HPOIL GAS PRIVATE LIMITED

(A Joint Venture of HPCL & OIL)

ANNUAL RATE CONTRACT FOR SUPPLY OF 250 SCMH and 400/450SCMH BOOSTER COMPRESSOR AT NAGALAND GA

TECHNICAL VOLUME
(OPEN DOMESTIC COMPETITIVE BIDDING)

Tender No.: HOGPL/2025-26/C&P/007

Date: 26.06.2025

Signature & Seal of Bidder

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: City Gas Distribution Project of Nagaland State

OWNER/COMPANY/PURCHASER/CLIENT: HPOIL GAS PRIVATE LIMITED (HOGPL)

VENDOR/BIDDER/SUPPLIER/CONTRACTOR: The party, who manufactures and supplies equipment and Provide services to the OWNER or to CONTRACTOR

MR: Material Requisition.

Section I: MATERIAL REQUISITION

1.0. SCOPE OF SUPPLY & SERVICES

Design, Engineering, Manufacturing, Testing, Inspection, Supply, Transportation, Transit Insurance, Loading & Unloading at Nagaland GA (HOGPL) site/store, Documentation including Erection, Installation, Commissioning with commissioning spares & Field Performance Test at HOGPL site of 250 SCMH and 400/450SCMH Electric Motor Driven Hydraulic Variable Suction CNG Booster Compressor with air compressor of capacity approx. 1.5KW discharge pressure approx. 10Kg/Cm2g, 100 water liter capacity air receiver and air dryer along with all accessories and auxiliaries as per technical volume of tender document complete in all respects including special tools & tackles with the list & Operation & Comprehensive maintenance services for 03 (Three) years post completion of warrantee period as per details furnished in this Bid documents.

SOR Item No.	Description of item	Unit	Quantity
1.1	DESIGN, ENGINEERING, MANUFACTURING, TESTING, INSPECTION, SUPPLY, TRANSPORTATION, TRANSIT INSURANCE, LOADING & UNLOADING AT NAGALAND GA (HOGPL) SITE/STORE, DOCUMENTATION INCLUDING ERECTION, INSTALLATION, COMMISSIONING WITH COMMISSIONING SPARES & FIELD PERFORMANCE TEST OF 250 SCMH ELECTRIC MOTOR DRIVEN HYDRAULIC VARIABLE SUCTION CNG BOOSTER COMPRESSOR WITH SUITABLE MOTOR AT HOGPL SITE INCLUDING AIR COMPRESSOR OF CAPACITY APPROX. 1.5KW DISCHARGE PRESSURE APPROX. 10KG/CM2G, 100 WATER LITER CAPACITY AIR RECEIVER AND AIR DRYER ALONG WITH ALL ACCESSORIES AND AUXILIARIES AS PER TECHNICAL VOLUME OF TENDER DOCUMENT COMPLETE IN ALL RESPECTS INCLUDING SPECIAL TOOLS & TACKLES WITH THE LIST. COMPREHENSIVE ANNUAL MAINTENANCE SERVICE CONTRACT OF CNG COMPRESSORS INCLUDING AIR COMPRESSOR DURING THE WARRANTY PERIOD INCLUSIVE OF (A) PREVENTIVE MAINTENANCE AT REGULAR INTERVAL BY OEM. (B) BREAKDOWN MAINTENANCE AS AND WHEN REQUIRED.	Nos	06
1.2	INLAND TRANSPORTATION UPTO DELIVERY (NAGALAND) LOCATION AND OTHER COSTS INCIDENTAL TO DELIVERY OF GOODS (INCLUDING ALL TAXES & DUTIES EXCEPT GST)	Nos	06
1.3	LUMP SUM COMPREHENSIVE OPERATION SERVICE CONTRACT OF CNG COMPRESSORS DURING THE WARRANTY PERIOD FOR 2 SHIFTS - EACH SHIFT OF 8 HRS.	Machine Shift Months	144

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1.4	LUMP SUM COMPREHENSIVE OPERATION SERVICE CONTRACT OF CNG COMPRESSORS DURING 1ST YEAR AFTER WARRANTY PERIOD FOR 2 SHIFTS- EACH SHIFT OF 8 HRS.	Machine Shift Months	144
1.5	LUMP SUM COMPREHENSIVE OPERATION SERVICE CONTRACT OF CNG COMPRESSORS DURING 2ND YEAR AFTER COMPLETION OF 1ST YEAR FOR 2 SHIFTS- EACH SHIFT OF 8 HRS.	Machine Shift Months	144
1.6	LUMP SUM COMPREHENSIVE OPERATION SERVICE CONTRACT OF CNG COMPRESSORS DURING 3RD YEAR AFTER COMPLETION OF 1ST YEAR FOR 2 SHIFTS- EACH SHIFT OF 8 HRS.	Machine Shift Months	144
1.7	LUMP SUM COMPREHENSIVE MAINTENANCE SERVICE CONTRACT OF CNG COMPRESSORS INCLUDING AIR COMPRESSOR DURING 1ST YEAR AFTER WARRANTY PERIOD INCLUSIVE OF MANPOWER, SPARES, CONSUMABLES ETC. CMC WILL CONSIST OF TWO PARTS: (A) PREVENTIVE MAINTENANCE AT REGULAR INTERVAL BY OEM/AUTHORIZED CONTRACTOR AS PER RECOMMENDATION OF OEM. (B) BREAKDOWN MAINTENANCE AS AND WHEN REQUIRED WITHIN AMC BY OEM.	Machine Months	72
1.8	LUMP SUM COMPREHENSIVE MAINTENANCE SERVICE CONTRACT OF CNG COMPRESSORS INCLUDING AIR COMPRESSOR DURING 2ND YEAR AFTER COMPLETION OF 1ST YEAR INCLUSIVE OF MANPOWER, SPARES, CONSUMABLES ETC. CMC WILL CONSIST OF TWO PARTS: (A) PREVENTIVE MAINTENANCE AT REGULAR INTERVAL BY OEM/AUTHORIZED CONTRACTOR AS PER RECOMMENDATION OF OEM. (B) BREAKDOWN MAINTENANCE AS AND WHEN REQUIRED WITHIN AMC BY OEM.	Machine Months	72
1.9	LUMP SUM COMPREHENSIVE MAINTENANCE SERVICE CONTRACT OF CNG COMPRESSORS INCLUDING AIR COMPRESSOR DURING 3RD YEAR AFTER COMPLETION OF 1ST YEAR INCLUSIVE OF MANPOWER, SPARES, CONSUMABLES ETC. CMC WILL CONSIST OF TWO PARTS: (A) PREVENTIVE MAINTENANCE AT REGULAR INTERVAL BY OEM/AUTHORIZED CONTRACTOR AS PER RECOMMENDATION OF OEM. (B) BREAKDOWN MAINTENANCE AS AND WHEN REQUIRED WITHIN AMC BY OEM.	Machine Months	72
2.1	DESIGN, ENGINEERING, MANUFACTURING, TESTING, INSPECTION, SUPPLY, TRANSPORTATION, TRANSIT INSURANCE, LOADING & UNLOADING AT NAGALAND GA (HOGPL) SITE/STORE, DOCUMENTATION INCLUDING ERECTION, INSTALLATION, COMMISSIONING WITH COMMISSIONING SPARES & FIELD PERFORMANCE TEST OF 400/450 SCMH ELECTRIC MOTOR DRIVEN HYDRAULIC VARIABLE SUCTION CNG BOOSTER COMPRESSOR WITH SUITABLE MOTOR AT HOGPL SITE INCLUDING AIR COMPRESSOR OF CAPACITY APPROX. 1.5KW DISCHARGE PRESSURE APPROX. 10KG/CM2G, 100 WATER LITER CAPACITY AIR RECEIVER AND AIR DRYER ALONG WITH ALL ACCESSORIES AND AUXILIARIES AS PER TECHNICAL VOLUME OF TENDER DOCUMENT COMPLETE IN ALL RESPECTS INCLUDING SPECIAL TOOLS & TACKLES WITH THE LIST. COMPREHENSIVE ANNUAL MAINTENANCE SERVICE CONTRACT OF CNG COMPRESSORS INCLUDING AIR COMPRESSOR DURING THE WARRANTY PERIOD INCLUSIVE OF (A) PREVENTIVE MAINTENANCE AT REGULAR INTERVAL BY OEM. (B) BREAKDOWN MAINTENANCE AS AND WHEN REQUIRED.	Nos	04

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2.2	INLAND TRANSPORTATION UPTO DELIVERY (NAGALAND) LOCATION AND OTHER COSTS INCIDENTAL TO DELIVERY OF GOODS (INCLUDING ALL TAXES & DUTIES EXCEPT GST)	Nos	04
2.3	LUMP SUM COMPREHENSIVE OPERATION SERVICE CONTRACT OF CNG COMPRESSORS DURING THE WARRANTY PERIOD FOR 2 SHIFTS - EACH SHIFT OF 8 HRS.	Machine Shift Months	96
2.4	LUMP SUM COMPREHENSIVE OPERATION SERVICE CONTRACT OF CNG COMPRESSORS DURING 1ST YEAR AFTER WARRANTY PERIOD FOR 2 SHIFTS- EACH SHIFT OF 8 HRS.	Machine Shift Months	96
2.5	LUMP SUM COMPREHENSIVE OPERATION SERVICE CONTRACT OF CNG COMPRESSORS DURING 2ND YEAR AFTER COMPLETION OF 1ST YEAR FOR 2 SHIFTS- EACH SHIFT OF 8 HRS.	Machine Shift Months	96
2.6	LUMP SUM COMPREHENSIVE OPERATION SERVICE CONTRACT OF CNG COMPRESSORS DURING 3RD YEAR AFTER COMPLETION OF 1ST YEAR FOR 2 SHIFTS- EACH SHIFT OF 8 HRS.	Machine Shift Months	96
2.7	LUMP SUM COMPREHENSIVE MAINTENANCE SERVICE CONTRACT OF CNG COMPRESSORS INCLUDING AIR COMPRESSOR DURING 1ST YEAR AFTER WARRANTY PERIOD INCLUSIVE OF MANPOWER, SPARES, CONSUMABLES ETC. CMC WILL CONSIST OF TWO PARTS: (A) PREVENTIVE MAINTENANCE AT REGULAR INTERVAL BY OEM/AUTHORIZED CONTRACTOR AS PER RECOMMENDATION OF OEM. (B) BREAKDOWN MAINTENANCE AS AND WHEN REQUIRED WITHIN AMC BY OEM.	Machine Months	48
2.8	LUMP SUM COMPREHENSIVE MAINTENANCE SERVICE CONTRACT OF CNG COMPRESSORS INCLUDING AIR COMPRESSOR DURING 2ND YEAR AFTER COMPLETION OF 1ST YEAR INCLUSIVE OF MANPOWER, SPARES, CONSUMABLES ETC. CMC WILL CONSIST OF TWO PARTS: (A) PREVENTIVE MAINTENANCE AT REGULAR INTERVAL BY OEM/AUTHORIZED CONTRACTOR AS PER RECOMMENDATION OF OEM. (B) BREAKDOWN MAINTENANCE AS AND WHEN REQUIRED WITHIN AMC BY OEM.	Machine Months	48
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2.0. INFORMATION/ DOCUMENTS/ DRAWINGS TO BE SUBMITTED BY SUCCESSFUL BIDDER

Successful Bidder shall submit four copies of listed below, each of the following:

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.(Inspection site should be PESO approved and Lab should be NABL Approved)

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

Statutory test certificates, as applicable.

