASTM A269 TP 316L. The piping/tubing, valves, fittings shall be of Parker, sandvik, & Swagelok make. The system shall be "go-no-go" gaugeable to demonstrate that fittings are properly tightened. Wherever possible valves and control devices shall incorporate the same end connector system. The Supplier shall ensure that personnel assembling the pipe work shall be competent in the system employed. The preferred valve types for isolation are 90 degree 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. All the fittings shall be high pressure double ferrule compression type.

E) ELECTRICAL SPECIFICATION

It is not intended to cover all aspects of design but to indicate the basic requirements only. Vendor shall ensure that the design and installation on the skid is carried out as per good engineering practice to meet the requirements of safety, reliability, ease of maintenance and operation, aesthetics and interchangeability of equipment.

CODES AND 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:
 - Indian Electricity Act and Rules framed there under.
 - a. Fire Insurance Regulations.
 - b. Petroleum Rules and any other regulations laid down by Chief Controller of Explosives.
 - c. 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, the order of decreasing precedence shall govern.
 - Wiring:-All the Non Safe Wiring between the Ex'd' boxes shall be armoured wiring. The wiring between the IS Connections shall be Blue in Color

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AREA CLASSIFICATION AND EQUIPMENT SELECTION

- 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 OISD-179 guidelines where applicable.
- 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).
- 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.
- 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. Certificate from recognized agency to the effect is required to be produced that equipment supplied and/or installed conforms to above area classification.

EQUIPMENT SPECIFICATIONS

- 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 equipments shall be IP: 55 as per IEC specifications.
- 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.
- All electrical components and equipment shall be sized to suit the maximum load under the most severe operating conditions.
- All electrical equipments shall be supplied with double-compression cable glands, made of nickel-plated brass, tested and certified to be used in zone-1, hazardous area.
- 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 system earthing including making of earth-pits etc. shall be provided by the successful bidder.

4.38 Supply of application program, ladder logic, and list of error codes with descriptions for programming the dispenser parameter.

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- 4.39** Vendor shall provide facility required for calibration and fault finding diagnostics of mass flow meter and configuration of data in the electronic control unit.
- 4.40** 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. 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.

4.41 Programming, tuning, adjusting of the controller would be through dedicated software residing to a PC with the Windows OS. For this purpose a dedicated RS485 port to be made available to the dispenser. 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. For this purpose vendor shall supply a licensed multi-user software and OS in English. All necessary software shall be provided for calibration of transmitter from control room. Vendor to provide Manuals & trouble shooting guides of OS & software and a hard copy of application program.

2 Nos. of RS 485 Serial Communication ports shall be included in the Electronics of each dispenser for calibration, fault finding, diagnostics and downloading the transaction data.

4.42 The configuration data for the offered mass flow meter should be stored in a non-volatile memory or in a dedicated battery backed RAM such that this remain unchanged because of power fluctuations or power off conditions. In case mass flow meter vendor standard instrument has battery backed RAM; Back-up Power supply for displays so that display remains at least for 5 minutes after power failure. Vendor shall provide battery backup of 72 hours to the RAM of dispenser controller.

4.43 All parameter setting shall be password protected. Facility of changing password also shall be provided to enhance the security of password.


4.44 SCADA CONNECTIVITY

The CNG Dispensers shall have provision of SCADA Connectivity (MODBUS) for automation. Dispenser shall be capable of communicating with outside system using the open system architecture/protocol. It should be possible to transfer the data through twisted pair wires, transaction data as also flow meter data (both process and diagnostic) to RTU of SCADA. RTU and inter connecting cable shall be provided by Gail Gas. Detailed requirement of SCADA is as follows:

Parameters required for SCADA

Following parameters shall be monitored / controlled through SCADA system.

- a. Mass Totalizer from Dispenser Motherboard
- b. Mass Flow per Filling
- c. Read Gas Selling Price from Dispenser
- d. Download the gas selling price into the dispenser from SCADA system

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- e. Mass Flow Meter Status
- f. Tripping Status Dispenser
- g. Reset Switch Operation Status
- h. Dispenser Power Supply Status

Following Protocol details shall be furnished for SCADA connectivity:

1. Hardware Details: Connector Type, Communication Standard, Communication port Pin details,
2. Communication Port Configuration: Baud Rate, data bits, stop bit, parity
3. Polling Constraints: Minimum time period between two consecutive poll cycles.
4. Protocol Details: Protocol name and message structure for different read / write functions.
5. Function codes for reading Digital and Analog inputs
6. Function code for writing analog values in the IED registers
7. List of parameters available in the IED which can be accessed from the IED through serial port.
8. Register address of each parameter in the IED.

5.0 HAZARDOUS AREA

- The Supplier shall specify the hazardous area in accordance with the IS 5572 / relevant Standard of country of origin.
- All electrical equipment cabling and earthing shall be appropriate for the zone in which it is fitted, and all cables passing from the hazardous to safe area shall be equipped with appropriate barriers where necessary.
- All Instruments shall be suitable for an area classification of "Class 1, Group D, Division 1 as per NEC " OR " Zone 1, Group IIA / IIB as per IS / IEC"
- All dispenser mounted transmitters & temperature element and Solenoid Valves shall be intrinsic safe Ex 'ia' as per IEC 60079-11 and solenoid valves, switches and related junction boxes shall be flame proof Ex'd' as per IEC 60079-1. Other special equipment's/instruments, where intrinsic safety is not feasible or available, shall be flame proof as per IEC 60079-1.
- A complete dossier of all electrical equipment will be provided, showing area classification and certification of equipment.

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6.0 INSPECTION AND TESTING

6.1 All the dispensers shall be subjected stage wise inspection by TPI as per approved QAP which shall be in the scope of the Vendor.

6.2 The following activities shall be covered under inspection:

- a. Review of Q.A. documents.
- b. Review of calibration certificates for flow meter, dispenser, pressure transmitters, pressure gauges and all instruments.
- c. Review of all statutory certificates including W &M.
- d. Review of area classification compatibility of all items including bought out items.
- e. Review of Mill Test reports.
- f. Review of NDT reports.
- g. Review of bought out sub-assemblies/major components, test/inspection certificates.
- h. Dimensional checks as per approved drawings and data sheets.

6.3 Functional Test

All the dispensers shall be tested to demonstrate the functioning of all the components and controls.

6.4 Performance Test

- a. All the dispensers shall be performance tested for flow capacity, measuring accuracy and dispenser functioning with CNG or Nitrogen. CNG or Nitrogen shall be arranged by vendor.
- b. During the shop test of dispenser, in case 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.
- c. During the shop testing if the dispenser batch accuracy is found beyond ± 1.0 % dispenser shall stand rejected.


7.0 CALIBRATIONS AND THIRD PARTY CERTIFICATION

All mass flow meter, instrument gauges, etc shall be calibrated and calibration certificates shall be presented during factory acceptance test. Documentation and obtaining statutory approvals from the country of origin is in Bidders scope. The offer dispenser must be approved and certified by statutory authority, Weights and Measures or the other statutory authorities of the Country of Origin.

8.0 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.

Guaranteed performance for Dispensers shall be as follows:

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- i. Capacity of the Bus dispenser shall be => 75 kg/min under atmospheric discharge at inlet pressure of 250 bar (g) with design case gas composition, temperature of 150° C with no negative tolerance for errors in instruments and measurements.
- ii. Capacity of the CAR dispenser shall be => 15 kg/min under atmospheric discharge at inlet pressure of 250 bar (g) with design case gas composition, temperature of 150° C with no negative tolerance for errors in instruments and measurements.
- iii. Overall Dispensers Batch Accuracy of ±1.0% or better of the quantity filled 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

After Commissioning at Site:

All the dispensers shall be tested by vendor for their function & performance in presence of GGL/JPK. Any part or component, which is not functioning to the satisfaction of GAIL GAS, shall be repaired or replaced by the vendor without cost & time implication to purchaser and performance test again carried out. Vendor to execute performance test of all the dispensers after commissioning for accuracy and 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

9.0 DISPENSER ACCURACY PROVER

Dispenser Accuracy Prover unit working on ‘Flow-Through’ method complete with Master Mass Flow Meter, electrically conductive Hose, Nozzle, and Fittings and vent valve mounted on a suitable frame/trolley and does not require any outside power supply.

Master Mass Flow Meter shall be super calibrated Micro Motion mass flow meter to the specs needed to prove the accuracy of CNG (bus and car) dispensers, packaged on a frame / trolley so that it is transportable to the CNG station.


Master Mass Flow Meter shall be powered by 24V DC sealed batteries that can be recharged using single phase 230 V, 50 Hz AC power supply (Charger included in scope of supply). The carrying case shall be high impact static resistant plastic that will make transportation very easy with the built in retractable handle.

Supply shall include Software to calculate flow cal factor.

The Master Mass Flow Meter should be certified by W&M department or statutory authorities 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). Vendor shall also get the Master Meter certified from Weights and Measures, India. Master Meter Shall be selected such that same meter can be used as standard meter for all dispensers. The Meter Calibration must have traceability to International Standard.


Specifications

- This unit is rated for a Class 1 Div. 2 Group D environment

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- Flow rates in mass: 68 to 2313 kg/h (2.5 to 170 lb/min)
- Self powered with 24V DC batteries with charger included
- Accuracy: $\pm 1.5\%$ @ 68 to 177 kg/h (2.5 to 6.5 lb/m)
 $\pm 0.5\%$ @ 177 to 4627 kg/h (6.5 to 170 lb/m).
- Minimum measured quantity: 1.1 kg/h (2.5 lb).