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/PO.

WPS & PQR as required.

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

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

Weekly & fortnightly progress reports for all activities including procurement.

Purchase orders of bought out items soon after placement of order.

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

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

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.

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.

A list of documents to be furnished along with supply.

Bidder to furnish filled up documents / formats as per Commercial Volume of this tender.

Section II: SCOPE OF WORK

1.0. SCOPE OF SUPPLY

The scope of work/services to be provided by the bidder shall be inclusive of but not limited to:

Design, Engineering, Manufacture, assembly, testing at manufacturer's works, field trial runs, and Equipment performance test along with associated electrical, instrumentation etc. as per bid document.

Instrumentation and control system as specified on data sheets, P&ID including Local panel, Console/Local gauge boards, PLC.

Common structural steel skid for the compressor- Motor combination and for all auxiliary systems.

Air-cooled heat exchanger for inter stage and discharge gas.

All compressors have the necessary inbuilt infrastructure for installing a CNG cascade above them.

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Priority Panel at Package Discharge as per priority fill system.

All interconnecting oil, gas, water, air piping, cables within the compressor package.

All cable glands within the package and for incoming main power cable shall be supplied by vendor. Cable glands shall be of flame proof type.

Impulse and pneumatic piping/Tubing for all valves, fittings as specified & required for mounting the instruments. Block and bleed valves to be provided for Pressure gauges and pressure Transmitters.

NRV at final discharge.

CNG compressors shall have the inbuilt gas and fire detectors inside the enclosure. Location for Gas detectors is above the internal tubing or stage tubing and for fire detectors is above the motor and PLC panel.

Structural supports within the compressor package for all piping, instruments etc.

One no. relief valve at each stage discharge, first (1st) stage suction and Blow Down Vessel.

Y- type strainers, valves, sight flow indicators, check valves, auto & manual drain traps etc. as required for various auxiliary systems i.e. frame lube oil, cylinder lubrication system, cooling water systems etc.

Coupling/V-belts/pulleys.

Acoustic enclosure for Compressor package, with one number L.E.L detectors and one UV detectors in the enclosure.

- Common CO2 extinguishing system consisting of two cylinders, piping, valves and control systems, Also one CO2 cylinder will be extinguish at the time successful commissioning of compressor and that will be refilling by bidder.
- Inlet and outlet manual and automatic isolating valves for maintenance & emergency. Field Performance test at site.
- Supply of all erection & commissioning spares.
- One set of spare parts catalogue along with the priced bid, as built drawings, and Operation & Maintenance catalogue with each compressor package.
- Arranging 02 days onsite training program for operators and Client engineers by bidder
- Training of six engineers in three batches at Packager's works. The travelling, boarding, and lodging of Purchaser's engineers shall be borne by Purchaser. Each training module shall span for one week and shall cover the equipment constructional features, operational and maintenance procedures, practical hands on experience on assembling, dismantling etc.
- The compressor package control system shall be designed for unattended safe operation in automatic mode and shall unload, start, load, stop safely. The compressor shall start in auto in case high bank pressure in dispenser fall below 210 kg/cm2g and stop once the pressure in all three banks reaches 255 kg/cm2g.
- Compressor shall be suitable for continuously variable suction pressure from 210kg/cm2g to 30 kg/cm2g, supplied through LCV mounted CNG storage cascade.
- The ingress of oil into CNG adversely affects vehicle emission and storage system. Hence in case of lubricated cylinders, vendor shall supply a proven, maintenance free oil removal system with automatic and manual drain after after-cooler to remove oil from removal system to restrict the oil less than 5 PPM

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in discharge compressed gas.

- Electric motor with hydraulic as Compressor Driver.
- For metering of natural gas, 1 No. Coriolis type Mass Flow meter shall be provided at the inlet of Compressor Package.
- Instrumentation and control system as specified in the tender document.
- One no. Instrument Air compressor/dryer package with air storage vessel of 1.5 KW motor rating as required for operation of complete package/dispensing unit.
- Suitable Priority Fill System with compressor top-up facility inclusive of regulating valves, bypass valve & liquid filled pressure gauges as specified in technical specifications.
- Electrical equipment / Instruments being requested in the Compressor package.
- Separate junction boxes for different type of signals like analog, digital signals, alarm, shutdowns, and thermocouples, RTDs etc. for interfacing to local panel as per requirement.
- Main incoming cable from owners PDB to main control panel of the compressor (a distance of 50 meter is to be considered) through GI conduit/trenches, Cable from owner's electronic earth pit (EE) for electronic circuit in control panel, cable from owner's main earthing ring to control panel body earth and all inter connecting cables including complete erection accessories like double compression cable gland, cable tags, lugs etc. as required.
- Fire and Gas detection system integrated with compressor instrument panel and should be installed in the package as fire detector above motor and panel and gas detector above the tubing and cylinder.
- Gas vent header
- Operation and Maintenance during the warranty period along with spares, consumables, lubricants, and manpower, etc., except electricity.
- Piping from air compressor and CO2 cylinders up to enclosures in the scope of bidder. One CO2 cylinder will be used at the time of Commissioning of compressor the refilling of extinguish cylinder in the scope of contractor.
- Special tools and tackles along with Toolbox (List to be submitted with bid) Bidder may outsource auxiliaries' equipment from domestic market from reputed manufacturer approved by PURCHASER. However, the overall guarantee shall lie with the bidder.

2.0. SCOPE OF WORK

- Bidder's scope of work shall include but not limited to design, engineering, manufacturing, inspection, testing, supply including packaging, forwarding, insurance, custom clearance, handling and unloading as well as at PURCHASER stores, package performance test (FAT) at Bidder 's shop and Site Acceptance Test (SAT) of "ELECTRIC MOTOR DRIVEN HYDRAULIC VARIABLE SUCTION CNG BOOSTER COMPRESSOR PACKAGES" as required for dispensing CNG to vehicles at various location of Nagaland State. Electric type CNG Booster Compressor is designed to handle a flow rate of 250SCMH and 400/450 SCMH from a variable suction pressure of 30 - 210 kg/cm2g to a discharge pressure of 255 kg/cm2g.).
- The variable suction Compressors have to be installed at the CNG outlets of Client's / Oil and Marketing Company (OMC) retail Outlets located in Nagaland State for dispensing in vehicles. The suction of the compressor will be from Light Commercial Vehicle (LCV) mounted mobile cascades provided by Client and the compressed natural gas (CNG) will be dispensed in vehicles by the dispensers installed by

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Client.

- Bidder shall be responsible for supply, erection, commissioning, and field trial run. Noise level test and performance test of all packages at sites. The field trial run of the Variable Suction Compressor will be for continuous run of minimum of 04 hours in which satisfactory performance of the package together with all accessories auxiliaries and controls shall be established for satisfactory performance for specified operating conditions.

- The bidder has to operate & maintain the compressors for all days in a year (including air compressor) during warranty & post warranty period under operation & comprehensive maintenance period from the successful date of commissioning duly accepted by owner. The bidder has to keep the compressors operational round the clock by providing suitable operator and all the expenditures including manpower, spares and consumables, oil, lubricant etc. to make the compressors operational shall have to be borne by the bidder. The power required to run the compressors will be provided by Client. The contractor shall maintain the compressors in sound mechanical condition at all times. The contractor shall rectify the defects notified by Client immediately and should submit all the history log sheets and spares availability status along with the report in the format mutually agreed between Client and the bidder.

- Periodic inspections of Safety Valves, Transmitters, Pressure vessel gauge and any other equipment as per statutory norms of Nagaland Factory Rules 1963. SMPV and Gas Cylinder Rules shall have to be carried out by the bidder at his own cost during the period of operation & maintenance by the bidder. The inspections have to be carried out by competent persons as per advice of Engineer-in-Charge and certificates have to be submitted to Client.

- The contractor shall deploy adequate number of operator/technicians / supervisors / Engineers / helpers as well as tools, spares, consumables and equipment for smooth and proper operation & maintenance of the Compressor 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. Contractor to submit a detailed organogram with key person details before starting maintenance of the compressor package. The operation & maintenance staffs have to be available round the clock daily throughout the year.

- 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 & around the clock.

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

- Bidder will make sitting arrangements to operators in process area to observe machine continuously, make a small shed for operators to seat.

- The work force deployed by the contractor for operation and maintenance service of Compressors, 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.

- 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.

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

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

- All personnel of the contractor entering on work premises shall be properly and neatly dressed and shall wear uniform, badges while working on premises of the Owner including work sites.

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- 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.
- All the safety rules and regulations prevailing and applicable from time to time at the installations as directed by OWNER will be strictly adhered to by the contractor.
- 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.
- The services shall be provided in terms of shift pattern on the round the clock basis. The contractor is responsible to provide effective and efficient services in all shifts and assure that there is no disruption in the services for want of any resources.
- The contractor shall establish a central control room to operate 24 hours, seven days a week where complaint regarding non-performance of the Compressors in terms of the contract can be lodged. Further, the contractor shall deploy adequate number of operator/technicians/ supervisors / engineers at various site offices in consultation with Engineer-in-Charge to provide trouble free maintenance of the Compressors.
- 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. cell phone / walky-talky.
- The successful bidder shall indemnify the Owner from any claim of the contract labour.
- The successful bidder shall comply to all the rules regarding PF, ESI etc. as stated in the tender document.
- 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.
- Summary of breakdown hour's station wise with analysis shall be submitted to CNG control room on a fortnightly basis both in hard and soft form as per OWNER format.
- The contractor has to submit the following documents on monthly basis along with the bill:

  1. Preventative maintenance compliance report for that month along with the detailed service report.
  2. Details of the compressor breakdown, summary of break down hours for that month and the cumulative break down hours along with breakdown response time.
  3. Compressor parameter logbook for the month.
  4. Certificate to be given by the bidder stating that they have complied with all the labour regulations and are following the minimum wages act.
  5. All consumables, lubricating oil, coolant required for carrying out preventive / any type of maintenance shall be in the scope of supplier during the warranty period. The warranty spares shall be supplied by the vendor during the warranty period as per warranty clause.
  6. All tools, tackles and fixtures required for carrying out the above maintenance of the compressor shall be in scope of the bidder. The scope will also include handling equipment's like crane, forklift, chain pulley block, etc required during the any maintenances activity.
  7. Any correspondence required to be made with the principal company or OEM or various offices shall be made by the bidder or bidder's agent. All arrangements like phone, fax, computer, Internet etc. required for above correspondences shall be arranged by the bidder at his own cost.
  8. The periodic maintenance required to be done as per OEM recommendation shall be taken up promptly. The bidder shall provide the detailed preventative maintenance schedule along with:
  a) Estimated down time required for each type of maintenance schedule.

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b) List of spares and their quantities required for each type of maintenance schedule per compressor.
c) Type and number of man days required for each type of maintenance schedule per compressor.