Prover Meter Unit Data Sheet		
Sr. No.	Description	Required
1	Item	Prover Meter Unit
2	Make	
3	Model	
4	Nos.	1
5	Inlet Pressure Barg	200-250
6	Fill Pressure Barg	200-250
7	Operating temp. range °C	-20 to 70
8	Operating Flow range	1 kg/min to 100kg/min
Electrical		
9	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
10	Battery	Rechargeable type, Suitable for operation
11	Battery Back-up	Minimum 3 hr
12	Power required for battery charger	AC 230 volts $\pm 10\%$ 50 Hz $\pm 3\%$
End Connections		
13	Inlet	Receptacles for NZS type for car, NGV1 type for Car, NGV1 type for Bus
14	Outlet	Quick Release Coupling- Male type
15	Pressure Rating barg	250
Flexible fill hose for Car		
16	Type	Steel Reinforced, electrically conductive
17	Make	
18	Pressure Rating barg	
19	Size of delivery hose	3/8"
20	Length of Hose	2 mtrs.
21	Filling end	With 3-way ball valve & NGV1 type

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		nozzle and NGV1 to NZS adapter
22	Receiving end	Quick Release Coupling- Female type
Master Mass flow meter		
30	No. of metering lines	Single
31	Metering principle	Coriolis
32	Make	Micro motion
33	Model	
34	Batch delivery accuracy	0.05%
35	Repeatability	0.25%
36	Linearity	
37	No. of Points for master calibration	Minimum 10 points
38	Maximum flow/flow range for calibration	Suitable for both small vehicle to heavy vehicle

10.0 TRAINING REQUIREMENTS

The training program shall be phased to suit the construction program such that the Company'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. Commissioning will not be deemed to have completed and formal acceptance will not be granted until training has been completed to the satisfaction of GGL.

11.0 WARRANTY SERVICING AND SPARE PARTS

The supplier's shall provide a warranty period of 12 months from the date of final acceptance of the equipment on installation & commissioning at site OR 24 months from the date of last shipment of equipment, whichever expires first.

12.0 TECHNICAL SUPPORT


The bidder should have adequate service backup facility in the city of installation. The bidder should be able to respond customer complains within 4 hrs of lodging of complain.

13.0 PACKAGING

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.


14.0 COMMISSIONING OF DISPENSERS

Vendor shall carry out commissioning of Dispensers within 2 weeks of receipt of intimation from GAIL GAS.

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15. DATA SHEET OF MASS FLOW METERS FOR BUS AND CAR DISPENSERS

MASS FLOW METERS (CORIOLIS TYPE)				
Units:- Service:- Gas		Features/ Dimension	Pressure Rating	Temperature Rating
General	1	Tag No.		
	2	Line No.		
	3	Service		
	4	Overall CV		
Meter	5	Type/Model		
	6	Function		
	7	Conn.Size: Size & Rating		
	8	Facing & Finish		
	9	Body Material		
	10	Wetted Parts Material		
	11	Enclosure		
	12	Conduit connection		
	13	Flow Range		
	14	Batch Accuracy		
	15	Repeatability		
	16	W&M Lockout Configuration		
Converter	17	Load Resistance - ohms.		
	18	Output		
	19	Power supply		
	20	Area classification		
	21	Intrinsically safe / Explosion Proof		
	22	Enclosure		
	23	Conduit connection		
	24	Mounting		
25	W&M Lockout Configuration			
Options	26	Filter / Mesh Wire		
	27	Mounting Brackets		
	28	Interconnecting		
	29	Special cabling		
	30	Cable glands		
	31	Accessories for hot tap		

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16. DATA SHEET OF SOLENOID VALVE FOR BUS AND CAR DISPENSERS

Solenoid Valves					
Units:- Service:- Gas			Features/ Dimension	Pressure Rating	Temperature Rating
General	1	Tag No.			
	2	Line No.			
	3	Line Size & Sch.			
	4	Service			
Valve	5	No. of ways			
	6	Size - Body Port			
	7	End Connection			
	8	Material Body			
	9	Trim			
	10	Body rating			
	11	Operating mode NC/NO/Univ			
	12	Packing			
	13	Enclosure			
Electrical	14	Area Classification			
	15	Cable Entry			
	16	Type. Of Energisation Dropout			
	17	Power Supply			
	18	Power Consumption VAW			
	19	Inrush Current			
Options	20	Insulation Class			
	21	Voltage -Energizing -Dropout			
	22	Manual reset			
	23	Latching on Ener. / De-Energ.			
	24	Bug screen for vent port			
	25	Intrinsically safe			
Service Condition	26	Fluid			
	27	Press. Open / Max.			
	28	Temperature C-Open / Max			
	29	Maximum Flow			
	30	S.G.at open Temp.Mol.Wt.			
	31	Viscosity mPa.s (CP)			
	32	Allowable press drop			
	33	Del. P Shut Off			
	34	Valve CV			
	35	Model No.			
	36	Specification Remarks			

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17. DATA SHEET OF BUS DISPENSERS

1	GENERAL	
2	PROJECT: CITY GAS DISTRIBUTION	
3	OWNER: M/S GAIL GAS LIMITED	
4	SERVICE: DISPENSER FOR CNG DISPENSING	
5	DISPENSER CONFIGURATION	SINGLE HOSE -One side
6	NOTE: <input checked="" type="checkbox"/> SCOPE OPTION / INFORMATION SPECIFIED BY PURCHASER <input type="checkbox"/> INFORMATION REQUIRED FROM VENDOR.	
7	<input type="checkbox"/> MANUFACTURER:.....	<input type="checkbox"/> MODEL NO.:.....
8	<input type="checkbox"/> PLACE OF MANUFACTURE:	
9	<input checked="" type="checkbox"/> No OF LINES: One	FRAME MATERIAL: STAINLESS STEEL 304
10	POWER REQUIREMENTS: SINGLE PHASE AC 230 V ±15%, 50 HZ ± 3%.	<input type="checkbox"/> POWER CONSUMPTION:.....
11	<input checked="" type="checkbox"/> INLET GAS PRESSURE: 255 bar(g)	<input checked="" type="checkbox"/> FILL PRESSURE: 200 bar (g)
12	<input checked="" type="checkbox"/> METERING: CORRIOLIS MASS FLOW MTER WITH INTEGRAL TRINSMITTER & DISPLAY and HAVING W&M LOCKOUT CONFIGURATION AND PROVISION OF MECHANICAL COUNTER	<input checked="" type="checkbox"/> FLOW RATE: Min 75kg/min at 250 bar inlet and discharge at atmosphere.
13	<input checked="" type="checkbox"/> TEMPERATURE RANGE: (-) 55°C to 70°C	
14	<input checked="" type="checkbox"/> TUBE PRESSURE RATING 6000psi	
15	<input checked="" type="checkbox"/> FILL NOZZLE TYPE: NGV1 Type2 Class A	<input checked="" type="checkbox"/> FILL VALVE TYPE: 3-way Valve
16	<input checked="" type="checkbox"/> BREAKAWAY COUPLING: YES	<input checked="" type="checkbox"/> COUPLING SIZE: 3/8"
17	<input checked="" type="checkbox"/> VENT RETURN COUPLING: YES	<input checked="" type="checkbox"/> COUPLING SIZE: 1/8"
18	<input checked="" type="checkbox"/> FILL HOSE TYPE: TWIN	<input checked="" type="checkbox"/> FILL HOSE SIZE: 3/8"
19	<input checked="" type="checkbox"/> FILL HOSE LENGTH: 4 M	<input checked="" type="checkbox"/> MAX BURST PRESSURE: FOUR TIMES THE WORKING PRESSURE
	<input type="checkbox"/> SPECIFIC CONDUCTIVITY OF FILL HOSE:	
20	<input checked="" type="checkbox"/> SOLENOID / PNEUMATIC VALVE: YES	<input checked="" type="checkbox"/> EMERGENCY SHUTDOWN BUTTON (ESD):REQUIRED
21	<input checked="" type="checkbox"/> HOSE RETRACTOR: YES	
22	<input checked="" type="checkbox"/> DELETED	
23	<input checked="" type="checkbox"/> TEMPERATURE COMPENSATION: YES (Selectable)	
24	<input checked="" type="checkbox"/> SITE / INSTALLATION DATA	
25	DATA:	
26	<input checked="" type="checkbox"/> AMBIENT TEMP.(°C):	MAX - 50 °C
		MIN 12 °C
27	<input checked="" type="checkbox"/> RELATIVE HUMIDITY (%)	MAX: 100
28	<input checked="" type="checkbox"/> ALTITUDE (M):	



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29	■ EARTH QUAKE:		■ WIND VELOCITY (KM/HR): 160 (MAX)		
30	■ INSTALLATION		OUTDOOR		
31	■ MOUNTED ON		DISPENSER ISLAND IN THE FOURECOURT		
32	■ ELECTRICAL AREA HAZARD				
33	CLASS/ZONE: CLASS I ZONE I DIVISION: I GAS GROUP: D, GROUP IIA, IIB				
34	APPLICABLE CODES AND STANDARDS:				
35	■ DISPENSER APPROVALS: AS Defined in the Technical Specification above		■ TUBING: STAINLESS STEEL 3/8"		
36	□ VALVE PRESSURE TEST:				
37	UTILITIES DATA				
38	■ Electricity: AC230 V ± 15% single phase				
39	□ Solenoid Valves	A.C/D.C.	V	Ph	Hz
40	□ Electronic PCBs:	A.C/D.C.	V	Ph	Hz
41	□ Mass Flow meters	A.C/D.C.	V	Ph	Hz
42	Electrical connection (Cable gland to be provided by the vendor for 2.5 mm ² x3 Cable):				
43	□ Total Consumption				
44	Solenoid Valves:(Watts)				
45	Electronic PCBs (Watts)				
46	Mass Flow meters: (Watts)				
47	■ MATERIALS :		Pneumatic Instrument :		
48	Component Materials		(Gas Consumption)		
49	Solenoid Valve		SS/Brass		
50	Spring Loaded Regulator	SS/Brass		Nos. Transaction:	
51	Pneumatic Valve	SS		Consumption (SCM):	
52	2-way Isolation Valve		SS		
53	3-way filling valve		SS		
54	Coalescing Filter		SS / BRASS		
55	Tube 3/8"		SS		
56	Bleed Valves		SS		
57	INSPECTION AND TESTS				
58	Material Composition and Physical Properties Certificates Required For:				
59	■ Solenoid Valve	■ Spring Loaded Regulator		■ Safety Valves	