- Contractor team (Technician / Operator) – Roles and Responsibility:
  The functions and responsibilities are listed below:
  a) To function as an integral member of the HOGPL O&M coordination team.
  b) Interface with Contractor / HOGPL on all equipment and system issues mobilize any Contractor / HOGPL resources required for scheduled or unscheduled maintenance.
  c) Assist HOGPL personnel with development and implementation of sound operating and maintenance strategies and procedures, including corrective action guidance.
  d) Assessments of consumables, operational and maintenance spares, OEM services etc. Maintain spares inventory well in stock to avoid any uninterrupted operations on round the clock basis.
  e) Provide reports as per HOGPL O&M practices.
  f) Conduct training programs for upgrading O&M resources, participate in all Contractor and safety trainings.
  g) Collect and provide data as deemed necessary by HOGPL to analyse equipment performance.
  h) Responsible for performing all routine, breakdown & scheduled maintenance activities during O&M.
  i) Monitor the performance of equipment's.
  j) Monitor all essential parameters of the running equipment and report any discrepancy in operational parameters.
  k) Responsible for log-book data capturing, minor maintenance activities, safety of equipment's for safe operations.
  l) The contractor 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 such as compressor parameter log book, complaint log book, service report, break down summary report etc. shall be in scope of the Contractor.
  Operation & Maintenance team shall be made available for work on 24 Hrs. basis

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

- The bidder shall use only OEM's certified spares during maintenances. All spares shall be kept in sealed OEM stamped packages. The packages shall be opened in front of OWNER representative during maintenance. In case, the schedule maintenance of the OEM manual recommends to check and replace parts like valve spring, valve plates, piston rings etc. after certain time interval, same shall replace or used further only on approval from the OWNER's representative. However, any untoward consequences for non-replacement of such parts shall be the responsibility of the bidder and spares, repair required to put back the unit into operation will be to bidders account.

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

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

- The contractor 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 such as compressor parameter logbook, complaint logbook, service report, break down summary report etc. shall be in scope of the bidder.

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

- All the maintenance / inspection job carried out by the bidder shall be recorded in a service report and

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the report of the same shall be jointly signed by OWNER representative and submitted immediately after carrying out the maintenance. Service report format shall be approved by OWNER.

- The EIC will be final authority to take decision with regards to maintenance or replacement of parts or any disagreement between the bidder and OWNER, during the execution of the contract.
- The bidder shall carryout calibration of gas detectors and flame detectors every six months or earlier as per requirement or instruction of EIC of OWNER. Also, yearly calibration of all instruments such as pressure gauges, transmitters, switches, mass flow meters etc shall be in the scope of the bidder. In addition to the above all safety relief valves shall also be tested and calibrated every year.
- Calibration of all the instruments and safety valves shall be done from government-approved laboratories and shall be carried out at least 15 days prior to the calibration due date.
- The bidder shall keep 1 set of safety relief valves in spare for the purpose of calibration.
- The bidder shall carry out retesting of pressure vessels periodically i.e. every year or earlier as per Gas Cylinder rules 2016 / Static & Mobile Pressure Vessels Rules.
- During the warranty period of one year and three years after warranty period the bidder shall maintain the compressor with spares and consumables at his own cost. (HOGPL reserve the right to commission the compressor with 2-month advance notice to bidder).
- 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 medical assistance to the contractor personnel.
- The contractor shall be responsible for the discipline and good behavior of all his personnel deployed in the services contracted out and in case any complaint is 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.
- The contract shall arrange to supply/renew identity card to his workforce at his own cost, if so required by HOGPL for security or for any other reasons. Those contractor's personnel shall be required to carry their respective identity cards while on duty and produce on demand.
- Nothing contained herein shall restrict HOGPL from accepting similar service from other agencies at its discretion and at the risk and cost of the contractor, if the contractor fails to provide the said services any time.
- **SUB-LETTING OF CONTRACT-** No part of the CONTRACT nor any share or interest therein shall in any manner or degree be transferred, assigned or sublet by the BIDDER directly or indirectly to any person, firm or corporation whatsoever without the consent in writing, of the ENGINEER/EMPLOYER except as provided for in the succeeding sub-clause.
- **SUB-CONTRACTS FOR TEMPORARY WORKS ETC.:** The EMPLOYER may give written consent to Sub- contract for the execution of any part of the WORK at the site, being entered in to by BIDDER provided each individual Sub- contract is submitted to the ENGINEER-IN-CHARGE before being entered into and is approved by him.
- **LIST OF SUB-CONTRACTOR TO BE SUPPLIED:** At the commencement of every month the BIDDER shall furnish to the ENGINEER-IN-CHARGE list of all SUB-CONTRCATORS or other persons or firms engaged by the BIDDER and working at the SITE during the previous month with particulars of the general nature of the Subcontract or works done by them.
- **iii) CONTRCATOR'S LIABILITY NOT LIMITED BY SUB-CONTRCATORS:** Not withstanding any sub-

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letting with such approval as aforesaid and not withstanding that the ENGINEER-IN-CHARGE shall have received copies of any Subcontracts, the BIDDER shall be and shall remain solely responsible for the quality, proper and expeditious execution of the Contract in all respects as if such sub-letting or Subcontracting had not taken place, and as if such work had been done directly by the BIDDER

- The BIDDER shall bear all responsibility for any act or omission on the part of sub- BIDDERs in regard to work to be performed under the CONTRACT.

- **iv) EMPLOYER MAY TERMINATE SUB-CONTRACTS:** If any SUB-CONTRCATOR engaged upon the works at the site executes any works which in the opinion of the ENGINEER-IN-CHARGE is not in accordance with the CONTRACT documents, the EMPLOYER may by written notice to the BIDDER request him to terminate such subcontract and the BIDDER upon the receipt of such notice shall terminate such Subcontract and dismiss the SUB-BIDDER(S) and the later shall forthwith leave the works, failing which the EMPLOYER shall have the right to remove such SUB- CONTRCATOR(S) from the site.

- **v) NO REMEDY FOR ACTION TAKEN UNDER THIS CLAUSE:** No action taken by the EMPLOYER under the clause shall relieve the BIDDER of any of his liabilities under the CONTRACT or give rise to any right or compensation, extension of time or otherwise failing which the EMPLOYER shall have the right to remove such SUB-CONTRCATOR(S) from the site. except for the authorized agent. Bidder shall mention the details of authorized agent in their bid.

- **vi) BIDDER has responsibility as a Principal employer to check all the statutory compliances of the deployed staff at HOGPL site by Sub-Letting contractors. BIDDER has to check all the documents and verify it. HOGPL is not responsible for any dispute regarding statutory compliances.**

3.0. EXCLUSIONS

The following are excluded from the scope of the bidder:

- All civil works and foundation design, however the bidder shall furnish all the relevant data for design of any pedestal if required.

- Cascades.

- CNG Dispensers and Interconnected SS tubes & fittings. The design, construction, manufacture, supply, testing and other general requirements of the compressor package equipment shall be strictly in accordance with the data sheets, applicable API codes, Technical specification, approved drg /document 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. Any modification suggested by the statutory bodies either during drawing approval or during inspection, if any, shall be carried out by the Bidder without any additional cost and delivery implications.

4.0. CODES & STANDARDS

Following codes, standards, and regulations to be considered:

- OISD 142:
- IS 5572
- OISD 179, NFPA-52: 2006, NFP-496, NFPA-68, NFPA-70 or equivalent
- NFPA – 37
- NFPA – 12- CO2 Flooding system
- IS: 325/ IEC or International standards. – Standards for electric Motor
- IS: 6382

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- Applicable ANSI, ASTM, NEC, NEMA code
- API – 618/API 11 P
- EURO EAN NORM P.E.D., Italian NOR M D.P.R. 47/55
- EURO EAN NORM P.E.D, D.M. 24.5.02 - D.M. 2 8 .6.02
- D.M 2 4.11.84 parte prima - sez. II°, D.M . 24.5.02 - D.M. 28.6.02, DIN 2413, S AE J 514
- EURO EAN NOR MS, CEI N 60079- 0/CEI EN 60079-14/ CEI, EN 60204-1/ CEI EN 60439-1, ATEX STAN DARD
- API – 661: Specifications for Air cooled exchangers
- ASME Section – VIII Div. – 1/2 Design codes for pressure vessels.
- Gas Cylinder Rules 2016.
- Standard Specifications of Bureau of Indian Standards (BIS).
- Specifications/Recommendations of IEC.
- Indian Electricity Rules.
- Indian Explosives Act.
- Delhi Factory Rules, 1950
- TEMA – C - Water cooled heat exchangers
- ASME / ANSI – B-31.3 Code for Process Piping
- DIN 2413-This standard covers the design of steel bends and bent pipes of circular cross section used in pressure pipelines.
- SAE J 514-Standard for CNG hydraulic tube fittings and O-ring
- CEI EN 60079-10-Classification of area for explosive gas atmosphere
- CEI EN 60079-14-Design, selection and installation of electrical systems for areas with potentially explosive atmosphere.
- CEI, EN 60204-1-Standard for safety of machinery — Electrical equipment of machine
- CEI EN 60439-1-Standard for safety of electrical equipment
- ATEX-Standard for describing electrical equipment and workspace is allowed in an explosive atmosphere.

5.0. OTHER CONDITIONS OF WORK

5.1 UTILITIES & BATTERY LIMITS

5.1.1 UTILITIES.

Air compressor along with 1.5 KW electric motor having discharge pressure of 10 kg/cm2g with dryer shall be supplied by the bidder. Air receiver of 100 water liter capacities shall be provided. Air dryer suitable for automatic operation shall also be supplied along with all accessories. Air compressor, drier and air receiver for instrument air, shall be kept off the package in safe area or client's building. Piping, electrical & instrumentation cabling shall be in bidder’s scope. Necessary FR unit shall be provided as per requirement. Manual drains and automatic moisture traps shall be provided in the system. Air receiver shall be provided with SRV, pressure switch, pressure gauge and drains. Pressure switch and pressure gauge shall have isolation valve. Air dryer shall be with bypass arrangement.

Two Number Tapping from air receiver and dryer shall be provided as follows:

a) For dispenser: One tapping with isolation valve from air receiver.
b) For booster compressor: One tapping with isolation valve from air receivers.

Cooling water is not available as utility and the package shall be provided with self-sufficient cooling water system for Compressor, as required, with makeup tank. However cooling water for makeup tank is available. All the electrical equipment in this system shall be suitable for area classification of Hazardous area CLASS-1, DIVISION-1, GROUP-D as per NEC.

All electrical and instrumentation terminals shall be as specified.

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Electric power shall be made available by Owner.

For running the compressor and illumination 415 Volt (±10 %) 3-phases 3 Wire, 50 Hz (±5%) shall be provided to starter panel to feed the compressor motor. Bidder shall indicate power/ Feeder (KW/Amp) requirement in the offer.

Purchaser shall provide UPS (240 ±1 % V, 50 ±1 % Hz) for LCP. Bidder shall indicate power/ feeder (KW/Amp) requirement in the offer. Bidder to make arrangement for conditioning of power supply beyond above limit.

5.1.2 BATTERY LIMITS

All customer interface connections, gas Inlet shall be brought out to the package edge and terminated with ¾ "OD SS-Tube.

As and where specified on the data sheets all vents (i.e. Relief valve, distance piece and packing) shall be Mani folded and terminated at skid edge outside the enclosure and vented to safe height of 2.5m at package roof with proper support.

All drains from different process equipment, distance piece and packing shall be Mani folded and terminated as single point for customer interface duly flanged with isolation valve.

UPS and Non-UPS power shall be made available from power distribution board (PDB) in the electrical room. Supply, Erection and termination of all cables and accessories from feeder in electrical room (50 mtrs distance to be considered) shall be in the bidder's scope.

Electrical earth pit shall be made available at a distance of about 5 mt. from compressor package. Electrical Earthing Cable from this earth pit shall be in the bidder's scope shall be terminated to dedicated earth provided in the panel through proper size of glands. Owner's earthing main ring shall be made available at compressor foundation for equipment earthing. Electrical earthing for motor shall be done through Cable and the body earthing to be done through GI strip of 25 x 3 inside the compressor package shall be in the bidder's scope.

6.0. AS-BUILT DOCUMENTS

On successful completion of hydrostatic testing, the Bidder shall prepare As Built drawings & reports of entire Filter separator system 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:
(i) As-built drawing of Compressor package GAD / Fabrication Drawing / P&ID etc.
(ii) Test Reports/Results/Records

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

Type of document	**Software**
a) Test Reports/Results/Records	MS Word/Excel (MS Office 2000)
b) Drawings	AutoCAD

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

7.0. DOCUMENTS TO BE SUBMITTED AT THE TIME OF BIDDING

Sizing calculation of Compressor package, data sheet, power requirement, Reference list of similar equipment supplied in past, Preliminary GAD of Compressor package with overall dimension and weight and BOQ. Bidder is advised to comply with all the requirements of bid document without any deviations. Company reserves the right to reject any bid with deviations without making any reference to bidder.

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8.0. BIDDER'S RESPONSIBILITIES

Bidder's responsibilities, besides the scope of work for supply to be performed by him defined earlier, shall also include the following:
a. Interpretation and verification of data/information furnished by Company. Any additional information/data/surveys etc. required by Bidder for detailed engineering shall be obtained by him. Company may assist him in obtaining such information/ data by issuing recommendatory letters etc.

b. Entire engineering for procurement & fabrication, including drawings, QA/QC procedures, etc. performed by the Bidder for the Compressor package system shall be reviewed and approved by Company. All works shall be executed based on approved documents only.

c. Review and approval of Bidder's documents by Company shall in no way relieve the Bidder from his sole responsibility for safe and efficient design, engineering, supply and subsequent smooth operation of the system.

d. Bidder shall depute independent third-party inspector from List of Recommended TPIA for carrying out all necessary inspections and review of test results/reports etc.

e. Pre-commissioning/ commissioning assistance of entire compressor package.

f. Bidder shall carry out all testing and inspection of materials, equipment etc. through independent testing institutions, laboratories, if so desired by Company.

g. Any other work not specifically listed above but is required for successful completion of entire system.

9.0. CHECKLIST: SCOPE OF SUPPLY

Bidder shall furnish all equipment, drivers, 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 operations of the equipment package shall be included by the Bidder in his scope.
Bidder to write 'YES' or 'NO' against each item. Bidder 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 should give reason for the same.

Bidder's scope of supply shall include but not be limited to the following:

Sl. No.	Description	Specified by Purchaser (YES/NO)	Included by Bidder (as annexure/ page)	Remarks
1	Each compressor package shall be complete with:			
2	Document required for equipment qualification criteria submitted along with User's certificate	Yes		
3	Area Classification: All electrical and electronic components as specified shall be suitable for hazardous area CLASS-1 DIVISION-1 GROUP-D as per NFPA 70 Article 500 or ZONE-1, GROUP IIA/IIB as per EIC/IS	Yes		
4	Two nos. Modular type DCP fire extinguisher capacity 10 Kg, shall be provided with each Compressor in the enclosure.	Yes		

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5	One LEL, one fire detector (UV) and one FLP Lamp shall be provided in the enclosure.	Yes		
6	One air compressor with air storage Vessel and air drier for utility air required. Gas shall not be allowed to operate instrumentation.	Yes		
7	Cooling System at site is not available: It is required to have closed circuit radiators for cooling compressor and auxiliaries if needed which shall be in the scope of the Bidder.	Yes		
8	Safety relief valves on each stage of the compressor	Yes		
9	Minimum flow capacity corresponding at suction pressure of 30 Kg/cm2 and discharges at 255 Kg/cm2	250 SCMH and 400/450 SCMH		
10	Explosion proof Electrical panel to be installed in the hazardous area.	Yes		
11	Electrical equipment of cooling system to be explosion proof.	Yes		
12	All valves, tubing's, fittings, as specified and required within the compressor package shall be SS- 316	Yes		
13	CO2 flooding system included as per specifications	Yes		
14	Instrumentations and control included as per specifications, including One No mass flow meter.	Yes		
15	Acoustic enclosures for Motor & compressor for noise attenuation up to 75DBA @ 1 metre distance.	Yes		
16	Priority Panel as specified at package discharge.	Yes		
17	Cabling with cable trays for all electrical & instrumentation cabling within the package	Yes		
18	All couplings and Guards	Yes		
19	Set of Special tools & tackles and Toolbox (along with list)	Yes		
20	Inspection and testing as specified on the data sheet and TS.	Yes		
21	Documents: All data and drawings as required as per TS	Yes		
22	Erection, commissioning, and PG test at site of the complete package	Yes		
23	Foundation and anchor bolts is in the scope of the Bidder	Yes		
24	Operation and Maintenance Services is as per TS.	Yes		

10.0. GUARANTEED PARAMETERS

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Sl No	Description	Bidder to indicate
1	Average flow capacity (over full range of suction pressure from 210 kg/cm2g to 30 kg/cm2 varying on continuous basis) required min 400 Sm3/hr	
2	Minimum flow capacity corresponding to suction Pressure of 210 kg/cm2g	
3	Minimum flow capacity corresponding to suction Pressure of 30 kg/cm2	
4	Minimum flow capacity corresponding to suction Pressure of 50 kg/cm2	
5	Sound level of enclosure(requiredMax75DBA)	
6	Electric power consumption in KWH with no (+) tolerance with overall full range of suction pressure (from 210 kg/cm2 to 30 kg/cm2 varying on continuous basis) to compress 250 SCMH and 400/450 SCMH gas with no (-) tolerance without air compressor and exhaust fan for loading and penalty purpose *	
7	Specific power consumption of compressor package Kwh/Kg CNG (Penalty purpose) *	

POWER LOADING:
Power loading shall be done on the basis of the lowest power consumption quoted and shall be calculated based on the following:

E (Rs.) = (Ed) x Re x 4380 x Df

E = Amount of loading in INR
Ed = Difference between Lowest Electric Power Consumption and Electric Power Consumption indicated by respective bidder (KWH)
Re = Unit rate of electricity which is Rs. 6/- per unit
4380 = 12 hrs per day for 365 days
Df = 3.274 (Discounting factor based on 5 years of operation)

During evaluation, this amount shall be loaded in the price quoted by the bidder to arrive the final evaluated amount of respective bidder.

11.0. Penalty for Non-Performance during Operation & Maintenance Period

(a) On normal day (i.e. the day other than the Scheduled Maintenance Day):

(i) The party has to ensure that the equipment is available for operation for a minimum of 12 hours per day.

(ii) If the equipment is down for more than 6 hours on any day. Penalty would be applicable as follows:

up to 10 hours: Rs. 20,000/- per day

Beyond 10 hours: Rs. 40,000/- per day.

(b) On Scheduled Maintenance Day:

(i) The party would be required to carry out the recommended schedule/preventive maintenance

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of the equipment for which the party has to indicate the time required for each type of schedule maintenance.

(ii) If the equipment is down for more than 6 hours & upto 12 hours beyond the time indicated for the agreed schedule maintenance, the party would be penalized Rs. 20,000/- and for more than 12 hours Rs. 40,000/- per day.

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 O&M charges to be paid to the party per month per compressor

- Non-availability of manpower in any shift/any workplace will not be tolerable.
- The BIDDER will be penalized for each such act as follows.
- For non-availability of compressor operator, PPE, Uniform = 5% of Max. Invoice value of Single Pkg. / Incident & Max. amount will be penalized up to 10% of the Max. Invoice value of each package in a month.
- If the BIDDER fails to provide PPE and Uniform to his manpower after stipulated time, HOGPL will provide the PPE and Uniform at his risk and cost considering original invoice value plus 15% overhead charges which will be recovered from BIDDER.
- We at HOGPL will not tolerate any kind of Indiscipline act at the premises from the BIDDER employee's during the service time. If any such incident happens, the BIDDER will be penalized 5% of the Max. Inv. Value / Incident & Max. amount will be penalized up to 10% of single package invoice value
- In any Case/any situation, total cumulative penalty from all accounts (i.e. from gas loss, break down time, statutory requirements etc.) will be limited to 50% of monthly invoice value of concerned package for concerned month.
- No penalty will be carried over to next month.
- For any IR (Industrial Relation) issue (like strike by operators for wages,union issues etc.) CNG station operation stopped, BIDDER will be penalized Rs. 25,000/- Incident. Max. Capping is up to Rs.1,00,000/- Month
- Non-availability of compressor due to malfunctioning or non-availability of any of its auxiliaries / part shall be considered as the non-availability of the compressor package and shall be liable for above penalty.
- The penalty clause will be put into force, immediately after successful commissioning and subsequent performance test (which will be for a minimum period of 72 hours) of compressor packages.
- Any reason for non-availability of compressor package and in scope of the bidder shall be liable for the above penalty.
- In case of any complaint regarding non-fulfillment of any obligation under the contract, HOGPL reserves the right to withhold payment to the contractor, and out of such amount and including the security deposit hold, make such payment as it may consider necessary for smooth and

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unhindered working of the contract.

- The BIDDER shall depute his Supervisor for supervision of the services to receive instructions from Engineer-in-Charge or his representative.

- CONTRACTOR'S RESPONSIBILITY- The contractor shall depute his Supervisor for supervision of the services to receive instructions from Engineer-in-Charge or his representative

11.1. Penalty Due to power consumption.

- The volumetric efficiency and rated output of the compressor shall be consistently within the limit. Power consumption per Kg gas compressed should be within the benchmark set by HOGPL. A present benchmark for specific power consumption is 0.07 Kwh/kg (Between CNG supply suction pressure of approx. 210 Kg/cm2 and mobile cascade disconnection at 30 Kg/cm2).

Sp. Power in Kwh/kg = Total power units consumed by the compressor/ 3 months
Total gas sold in the same period i.e. In 3 months

- The extra electricity bill amount due to inefficient operation shall be recovered from the lessor at the tariff prevailing at the time of operation. The extra electricity due to higher specific power consumption will be calculated as follows.