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60	<input checked="" type="checkbox"/> Tube	<input checked="" type="checkbox"/> Hose	<input checked="" type="checkbox"/> Fittings		
61	<input type="checkbox"/> Coalescing Filter..... <input type="checkbox"/> Bleed Valve.....				
62			Required	Observe	Witness
63	<input checked="" type="checkbox"/> Shop inspection	by Purchaser during manufacture	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
64	<input checked="" type="checkbox"/> Functional/Tests		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
65	<input checked="" type="checkbox"/> Field performance test for 4 hrs and Field Trial Run 72 Hrs. Under Vendor's Supervision (Dispenser)		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
66	<input type="checkbox"/> WEIGHTS				
67	<input type="checkbox"/> Overall supply (including, all components and packing crate) Kg. approx.....				
68	<input type="checkbox"/> Maximum erection weight Kg. Approx.....				
69	SCOPE OF SUPPLY				
70	<input checked="" type="checkbox"/> Dispenser Assembly complete.				
71	<input checked="" type="checkbox"/> Vendor Data as specified				
72	NOTE : Refer checklist for scope of supply				

NOTE: For all Electrical / Instrumentation items vendor shall provide certificates issued by statutory Inspection Authority confirming suitability of Design / Construction for specified Hazardous Area Classification.

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18. DATA SHEET OF CAR DISPENSERS

1	GENERAL	
2	PROJECT: CITY GAS DISTRIBUTION	
3	OWNER: M/S GAIL GAS LIMITED	
4	SERVICE: DISPENSER FOR CNG DISPENSING	
5	DISPENSER CONFIGURATION	DUAL HOSE –Fill & Vent-Two side
6	NOTE: ■ SCOPE OPTION / INFORMATION SPECIFIED BY PURCHASER □ INFORMATION REQUIRED FROM VENDOR.	
7	□ MANUFACTURER:.....	□ MODEL NO.:.....
8	□ PLACE OF MANUFACTURE:	
9	■ No OF LINES: One	FRAME MATERIAL: STAINLESS STEEL 304
10	POWER REQUIREMENTS: SINGLE PHASE AC 230 V ±15%, 50 HZ ± 3%.	□ POWER CONSUMPTION:.....
11	■ INLET GAS PRESSURE: 255 bar(g)	■ FILL PRESSURE: 200 bar (g)
12	■ METERING: CORRIOLIS MASS FLOW MTER WITH INTEGRAL TRINSMITTER & DISPLAY and HAVING W&M LOCKOUT CONFIGURATION AND PROVISION OF MECHANICAL COUNTER	■ FLOWRATE: Min 15kg/min at 250 bar inlet and discharge at atmosphere.
13	■ TEMPERATURE RANGE: (-) 55°C to 70°C	
14	■ TUBE PRESSURE RATING 6000psi	
15	■ FILL NOZZLE TYPE: NZS 5424	■ FILL VALVE TYPE: 3-way Valve
16	■ BREAKAWAY COUPLING: YES	■ COUPLING SIZE: 3/8"
17	■ VENT RETURN COUPLING: YES	■ COUPLING SIZE: 1/8"
18	■ FILL HOSE TYPE: TWIN	■ FILL HOSE SIZE: 3/8"
19	■ FILL HOSE LENGTH: 4M	■ MAX BURST PRESSURE: FOUR TIMES THE WORKING PRESSURE
	□ SPECIFIC CONDUCTIVITY OF FILL HOSE:	
20	■ SOLENOID / PNEUMATIC VALVE: YES	■ EMERGENCY SHUTDOWN BUTTON (ESD):REQUIRED
21	■ HOSE RETRACTOR: YES	
22	■ NOT USED	
23	■ TEMPERATURE COMPENSATION: YES (Selectable)	
24	■ SITE / INSTALLATION DATA	
25	DATA:	
26	■ AMBIENT TEMP.(°C):	MAX - 50 °C
		MIN - 12 °C
27	■ RELATIVE HUMIDITY (%)	MAX: 100
28	■ ALTITUDE (M):	
29	■ EARTH QUAKE:	■ WIND VELOCITY (KM/HR): 160 (MAX)
30	■ INSTALLATION	OUTDOOR
31	■ MOUNTED ON	DISPENSER ISLAND IN THE FORECOURT
32	■ ELECTRICAL AREA HAZARD	
33	CLASS/ZONE: CLASS I ZONE I DIVISION: I GAS GROUP: D, GROUP IIA, IIB	
34	APPLICABLE CODES AND STANDARDS:	
35	■ DISPENSER APPROVALS: AS Defined in the	■ TUBING: STAINLESS STEEL 3/8"