- The extra expenses to be recovered from the lessor in Rs = (Specific power consumption over and above the benchmark) x (prevailing power tariff inclusive of taxes, duties & levies) x (Total sale of gas during the billing period.)

11.1.1. Compressor Capacity

- Bidder shall guarantee average capacity of 250 SCMH and 400/450 SCMH from suction pressure of 30 to 210 kg/cm2 and discharge pressure of 255 Kg/cm2 at discharge temperature of 52 degrees centigrade with no negative tolerance for errors in instruments and measurements.

- For calculation purpose 1kg of CNG =1.33 SCM
- If bidder quotes less than 20 KWH. No advantage will be given for quoting less than 20 KWH. The same shall be used to establish the capacity at site during package performance test.

11.2.2. Penalty towards Package Efficiency Loss

- This penalty shall be imposed on compressor blocks not capable of delivering a rated capacity of 250 SCMH and 400/450 SCMH

The following calculations shall be used for penalty towards package efficiency loss:

FOR 250 SCMH CNG COMPRESSOR

F = 2 x {(250 x H x RD x AD) – M}

FOR 400/450 SCMH CNG COMPRESSOR

F = 2 x {(400 x H x RD x AD) – M}

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Where, F = Penalty Amount in Rupees
H = Hours clocked in a month
RD = Average RD for the month using GC Data
AD = Air Density = 1.22541
M = Discharge mass flow during the month in Kgs

Note: Gauge Pressure at Station Inlet shall be used as benchmark for imposition of penalties and not suction pressure being displayed at the PLC.

12.0. MANDATORY SPARES PARTS FOR HYDRAULIC DRIVEN RECIPROCATING COMPRESSOR PACKAGE

a) 1 Set means the quantity required for one compressor package. Bidder to provide itemized detailed list of mandatory spares with parts number having validity period of 03 (three) years, in case owner is interested to purchase the same. Details items in the set will be as per OEM 's spare parts & maintenance manual.

b) In technical bid, bidder to provide itemized detailed list of mandatory spares without price.

c) In Priced bid, bidder to provide itemized detailed list of mandatory spares with price the list of mandatory spares which will not be the part of evaluation.

12.1 List of Mandatory Spares Part

Sr. No	Description of Part	Part Number	Qty.	Unit price	Total Cost
1					
2					
3					
4					
5					
6					
7					
	Total Cost				

Section III: DATA SHEET OF CNG BOOSTER COMPRESSOR:

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DATA SHEET - HYDRAULIC VARIABLE SUCTION CNG BOOSTER COMPRESSOR (250 SCMH)			
GENERAL			
	Feed gas process conditions are as follows,		
	Suction Pressure	30 - 210	Kg/cm^{2}g
	Temperature	35	˚C
	Flowrate	250	SCMH
	Discharge Pressure	255	Kg/cm^{2}g
	STANDARDS / CODES		
	1. PNGRB standards		
	2. Published standards		
	3. Indian standards		
	4. Oil India Safety Directorate (OISD)		
	5. API-11P, Second edition, API 618		
	6. International standards: ANSI, ASME, ASTM, API, SA, NACE, ISO, DIN, EN, etc.		
	Notes		
	1.SCOPE OF SUPPLY FOR EACH COMPRESSOR PACKAGE:		
	For Scope of Supply refer doc. No. VCS-1007-CGD-MC-SW-002 Attached with Tender.		
	2. For technical requirement, Refer Technical specification doc. No.VCS-1007-CGD-MC-TS-002 is attached with Tender		
	3.Bidder to furnish complete filled in data sheet in API 618 format.		
	4.The Variable Suction Compressor shall be suitable for continuous operation on variable suction pressure from 210 kg/cm2g to		
	30 kg/cm2g, supplied through LCV mounted CNG storage cascade and discharge pressure of 255 kg/cm2g		
	6.The compressor shall be designed to work for full suction pressure range of 210 kg/cm2g to 30 kg/cm2g.		
	7.Compressor suction scrubbers shall be fitted with vane pack mist eliminator. Vane pack shall remove liquid droplets down to 10 microns or below.		
	8.Design code for		
	piping - ASME/ANSI B 31.3		
	Pressure Vessel - ASME SEC-VIII, DIV 1		
	Gas Cooler - Preferable API-661		

DATA SHEET – COMPRESSOR

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GENERAL:					
Service	:	Natural Gas		**Equipment Tag No.**	TBD
Configuration	:	2 x 100 %		**Running**	
Compressor Type	:	Non- Lubricating type, Variable suction Pressure reciprocating		**driver Type**	Electrical Motor Driven Hydraulic
Design margin	:			**Capacity Control**	Automatic (VTA)
Process Data	:	For one Compressor		**No of stages**	VTA
Design Cases	:			**No of Required**	2
Gas handled	:	Compressed Natural Gas (CNG)		**Design code**	API- 618 & API 11 P - 2nd Edition
Hazardous Area	:	Zone 1 IIA/IIB			

CASE-1

Parameters	**Units**	**Booster Compressor Package**		
Volume Flow rate	SCMH	250		
Mass flow	kg/hr	**VTC**		
Inlet conditions				
suction pressure	kg/cm2g	210-30(Continuous Variable suction)		Note-13
suction Temperature		35 (40 Max.)		
Molecular weight	kg/kmol	Ref Gas composition (VTC)		
mass density	kg/m3	Ref Gas composition (VTC)		
Specific heat ratio		Ref Gas composition (VTC)		
Compressibility factor		Ref Gas composition (VTC)		
Final Discharge conditions				
Discharge pressure	kg/cm2g	255		Note-4,5
Discharge Temperature		52		Note-1,6
Mass weight	kg/m3	Ref Gas composition (VTC)		
Compressibility factor		Ref Gas composition (VTC)		
Polytropic Efficiency	%	Note-7		
Duty	KW	VTC		Note-8
Total Power	KW	VTC		
Compositions in Mole %				

Components	**Normal Gas Composition Range**	**Design Case**	
Methane	82.0 - 99.0	92.5	
Ethane	7.5 - 0.9	2.22	
Propane	3.5 - 0.0	1.84	
i- Butane	0.75 - 0.0	0.49	
n- Butane	0.75 - 0.0	0.49	
i- pentane	0.33 - 0.0	0.31	
Hexane	0.25 - 0.0	0.18	
Carbondioxide	4.9 - 0.0	1.9	
Nitrogen	**0.08 - 0.0**	**0.07**	
H2S	10 ppm	10 ppm	

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	NOTES:
	1. Given temperature is booster compressor package outlet temperature. However, compressor discharge temperature will be provided by vendor at their compressor datasheet.
	2. Compressor vendor to confirm the compressor ratio.
	3. Compressor vendor shall ensure the suitability of the material of construction for the Booster compressor for 35 °C suction Temperatures & corresponding discharge temperature) s).
	4. The discharge pressure provided is the discharge pressure at the end of final stages of compression.
	5. The discharge pressure at each stage has to be provided by vendor.
	6. The discharge temperature at each stage has to be provided by vendor.
	7. Polytropic efficiency will be provided by compressor vendor.
	8. The given duty is the Absorbed power of the compressor.
	9. Vendor to consider 10% margin on the flowrate to design compressor.
	10. Design Life of the compressors shall be minimum 25years.
	11. Ambient Temperature: 2 °C MIN / 47 °C MAX.
	12. The given suction and discharge properties is based on Design Operating case. Also, vendor to design compressor suitable for normal gas composition range as specified above.
	13. VTA - Vendor To Advise
	14. VTC - Vendor To Confirm

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GENERAL			
	Feed gas process conditions are as follows,		
	Suction Pressure	30 - 210	Kg/cm^2g
	Temperature	35	˚C
	Flowrate	400	SCMH
	Discharge Pressure	255	Kg/cm^2g
	STANDARDS / CODES		
	1. PNGRB standards		
	2. Published standards		
	3. Indian standards		
	4. Oil India Safety Directorate (OISD)		
	5. API-11P, Second edition, API 618		
	6. International standards: ANSI, ASME, ASTM, API, SA, NACE, ISO, DIN, EN, etc.		
	Notes		
	1.SCOPE OF SUPPLY FOR EACH COMPRESSOR PACKAGE:		
	For Scope of Supply refer doc. No. VCS-1007-CGD-MC-SW-002 Attached with Tender.		
	2. For technical requirement, Refer Technical specification doc. No.VCS-1007-CGD-MC-TS-002 is attached with Tender		
	3.Bidder to furnish complete filled in data sheet in API 618 format.		
	4.The Variable Suction Compressor shall be suitable for continuous operation on variable suction pressure from 210 kg/cm2g to		
	30 kg/cm2g, supplied through LCV mounted CNG storage cascade and discharge pressure of 255 kg/cm2g		
	6.The compressor shall be designed to work for full suction pressure range of 210 kg/cm2g to 30 kg/cm2g.		
	7.Compressor suction scrubbers shall be fitted with vane pack mist eliminator. Vane pack shall remove liquid droplets down to		
	10 microns or below.		
	8.Design code for		
	piping - ASME/ANSI B 31.3		
	Pressure Vessel - ASME SEC-VIII, DIV 1		
	Gas Cooler - Preferable API-661		

DATA SHEET – COMPRESSOR

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GENERAL:					
Service	:	Natural Gas		**Equipment Tag No.**	TBD
Configuration	:	2 x 100 %		**Running**	
Compressor Type	:	Non- Lubricating type, Variable suction Pressure reciprocating		**Driver Type**	Electrical Motor Driven Hydraulic
Design margin	:			**Capacity Control**	Automatic (VTA)
Process Data	:	For one Compressor		**No of stages**	VTA
Design Cases	:			**No of Required**	2
Gas handled	:	Compressed Natural Gas (CNG)		**Design code**	API- 618 & API 11 P - 2nd Edition
Hazardous Area	:	Zone 1 IIA/IIB			

CASE-1

Parameters	**Units**	**Booster Compressor Package**		
Volume Flow rate	SCMH	400/450		
Mass flow	kg/hr	**VTC**		
Inlet conditions				
suction pressure	kg/cm2g	210-30(Continuous Variable suction)		Note-13
suction Temperature		35 (40 Max.)		
Molecular weight	kg/kmol	Ref Gas composition (VTC)		
mass density	kg/m3	Ref Gas composition (VTC)		
Specific heat ratio		Ref Gas composition (VTC)		
Compressibility factor		Ref Gas composition (VTC)		
Final Discharge conditions				
Discharge pressure	kg/cm2g	255		Note-4,5
Discharge Temperature		52		Note-1,6
Mass weight	kg/m3	Ref Gas composition (VTC)		
Compressibility factor		Ref Gas composition (VTC)		
Polytropic Efficiency	%	Note-7		
Duty	KW	VTC		Note-8
Total Power	KW	VTC		
Compositions in Mole %				

Components	**Normal Gas Composition Range**	**Design Case**	
Methane	82.0 - 99.0	92.5	
Ethane	7.5 - 0.9	2.22	
Propane	3.5 - 0.0	1.84	
i- Butane	0.75 - 0.0	0.49	
n- Butane	0.75 - 0.0	0.49	
i- pentane	0.33 - 0.0	0.31	
Hexane	0.25 - 0.0	0.18	
Carbondioxide	4.9 - 0.0	1.9	
Nitrogen	**0.08 - 0.0**	**0.07**	
H2S	10 ppm	10 ppm	

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	NOTES:
	1. Given temperature is booster compressor package outlet temperature. However, compressor discharge temperature will be provided by vendor at their compressor datasheet.
	2. Compressor vendor to confirm the compressor ratio.
	3. Compressor vendor shall ensure the suitability of the material of construction for the Booster compressor for 35 °C suction Temperatures & corresponding discharge temperature) s).
	4. The discharge pressure provided is the discharge pressure at the end of final stages of compression.
	5. The discharge pressure at each stage has to be provided by vendor.
	6. The discharge temperature at each stage has to be provided by vendor.
	7. Polytropic efficiency will be provided by compressor vendor.
	8. The given duty is the Absorbed power of the compressor.
	9. Vendor to consider 10% margin on the flowrate to design compressor.
	10. Design Life of the compressors shall be minimum 25years.
	11. Ambient Temperature: 2 °C MIN / 47 °C MAX.
	12. The given suction and discharge properties is based on the Design Operating case. Also, vendor to design compressors suitable for normal gas composition range as specified above.
	13. VTA - Vendor To Advise
	14. VTC - Vendor To Confirm

Section IV: DATA SHEET OF INTERCOOLER / AFTERCOOLER:

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1	**GENERAL**			
2	PROJECT: **PROCUREMENT OF CNG BOOSTER COMPRESSORS**			
3	OWNER: **M/S HPOIL GAS PRIVATE LIMITED** SITE: **NAGALAND**			
4	Item No.: Service: **Intercooler / After cooler for Compressor Package**			
5	NOTE: ■ SCOPE OPTION / INFORMATION SPECIFIED BY PURCHASER □ INFORMATION REQUIRED FROM VENDOR.			
6	□ Manufacturer:	Type: □ Forced Draft □Induced Draft		
7	□Bundle Size: m x m x m	Bundles/Section		Number of Units:
8	Bundles/Unit:	In Parallel / Series		Section Size:
9	Surface/Bundle: m²	Bare Tube: m²		Section/Unit:
10	Surface/Unit: m²	Bare Tube: m²		Plot Area/Unit:
11	**PERFORMANCE (Of One Unit)**			
12	Heat Exchanged: kcal/hr			MTD (Corrected): ^{U}C
13	Transfer Rate: kcal/hr m² ^{U}C	(Finned Surface)		(Bare Surface)
14	**TUBE SIDE**			
15	Fluid Circulated	**GAS**		Gravity: Liquid API SG @ 15.4EC
16	Total Entering Gas kg/hr			Enthalpy / Latent Heat kcal/kg
17	Operating Temperature	In:	Out:	Fouling Resistance hr m² ^{U}C/kcal
18	Operating Pressure Passes / Bundle kg/cm²			
19	AIR SIDE			
20	Temperature	In: **47**	Out:	Altitude m
21	Total Flow/Unit kg/hr			Static Pressure kg/cm²
22	Quantity/Fan kg/hr			Power/Fan kW
23	Face Velocity m/sec			Power/Unit kW
24	**CONSTRUCTION (Each Bundle)**			
25	Design Pressure: kg/cm²g	Test Pressure: kg/cm²g		Design Temperature: ^{U}C
26	Code Requirements:			
27	Type of Tubing:	Tube Material:		Fin Material: **Al**
28	**Tube** Bare Tubes (no's):	No. of rows: O.D. Length		BWG/Thk
29	Fins: Spacing /inch. O.D.	Root Dia		Thickness:
30	**Header** Type: Plug / Cover		No. of Splits:	Material:
31	Plugs/Gaskets	Side Frame: **C.S. Inside Zinc Protected**		
32	**Nozzles**	In:		Out:
33	**Couplings**	**Vent:**		Drain:
34	**CONSTRUCTION (Each section)**			
35	Structure	**CS**	Sec./Gr. No.	Design Wind Load: kgf/m
36	Plenum Chamber	**CS inside Zinc Protected**		Type:
37	Fans No.	Dia.	RPM	Mfr.

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38	Blades	Material:	No./Fan	Pitch Angle (Design):
39	Hubs	Material:	Pitch: Autovariable / Adjustable (No.)	
40	Louvers	Material:	Type:	Mfr.
41	Weights kg Each Section (Dry) :		Full of Water:	
42	Each Bundle (Dry):		Full of Water:	
43	**APPLICABLE SPECIFICATIONS API Standard 661**			
44	REMARKS 1. Air coolers shall be designed for 20% excess capacity than required normally.			
45	Exchanger shall be designed with air side temperature of 47 ^{0}C.			
46	Separate data sheet shall be filled by the bidder for each service i.e. Inter cooler and After cooler			

Section V: DATA SHEET OF LV INDUCTION MOTOR:

GENERAL INFORMATION

Applicable To: Proposal Purchase As Built Vendor shall complete Data Sheet with information not otherwise provided by Client: Buyer.

HPOIL GAS PRIVATE LIMITED

Facility: _____ Tag Number: _____

Location: Nagaland Manufacturer/Model No.: _____

Service: _____

[TECHNICAL DATA SHEET]

1.00	**GENERAL**		
1.01	Vendor	* / # #	
1.02	Manufacturer	* / # #	
1.03	Country of Origin	* / # #	
1.04	Mechanical data validity (IFI/IFP)	* / # #	
1.05	Maximum delivery date	* / # #	
1.06	Type		
1.07	Standards, Codes		
1.08	General specification		
1.09	Tag No.		
2.00	**ENVIRONMENTAL/CONDITION**		
2.01	Place of installations	Indoor	Outdoor
2.02	Altitude if>1000m		
2.03	Maximum ambient temperature		
2.04	Design ambient temperature		
2.05	Relative Humidity		
2.06	Special conditions (Tropicalisation, etc..)		
2.07	Hazardous area (zone)		
2.08	Gas group		
2.09	Auto ignition temperature		
3.00	**DRIVEN EQUIPMENT CHARACTERISTICS**		

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3.01	Driven Machine	* compressor Fan Pump	
3.02	Service conditions	S1 S2	
3.03	Maxi shaft power	*	
3.04	Shaft power at operating point	*	
3.05	Brake torque curve (kn2...)	*	
3.06	Required starting brake torque (Nm)	*	
3.07	Moment of Inertia MR2 (kgm2)	*	
3.08	Driver Machine Speed RPM	*	
3.09	Drive (Direct / Belt)	*	
3.10	Coupling	*	
3.11	Toward Motor Thrust	* Transient Continuous	
3.12	Toward Coupling Thrust	* Transient Continuous	
3.13	Radial Thrust	* Transient Continuous	
3.14	Number of Belts	*	
4.00	**FOR AIR COOLERS EXCHANGER ONLY**		
4.01	Motor in/outside air flow	*	
4.02	Motor Ventilation Against Air Flow	* Yes No	
4.03	Max. Temp. of air (°C)	*	Air Speed: * m/s
4.04	Weight Supported by the Shaft End kg	*	
5.00	**MOTOR GENERAL CHARACTERISTICS**		
5.01	Rated power kW	# #	
5.02	Synchronous Speed RPM	# #	
5.03	voltage (+/- 10%)		
5.04	Phase		
5.05	Frequency (+/- 5%)		
5.06	Mounting Symbol	* / # #	
5.07	Height of Shaft	* / # #	
5.04	Degree of Protection (IP)		
5.05	Number of Consecutive Start ups Cold		
5.06	Number of Consecutive Start ups Warm		
5.07	Insulation Class		
5.08	Temperature Rise at (55°C)		
5.09	Type of Starting		
5.10	Cooling Type		
5.11	Impregnation	# #	
5.12	Direction of Rotation Facing Motor Shaft	* CW ☐ CCW/2	
5.13	Protection for Hazardous Area (Ex' d'...)		
5.14	Gas Group (IIB...)		
5.15	Temperature Class / Maxi. Surface Temperature		
6.00	**MOTOR ELECTRICAL CHARACTERISTICS**		
6.01	Rated Current (or Full Load Current)	# #	

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6.02	No Load Current	# #
6.03	No Load Power	# #
6.04	Locked Rotor Current (LRC) (%)	
6.05	Efficiency at	# #
6.06	Power Factor at	# #
6.07	Locked Rotor Power Factor Cos 0	# #
6.09	Thermal Time Constant	# #
6.10	Permissible Locked Rotor Time (Cold, Warm)	# #
6.11	Running Up Time Under Full Voltage	# #
6.12	Running Up Time Under 80% Voltage	# #
6.13	Permissible Voltage Drop at Starting (%Un)	
6.14	Full Load Speed (at 4/4 Load)	# #
6.15	Locked rotor torque at Un/0.8 Un (% FLT)	# #
6.16	Pull up torque at Un/0.8 Un (% FLT)	# #
6.17	Breakdown torque at Un/0.8Un (% FLT)	# #
6.18	Vibration at no load (% mm/s RMS)	# #
6.19	Critical Speed (% r/min)	# #
6.20	Maximum transient air gap torque when - 2 phase circuit at motor terminal Nm - 3 phase circuit at motor terminal Nm	# #
		# #
7.00	**MOTOR MECHANICAL CHARACTERISTICS**	
7.01	Frame material	# #
7.02	Moment of inertia MR2 kgm2	# #
7.03	Total weight kg	# #
7.04	Bearing	# # Antifriction sleeve
7.05	Bearing at coupling side/Opposite to coupling side	# #
7.06	Axial Thrust bearing	# # C.A C.O.A Without
7.07	Lubrication (Grease/oil)	Grease Oil
7.08	Painting	# #
7.09	Noise Level (Lp.Lw) dBA	
7.10	Service Factor	
8.00	**MOTOR CERTIFICATIONS**	
8.01	Nr. Of certification (for motors located in Hazardous area)	
8.02	Certifying Authority	
9.00	**MOTOR AUXILIARY EQUIPMENTS**	
9.01	Anti-condensation Heater Protection for Hazardous Area	
9.02	Anti-condensation Heaters (power, Voltage)	
9.03	Thermistor protection for motors	

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10.00	**MOTOR CONNECTIONS**	
10.01	NR. Of terminals Brought out	
10.02	Earthing Terminal (In / Outdoor, Section)	
10.03	Start or winding connection symbol (star/delta)	
11.00	**MAIN TERMINAL BOX**	
11.01	Short Circuit rating kA	
11.02	Protection (Gas Group, Temp. Class)	
11.03	Orientation	#
11.04	Cable Gland Opening Type	
11.05	Cable Size mm2	#
11.06	Overall Diameter mm	#
11.07	Diameter Over Armour mm	#
11.08	Diameter Under Armour mm	#
12.00	**AUXILIARY TERMINAL BOXES**	
12.01	Heater Terminal Box KA	
12.02	Protection (Gas Group, Temp. Class)	
12.03	Orientation	#
12.04	Cable Gland Opening Type	
12.05	Cable Size mm2	#
12.06	Overall Diameter mm	#
12.07	Diameter Over Armour (mm)	#
12.08	Diameter Under Armour (mm)	#
13.00	**INSPECTION & TESTS**	
13.01	Inspection and Tests	
NOTES:		
	* Data to be filled by supplier with its bid in the supplier data column, those data shall be in accordance with standard specification.	
	# Data to be defined during detailed engineering.	
	# # Data by motor manufacturer.	