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	Technical Specification above				
36	<input type="checkbox"/> VALVE PRESSURE TEST:				
37	UTILITIES DATA				
38	■ Electricity: AC230 V ± 15% single phase				
39	<input type="checkbox"/> Solenoid Valves	A.C/D.C.	V	Ph	Hz
40	<input type="checkbox"/> Electronic PCBs:	A.C/D.C.	V	Ph	Hz
41	<input type="checkbox"/> Mass Flow meters	A.C/D.C.	V	Ph	Hz
42	Electrical connection (Cable gland to be provided by the vendor for 2.5mm ² x3 Cable):				
43	<input type="checkbox"/> Total Consumption				
44	Solenoid Valves:(Watts)				
45	Electronic PCBs (Watts)				
46	Mass Flow meters: (Watts)				
47	■ MATERIALS :			Pneumatic Instrument :	
48	Component Materials			(Gas Consumption)	
49	Solenoid Valve			SS/Brass	
50	Spring Loaded Regulator	SS/Brass		Nos. Transaction:	
51	Pneumatic Valve	SS		Consumption (SCM):	
52	2-way Isolation Valve		SS		
53	3-way filling valve		SS		
54	Coalescing Filter		SS / BRASS		
55	Tube 3/8"		SS		
56	Bleed Valves		SS		
57	INSPECTION AND TESTS				
58	Material Composition and Physical Properties Certificates Required For:				
59	■ Solenoid Valve	■ Spring Loaded Regulator		■ Safety Valves	
60	■ Tube	■ Hose		■ Fittings	
61	<input type="checkbox"/> Coalescing Filter.....		<input type="checkbox"/> Bleed Valve.....		
62			Required	Observe	Witness
63	■ Shop inspection	by Purchaser during manufacture		<input type="checkbox"/>	■
64	■ Functional/Tests		■	<input type="checkbox"/>	■
65	■Field performance test for 4 hrs and Field Trial Run 72 Hrs. Under Vendor's Supervision (Dispenser)		■	<input type="checkbox"/>	■
66	<input type="checkbox"/> WEIGHTS				
67	<input type="checkbox"/> Overall supply (including, all components and packing crate) Kg. approx.....				
68	<input type="checkbox"/> Maximum erection weight Kg. Approx.....				
69	SCOPE OF SUPPLY				
70	■ Dispenser Assembly complete.				
71	■ Vendor Data as specified				
72	NOTE : Refer checklist for scope of supply				

NOTE: For all Electrical/Instrumentation items vendor shall provide certificates issued by statutory Inspection Authority confirming suitability of Design/Construction for specified Hazardous Area Classification.

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19. VENDOR DATA AND DRAWING REQUIREMENT FOR BUS AND CAR DISPENSERS


A. With Supply.

- a. Operation and maintenance manuals - 3 sets all in original for each dispenser. The instruction manual shall describe in details the construction and recommended procedure for maintaining, operating and trouble shooting of the dispenser shall also include cross-sectional drawings, exploded views of all spare parts along with part nos., quantity installed per dispenser. The manual shall provide detailed catalogues of all bought out items.
- b. Mechanical and electrical installation drawing including interconnection and wiring diagram
- c. Test certificates and catalogues of all major components like valves, mass flow meter, tubing etc.
- d. Calibration certificates for all measuring and protection devices (e.g. Mass flow meter, pressure transducer, pressure gauges).
- e. Test records of mechanical running, performance test.
- f. Complete wiring diagram of internal wiring of dispenser.
- g. Software (logic diagram) of dispensers on CD-ROM with suitable communication Protocol for communication with dispenser in order to change dispenser parameters if required.
- h. Certificates from statutory authorities confirming suitability of design / construction of all electrical and electronic items for use in hazardous area classification.


B. SCHEDULE OF DRAWING AND DATA REQUIREMENT

19.1 The following data and information marked "X" shall be furnished by the vendor:

S. No.	Description	With Bid	After Job Award		
			For Review	For Information	Final in Book Form
1	2	3	4	5	6
1.0	GENERAL				
1.1	Installation manual			X	X
1.2	Start-up, operation & maintenance manual Showing assembly details and critical tolerances. A copy of all certified drawings & documents to be enclosed.			X	X
1.3	Lubricant list with specification			X	X
1.4	Battery limit (interface) drawing / information	X	X		
1.5	Drawing list and submission schedule		X		X
1.6	Project implementation schedule, ordering		X		

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S. No.	Description	With Bid	After Job Award		
			For Review	For Information	Final in Book Form
	and inspection schedule for long lead and major items				
1.7	Pre-commissioning & commissioning procedure		X		
1.8	Performance guarantee test procedure		X		
1.9	Certificate of Weights & Measures of Dispenser / Mass flow meter from statutory body for offered models of Bus & Car Dispenser.	X	X		X
1.10	Dispensers unit model / mass flow meter model for dispensing specified mass flow rate at specified overall batch accuracy.	X	X		X
1.11	The "Test Certificate" for Dispenser / Mass flow meter.	X	X		X
1.12	Weights & Measures approval of Dispenser / Mass flow meter from Indian Authorities.	X	X		X
1.13	OIML compliance certificate for Dispenser / Mass flow meter	X	X		X
1.14	CCOE certificate for Dispenser / Mass flow meter & other instruments.	X	X		X
1.15	Training schedule with contents.		X		
2.0	DESIGN				
2.1	Process flow diagrams (PFDs) and Piping & Instrumentation diagrams (P&IDs) of sub systems and complete system with write-up on operation	X	X		X
2.2	Data sheets of Bus & Car Dispensers Mass flow meter duly filled up.	X	X		X
2.3	Performance data, vendor literature for equipment selection, performance curves with duty point marked for individual equipment		X		X
2.4	Specification for piping material & valves.		X		X
2.5	Utility requirement		X		X
2.6	Detail of control wiring diagram, interlock/ shutdown/ control scheme with write up on operation. Sizing Calculation for instrument items.		X		X
3.0	CONSTRUCTIONAL FEATURES				