Section VI: TECHNICAL SPECIFICATION

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1.0 SCOPE

This specification provides vendor the technical and operating conditions for the CNG hydraulic compressor must fulfill. Additional features other than those indicated herein which call for a better design, increase in efficiency, enhance reliability, optimization may be accepted subjected to Client's approval. The Compressor package shall be shipped in completely assembled condition. Gas supply line and delivery connection shall be made at site.

The vendor shall bid their main offer, items according to the technical specifications mentioned below.

1.1 HYDRAULIC DRIVEN RECIPROCATING COMPRESSOR

To increase the dispensing speed & reduce waiting time for filling at daughter booster station and better utilization of cascade capacity, hydraulic type motor driven reciprocating CNG variable suction booster compressor of capacity 250 SCMH and 400/450 SCMH at 210 to 30 kg /cm2 suction pressure has been envisaged at daughter booster station.

Hydraulic driven reciprocating compressor with electric motor, hydraulic pump and piping, cooling system, suction and discharge filters, control panel safety and control devices, tubing, valves, instrument and other accessories required for automatic and safe operation of the system.

The pistons / cylinders are actuated by hydraulic fluid instead of connecting rod. The hydraulic driven compressors are suitable for high suction pressure and for relatively low volume filling. The CNG gas shall be totally oil free, hence the membranes are inserted for positive separation.

The Bidder shall meet all applicable statutory codes, National law and Local regulation for safety and environment protection.

Bidder shall include all interconnecting piping tubing/cables.

The compressor package control system shall be designed for unattended safe operation in automatic mode and shall unload, start, load, stop safely. The compressor shall start in auto in case high bank pressure in dispenser fall below 210 kg/cm2g and stop once the pressure in all three banks reaches 255 kg/cm2g.

The priority fill system will ensure maximum flow rate by filling of vehicle and storage cascade.

Compressor shall be designed to ensure flow capacity and operating suction and discharge pressure as indicated in data sheet attached with tender.

1.2 COOLING SYSTEM

Each compressor package shall be complete with its own cooling system. The cooler shall be air cooled heat exchanger. The gas temperature aftercooler shall not exceed 52 deg C. For calculating the surface area of the cooler, the ambient air temperature of 47 Degree C and 80% RH shall be considered. Cooler design shall be based on 20% extra load corresponding to max severe operating conditions based on the thermal duty. Cooling system to be preferably installed on same skid along with compressor due to space constraint. Therefore, all electrical and instrumentation equipment installed shall be as CLASS-1, DIVISION 1, GROUP D of NEC or ZONE-1, GROUP IIA/IIB, IS/IEC.

1.3 ELECTRICALS

a) Prime mover (Electric Motor)

The motor shall be flame proof/ explosion proof and confirm to IS: 2148 suitable for zone 1 group IIA and T3 area as per IS/IEC. The Motor shall be of standard frame size as per IS/IEC and rated for continuous duty with high efficiency and shall be designed for star-delta starting. The Motor shall be provided with class 'F' insulation; however, temperature rise shall be limited to the temperature specified for class 'B' insulation as

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per IS and shall be suitable for voltage variation of 415V±10%. The bidder shall indicate the guaranteed total power requirement in KW. The motor rating shall be 110% of the greatest BKW required by the compressor. Bidder to furnish filled in data sheet of electric motor attached with tender.

a)	Type of drive	Totally enclosed fan cooled (TEFC) high efficiency s per IEEMA standard19-2000
b)	Protection Explosion proof	IP.55
c)	Insulation	Class “F” with Class “B” temperature rise
d)	Mounting	As per system requirements
e)	Specification standard	IS-325
f)	Supply voltage (assumed)	415 ± 10%-volt, 3 phase, 50 ± 5%Hz
g)	Nos. of hot starts of motors	4 per hours

b) Motor accessories as required

Bidder to include as per package requirement.

c) Electrical supply parameters:

All electrical shall be suitable for the following supply conditions.

Electrical operating voltage : AC, 3 phase, 415 V, 50 Hz

Electrical control voltage : 240 VAC, 50 Hz (under supplier 's scope)

Tolerance of voltage : ± 10%

Tolerance of frequency : ± 5%

d) Electric Specification

All electrical equipment of compressor package shall be installed in accordance with Zone 1, Gas group IIA, T3, IS 5571 and shall have approval of a recognized certifying authority.

Purchaser/Client shall provide 415 ± 10% volts, 3 phase and 50 ± 3% Hz electrical connection at CNG station electrical panel only.

Vendor shall supply the starter cum local control panel and the same shall be flame proof construction with IP 54. Certificate from recognized agency to the effect that equipment supplied and or installed conform to above area classification. All devices shall meet the requirement for the specified area classification in which they are installed, including instrumentation leads.

Vendor shall supply all the cable within the package. The power & control cables rated low voltage shall be designed for a system voltage of up to and including 1100V. The conductor shall be either annealed copper or aluminum for power cables and annealed copper for control cables. Conductors 6mm2 and larger shall be stranded. Conductors below 6mm2 may be stranded or solid as per IS 8130. The cables shall be suitable for use where combination of ambient temperature and temperature rise due to load and short circuit condition results in conductor temperature not exceeding the following.

Type of Insulation	Continuous operation	Short circuit condition

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General purpose PVC	70˚C	160˚C
XLPE	90˚C	250˚C

The insulation shall be of cross-linked polyethylene conforming to the requirements given in Table-1 of IS: 7098 Part-1. The average thickness of insulation shall be not less than nominal value specified in Table-3 of IS: 7098 Part-1. The Filler and Inner sheath shall be of extruded PVC conforming to the requirements of Type-ST2 of IS: 5831 for XLPE cable. The thickness of inner

sheath shall be as given in Table-5 of IS: 7098 Part1.

Armour shall be Galvanized steel round wires/strip for multi-core cables and Aluminum for single core as per IS 3975.

Outer sheath shall be Extruded FRLS (flame Retardant, Low smoke), Type ST2 PVC of IS 5831 for XLPE cables, colored BLACK.

All the above cables are intended to be used in hazardous gas areas. The cable shall accordingly be identified on outer sheath as per IS. The resistance of the armour shall not exceed that of the conductor as specified in IS 8130 by more than 33%.

e) Cable entry

Control panels: Bottom

f) Cable Glands and Cable sealing

Cable gland shall be ex'd' type with suitable size double compression type Nickel Plated brass glands are to be supplied for all cables. For entries into Ex'd' enclosures, barrier type (or compound filled) glands are provided. All cable glands and adaptors are to be type tested and certified by appropriate authorities for use in specified hazardous area.

g) Earthing System

The design & installation of earthing system shall be as per IS 3043 or equivalent international specification. The design and installation of earthing within the package shall be vendor scope. Vendor to provide provision for skid earthing. One or more no of earth plates with provision of inter connection to main earth grid shall be provided.

Phase sequence preventer (Current based) shall be provided.

h) Vibration

Compressor maximum vibration of cylinders shall not exceed 10 mm/sec unfiltered peak velocity. Maximum vibration level of installed compressor frame shall not exceed an unfiltered peak velocity of 5mm/sec or 200-micron unfiltered peak-to-peak vibration whichever is less. The bidder shall provide for all structural support within the package so that these levels can be achieved.

1.4 INSTRUMENTATION & CONTROLS

All the instruments and control shall be suitable for area Class I, Group D, Division I.

All package mounted transmitters & temperature elements, solenoid valves, switches and related junction boxes shall be flame proof 'd' as per IEC 79-1. Other special equipment / instrument, shall be flame proof/explosion proof as per IEC 79-1.

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The compressor package instrumentation & control is to be configured for manual as well fully automatic control system including starting, shutdown as applicable for unattended operation.

Suitable barriers may be used for safety

All the instrumentation shall be capable or operating for full range of operation.

Separate junction boxes shall be provided for each type of signal/control/power cables. All Signal, control and RTD cables shall be of 250V grade made of copper conductor of min 1.5 mm2, PVC insulated, PVC Shredded and armoured.

Suitable bypass for interlocks shall be provided for startup

Emergency shutdown (ESD) System is also in scope of vendor. This shall be in accordance with NZS-5425. A fail-safe system shall be designed and incorporated to isolate cascades storage from dispensers, stop compressor, isolate the compressor suction and cut off power supply on activation of ESD switch. This ESD switch shall have to be manually reset to restart the compressor package again. To isolate dispensers' actuators of dispensers may be used.

Compressor package shall be provided with following instruments:

1. All tripping shall be with lamp indication and annunciation.

2. Temperature indication: each stage discharge and after- after cooler

3. Pressure indication: each stage discharge, high & med bank; Pressure switch final stage discharge, high & med bank

4. Hydraulic oil tank: Level switch, temp indication & switch; Pump Pressure indication.

5. Coolant: Temp & pressure indication & switch and temp indication after cooler.

6. Hour meter.

7. One no. Pressure Switch/Transmitter shall be installed in the inlet line to compressor.

8. One no. Coriolis mass flow meter with integral local display with transmitter shall be installed for metering of gas.

1.5 PRIORITY FILL SYSTEM

Vendor shall supply a suitable priority fill system with compressor top-up facility inclusive of regulating valves, bypass valve & liquid filled pressure gauges all mounted in a stainless steel structural. The Priority fill system shall ensure that vehicle filling takes precedence over cascade filling.

Tubing and valves from LCV cascade and stationary cascade to compressor shall be ¾" SS 316 OD and other tubing and valves shall be minimum 1/2" size. End connections shall be 3/4" size pipe OD.
Suitable priority along with valves (for example 3-way Valve) shall be provided so that compressor can take suction either from LCV cascade or from stationary cascade as described following:

Case -I: Suction from LCV Cascade

(a) If the LCV Cascade pressure is more than 210 kg/cm2g, the gas dispensing should take place directly from LCV to dispenser bypassing booster compressor.
(b) Compressor shall start on pressing of manual start push button when the LCV cascade pressure falls below 210 kg/cm2g.The priority of filling shall be as follows:

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- First priority: Priority panel shall first fill the vehicle through dispenser.

- Second priority: If no vehicle is to be fuelled, priority panel shall fill the stationary cascade. The compressor shall shutdown automatically when either all stages of stationery cascade are filled to a pressure of 255 kg/cm2g or pressure in mobile cascade is less than 16 kg/cm2g.

Case -II: Suction from stationary cascade

a) Dispensing shall be done through stationary cascade without compressor running if stationary cascade pressure is more than 210 kg/cm2g.

b) Compressor shall start on pressing of manual start push button if stationary cascade pressure is less than 210 kg/cm2g. Dispensing into the vehicle should take place as usual. Compressor shall trip if either there is no vehicle or cascade pressure 255 Kg/cm2.

1.6 ENCLOSURE OF HYDRAULIC DRIVEN CNG COMPRESSOR PACKAGE

The maximum ambient temperature within the enclosure shall be limited to 52 Degree C based on the ambient temperature of 47 Degree C. Adequate ventilation fans shall be provided to meet the above and also to account for heat dissipation of the coolers.