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S. No.	Description	With Bid	After Job Award		
			For Review	For Information	Final in Book Form
3.1	G.A. Drawing of Dispensers showing overall dimensions, erection/ shipping weight and required maintenance clearances.	X	X		X
3.2	Cross section drawings of individual equipment/ skid, material & parts list.			X	X
3.3	Detailed foundation drawing of dispenser for casting foundation giving load pattern		X		
3.4	Details of inlet gas termination including X,Y,Z co-ordinates with respect to centre of dispenser or any other reference		X		
3.5	Drawings, documents, data as asked under Electrical & Instrumentation specifications of this Material Requisition.		X		X
3.6	Termination & Wiring Diagrams		X	X	X
4.0	SPARES				
4.1	List of spares as listed in the mandatory Spares table	X			
4.2	List of spares as listed in the commissioning spares Spares table	X			

19.2 Document Distribution Schedule

- i. Documents and drawings under column no. 3 shall be submitted with each copy of the bid.
- ii. Documents listed under column 4 are to be submitted in 3 copies
- iii. Documents listed under column 5 are to be submitted in 3 copies.
- iv. Documents listed in column 6 are to be submitted as hard bound indexed book containing the following details in four (4) copies & 1 transparencies and to be submitted within 2 weeks of release note/dispatch of materials/ equipment from vendor's works.All transparencies to be supplied in rolls (in two sets).

19.3 Details to be included in Final Documents Books


- i. Manufacturing Data Book containing all test certificates of components, raw materials, stage manufacturing tests and inspections, final tests & inspection documents including welders' qualification & welding procedure qualification, repairs & reworking carried out in shops. All raw material test certificates must be correlated to the P.O. Item No. & component to which they relate by clear noting on the certificates.

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- ii. Spares details including assembly drawings, part numbers, delivery, prices and ordering information
- iii. All design calculations carried out by the vendor.
- iv. Final Drawing Index and all as-built drawings reduced to A3/ A4 size and wherever reduction is not possible, full size copies duly folded and placed in plastic pockets.
- v. Catalogues/leaflets of sub-vendors/suppliers of various bought out components highlighting the components actually supplied correlated to P.O.Item Numbers.
- vi. Operating and maintenance instructions including lubrication schedules with details of suppliers for procurement by OWNER for subsequent needs.
- vii. Release Note and Packing List.
- viii. Any other documents asked for in the Purchase Requisition.
- ix. All final drawings shall also be given to purchaser in digitized form on CD-ROM
- x. compatible to AUTOCAD software

19.4 Special instructions for submission of Dwgs. /Documents:

- i. Fold all prints to 216 MM x 279 MM size & roll transparencies.
- ii. Contractor to forward the drawings and documentation to GAIL GAS clearly specifying purchasers Job no. & Req. No.
- iii. The drawing/Document no. with Rev. No. is essential.
- iv. Each Drawing/Document submitted to GAIL GAS/WGI must be checked and signed/stamped by contractor before it is submitted to GAIL GAS/WGI.
- v. Multi-sheet documents other than drawings must be submitted in their entirety in the event of a re-submission even if only a few sheets are revised.
- vi. Final submission in bound volumes shall necessarily have a cover page giving project title, Item name, P.O.No. particulars of owner & vendor and an index giving list of drawings & documents included (with revision no.).
- vii. All vendor drawings to be provided with a blank space measuring 75 mm W x 38 mm H for marking of review codes etc. by GAIL GAS.
- viii. Review of vendor drawings by GGL/WGI would be only to check compatibility with basic designs & concepts & shall in no way absolve the contractor/vendor of his responsibility to meet applicable codes, specifications & statutory rules/regulations.
- ix. Vendor shall submit within 10 days after placement of FOI, the complete list of drawings/documents with submission dates against each.


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20. CHECK LIST: BUS AND CAR DISPENSER PACKAGE


Notes:

- a. Vendor shall furnish all the equipment of Dispenser, auxiliary systems, instruments and controls and safety devices as per the enquiry document. Anything required over and above what is specified, for safe and satisfactory maintenance 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 reply is 'NO', vendor shall give reason for the same:
- c. Vendor's scope of supply shall include but not limited to the following:


S. 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	YES		
1.3	Certificate of Weight & Measure	YES		
1.4	CCOE Approval	YES		
1.5	- Electronic display (2 sets of 3 rows) for Bus Dispenser - Electronic display (2 sets of 3 rows) for Car Dispenser	YES		
1.6	Tamper proof locking arrangement for flow meter	YES		
1.7	Front/side mounted locking / latch for nozzle holding	YES		
1.8	Pressure dial gauge-dial/Digital 4" with c/w Red sector	YES		
1.9	Separate non-resettable straight forward totaliser	YES		
1.10	ESD button mounted on both sides	YES		
1.11	One set of isolation valves at the inlet of the piping with venting arrangement	YES		
1.12	Electrical equipment and instrumentations wiring are provided with certificate of area classifications	YES		
1.13	Dispenser automatically stop dispensing in case of: power failure, meter failure, overfill, failure of totalizers, transducer failure etc.	YES		
1.14	GAIL GAS's Logo and name displayed on both sides of dispensers	YES		
1.15	Common venting on the top of the dispenser	YES		
1.16	Overall CV is indicated of dispenser from inlet of the dispenser upto outlet probe including mass flowmeter, interconnecting tubing, valves, hoses, nozzles etc.,	YES		

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S. No	Description	Specified by Purchaser (YES/NO)	Included by Vendor (YES/NO)	Remarks
1.17	Dispenser is shipped in fully wired and assembled condition only gas supply connection and power supply connection shall be made at site.	YES		
1.18	Warranty for a period of 12 months form the date of Final acceptance on Installation & commissioning at Site or 24 months from the date of last shipment ,whichever first expires..	YES		
2.0	Spares and Tools / Tackles			
2.1	All necessary spare parts to sustain the maintenance of the CNG dispenser facilities within the warranty period are supplied and stock at the supplier workshop/ warehouse located in India for immediate replacement of parts	YES		
2.2	Mandatory spares as specified in the "Mandatory Spares" (Indicate separate price for each item)	YES		
2.3	Quote for one year Normal Maintenance	Reqd.		
3.0	Inspection and Testing			
3.1	As specified on the datasheets and Technical specifications	YES		
4.0	Vendor Data and drawings			
4.1	All data & drawings are required per VDR format	YES		
5.0	Erection, commissioning and trail 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		
5.2	One year maintenance contract including all operating spares including consumables applicable for dispenser.	YES		
6.0	Technical parameters to be confirmed by Vendor			
6.1	Inlet pressure Kg/cm ² g or [bar(g)] - 250	YES		
6.2	Fill Pressure Kg/cm ² g or [bar(g)] - 200	YES		
6.3	Operating temp range (-55°C to 70°C)	YES		
6.4	Power supply (Single ph AC 230V +15%, 50Hz+3%)	YES		
6.5	a) Fill Nozzle; NGV-1 Type 2 Class A with 9/16" NZS type Refueling Adopter for Bus dispensers b) Fill nozzle: Both fill hose shall be fitted with NZS-5425 fill nozzle for Car Dispensers	YES		
6.6	Flexible fill & vent Hose(twin type)-Parker/ Synflex / Mac	YES		
6.7	Flexi-Hose rating- 5000psi, Length -5 meters	YES		
6.8	Sequential filling - Three bank	YES		
6.9	Temp compensation - 200bar (g) equivalent at 15°C	YES		
6.10	Break-away coupling - 3/8"	YES		

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S. No	Description	Specified by Purchaser (YES/NO)	Included by Vendor (YES/NO)	Remarks
6.11	Principle of Metering - Coriolis	YES		
6.12	Flow meter with integral transmitter having display of flow rate, totalizers, and provision of mechanical counter, etc. Note: flow meter-transmitter must have tamper proof lock out configuration as per norms of W&M for use in public transactions.	YES		
6.13	a) Minimum flow rate 75Kg/min under atmospheric discharge at 250 bar inlet pressure for Bus Dispenser b) Minimum flow rate 15Kg/min under atmospheric discharge at 250 bar inlet pressure for Car Dispensers	YES		
6.14	Overall batch accuracy of Dispenser \pm 1.0 % or better	YES		
6.15	Mass flow meter accuracy \pm 0.5% of delivered qty or better	YES		
6.16	Repeatability \pm 0.3%	YES		
6.17	Calibration - traceable to NIST as per ISO 5168	YES		
6.18	Enclosure whether proof to IP65, NEMA4x	YES		
6.19	Pressure rating of wetted part - 5000psi at 25oC as per ASME / ANSI 31.3	YES		
6.20	Process temp effect - +0.01% of nominal flow rate per degree C on zero offset	YES		
6.21	Pressure influence – NIL	YES		
6.22	Surge and frequency transient- shall be in compliance with ANSI / IEEE(EFT) c62.41(1991)	YES		
6.23	EMI effect on sensor and transmitter-to the requirement of EMC directive1(jan'94)	YES		
6.24	Vibration effect - As per SAMA PMC31.1 1994	YES		
6.25	Dispenser / Mass flow meter model shall have Indian W&M certification	YES		
6.26	Custody transfer certificate for Dispenser / Mass flow meter, testing must be in accordance with OIML	YES		
6.27	The offered model must have CCOE approval	YES		
6.28	The offered model shall have digital protocol like MODBUS for SCADA connectivity.	YES		

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