The compressor package shall consist of single enclosure for Compressor and Electric Motor. The equipment shall be mounted on one common skid. The Enclosure to restrict maximum noise level to 75 DB(A) at 1 meter from the enclosure.

Enclosures shall be provide with a degree of protection equivalent to IP 55 as defined in AS 1939, shall be flame proof.

All the pressure, temperature, gas flow meter, oil level, lube oil pressure, coolant temperature, coolant level indicators shall be preferably visible from outside of enclosures.

Enclosures shall have internal flame proof lighting arrangement. For handling of all heavy parts for maintenance purpose lifting arrangement i.e. beam fitted with chain hoist shall be provide inside enclosure.

The Compressor shall be located inside an acoustic enclosure at Grade Level. All accessory and auxiliary system along with interconnecting piping shall be inside an enclosure, enough headroom shall be made available for easy access and maintenance of all equipment.

Components such as pressure gauges, temperature and pressure switches etc., which require in-situ adjustment and reading, shall be easily accessible.

Conduits and tubing shall be arranged in orderly and systematic manner and shall be routed neatly to enter the back of display or monitoring panels.

Routine service item such as, but not limited to, oil filters, gas filters and drive belt shall be located to facilitate easy one-man servicing.

Items which must be operated & monitored during operation shall be readily accessible without opening the enclosure door. For which, if required, separate partition with door must be provided.

Suitable gradients shall be provided on the enclosure roof for rain drainage and to avoid water pockets.

1.7 PIPING AND TUBING

All rigid piping, tubing & other components of compressor package shall be designed for full range of pressure & temperature and loading to which they may be subjected with a factor of safety of at least 4 based on minimum specified tensile strength at specified ambient temperature. Compressed air header and water piping

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shall be GI or seamless steel. The instrument air tubing material shall be SS-316/SS304. All lube oil piping down stream of filter shall be series 300 Stainless Steel. Mercapton/THT dosing is envisaged hence all materials coming in contact with gas shall be compatible to such gas with Mercapton dosing and be of compressor manufacturer's standard. The use of SA 515 material is prohibited.

All gas piping/ tubing, valves, fittings etc. from Suction of the 1st stage (right from interface) through final discharge from the compressor (up to interface) shall be SS-316 material with double compression ferrule fittings

1.8 PRESSURE VESSELS:

All pressure vessels shall be designed as per ASME VIII Div 1 or equivalent with 3 mm corrosion allowance and shall be fully (100%) radio-graphed as per ASME VIII-UW (a) or equivalent.

1.9 INSPECTION AND TESTING

1.9.1 General

- Inspection and Test Requirements shall be as per approved QAP.
- Bidder shall confirm compliance to all inspection and testing requirements stipulated therein and included the inspection charges in the lump sum cost.
- All Inspection and testing shall be witnessed by Third Party Inspection Agency at the bidder's cost. Approved Third Party Inspection Agencies are Bureau Veritas Industrial Services (BVIS), Lloyds Register of Shipping (LRIS), SGS or DNV.
- Client/PMC may witness tests as per data sheet and this specification. The bidder shall notify the timing of such inspection and testing at least 15 days in advance to Client/PMC. Client may depute their representative for witnessing the tests.
- Bidder shall submit detailed Test Procedure for Approval of the Purchaser/PMC one months in advance of the actual date of conducting each test.

1.9.2 Mechanical running test (MRT)

The MRT for each compressor shall be carried out in presence of Purchaser or their representatives along with third party as arranged by Vendor with job or shop driver including complete job driving system for 4 hours continuously at shop of compressor manufacturer. The compressor need not be pressure loaded for MRT test. During this test following shall be recorded at agreed intervals.

Vibration levels measured on cylinders and frame
- Oil cooler inlet and outlet temp
- Electric Current of each drive

Bidder shall submit test procedure for approval. Dispatch clearance shall be given after reviewing all test certificates/documents and completeness of the equipment.

1.9.3 PACKAGE PERFORMANCE TEST

Bidder shall assemble the complete package including auxiliary systems, instrumentation, safety devices within the enclosure at his shop/site and dispatch. The machine shall be accepted after the performance test at site. The performance test will be conducted by bidder within three (03) months of successful commissioning of compressor. Complete package shall be performance tested as a module along with electric motor & compressor performance Bidder shall demonstrate all controls, shutdown, trips / alarms etc.

The test shall be the basis of acceptance / rejection of the package thereon. Bidder shall submit the detail test

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procedure for the same, which shall be approved by PURCHASER. The test for the package shall be witnessed by PURCHASER or their representatives. All guaranteed and other critical parameters shall be demonstrated by the Bidder. In PG test minimum following shall be recorded.

- Compressor capacity average
- Sound level
- Vibration levels measured on cylinders and frame
- Bearing Temp
- Oil cooler inlet and outlet temp
- Electric current of each drive.

Bidder shall arrange a Mass flow meter at Discharge of Compressor package to measure the flow for Performance Guarantee test. Duration of test shall be approximately 4 hours which may be in steps in consultation with purchaser.

Formal Test procedure shall be submitted for approval of the purchaser before conducting the test.

1.9.4. WARRANTY

1. Bidder shall warrant all material and equipment free from defects in design, material and workmanship.
2. Bidder shall warrant all compressor packages will satisfy the requirements of the intended use and appropriate for application.
3. Repair / replace any equipment / item which prove to be defective, free of cost.
4. Assume responsibility for obtaining manufacturer's warranty of all bought out items.
5. Free of cost replacement of any part found not performing to the specified requirements for at least 18 months from date of delivery or 12 months from the date of successful commissioning. The parts replaced during the warranty period shall have to perform, to the specified requirements for 12 months from the date of replacement or else shall be replaced free of cost. In case of any failure of major components (insurance components), then the
complete compressor package shall have the warranty period of 12 months from the date of replacement.
6. Supplier shall guarantee that oil carryover in the CNG from lubricated compressor discharge is less than 5 ppm (at gas temperature less than 50ºC) before flowing into cascades/dispensers.

1.9.5. SPARES

1. Bidder shall provide necessary spares and consumables required for startup and commissioning, free of cost to HOGPL and shall furnish the list of such spares per compressor package in the technical bid. Bidder shall include at least 3 Nos. suction gas filter element / cartridge per compressor package in the commissioning spares. Unutilized commissioning spares shall be returned back to HOGPL after successful commissioning and performance test.
2. Bidders shall provide list of all spares with their part number of compressor package offered.

1.9.6 SPARE PARTS, SPECIAL TOOLS AND TACKLES

All spare parts, special tools & tackles for erection and commissioning shall be supplied and shall form his scope of supply.

A brand-new Separate set of special tools and tackles along with Toolbox as required for Normal operation and maintenance shall be supplied by the bidder, which shall form the property of Purchaser. Bidder shall submit a list of all such tools and tackles with the unpriced bid.

1.10 DOCUMENTS/DATA REQUIRED ALONG WITH BID

Bidder shall necessarily furnish the following along with the bid without which the offer shall be considered incomplete:

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1. Completely filled in Data Sheets of Compressor, Electric motors
2. Process and instrument diagram along with Bill of Material. The Bill of Material shall indicate all items, quantity of all items installed per compressor package, their part nos. and make.
3. General arrangement drawing of the compressor package and control panel giving overall dimensions and erection / shipping weight.
4. Technical data sheet of booster compressor and electric motor (both main & fan motor).
5. Flow v/s suction pressure and power v/s suction pressure graph or full range suction pressure I.e. 30 to 210 kg/cm2
6. Gas, water, lube oil, piping and instrument diagram.
7. Torque speed characteristic of motors.
8. List of commissioning spares per compressor package.
9. List of special tools & Tackles for installation & maintenance per compressor package.
10. List of major bought out items (shall include name of sub vendor, make, model nos. of items) as per table VIII
11. Leaflets, catalogues for all major items.
12. Performance curves as per clause 2.6 (c)
13. Maintenance schedule of the compressor package along with list of Spares for Maintenance
14. Electrical single line diagram.
15. P&ID of priority panel.
16. Start up and shut down write up along with operation philosophy.
17. Start up and shut down interlock diagram.
18. Duly filled compressor data sheet, as per table IV.
19. Reference list of similar / identical compressor package supplied in last 7 years of CNG application.
20. Deviation sheet as per Table XI
21. Training schedule with contents.
22. Tentative Layout/ keyplan/ General Arrangement indicating size of the skids, Centre distance between skid & space required along with maintenance requirements.
23. Checklist duly filled in with regards to scope of supply
24. Proven track record format duly filled in
25. Utilities requirements
26. Electrical Load summary
27. Catalogues of compressor, electric motor, instrumentation items, etc.

1.10.1 Within 2 weeks from date LOI / PO:

1. Detailed project schedule preferably in MS project giving all activities such as Design and review, Major bought out items (such as Motors, Control panels, Intercoolers, Compressor block castings, frame etc.), Machining of
components / castings, Sub-assemblies, Stage inspection, Acoustic enclosure assembly, Final Assembly, Final shop testing of machines, Final inspection, dispatch etc.
2. General arrangement drawing of the compressor package, giving overall dimension and erection / shipping weight.
3. P & ID for gas, oil, water and other circuits.
4. GA drawing, foundation details of the filter assembly including anchoring/grouting, load details, with exploded view drawings shall be provided.
5. Electrical Single Line Diagram along with control philosophy
6. Detailed foundation plan drawing of the compressor package, for casting foundation giving load pattern etc.
7. Detailed Civil foundation drawing with grouting/anchoring required if any for proper installation of CO2 cylinders shall be given for casting foundation along with load details.
8. Details of inlet gas termination including X, Y, Z co-ordinates with respect to center of compressor skid or any reference.
9. Detailed specification of lubricating oil such as kinematic viscosity, flash point, viscosity index etc and quantity of lube oil required for commissioning of each compressor package.
10. Typical cross-sectional drawing and literature to fully describe the details of all major components such as Compressor, Motor, Suction valve, Discharge valve, Piston rod gland packing, Piston rings, Coupling, Lube oil pump, intercoolers etc.
11. Shop test procedure.

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10.1.2 Along with supply:

1. Operation and maintenance manuals – 3 sets all in original for each compressor package (both in hard and soft form). The instruction manual shall describe in detail the construction and recommended procedure for installation, maintaining, operating and troubleshooting of the compressor shall also include cross-sectional drawings, exploded views of all spare parts, brought out items, instrumentation along with part nos., quantity installed per machine. The manual shall provide detailed catalogs of all bought out items.
2. Mechanical & electrical installation drawing including interconnection and wiring diagram. Type test certificates for cables. Tube light, junction Box and other electrical equipment's hazardous area classification certificates. Main motor & cooling fan Motor hazardous area classification, routine test
and IP certificate. Compressor panel hazardous area classification, routine test, IP certificate and CCoE Approval.
3. Material, Fabrication, Final Inspection Test certificates, of all major components like compressor frame, mass flow meter, inter stage tubing / piping, intercoolers, motors, oil pump, water pump, control panel, suction/discharge valves, PLC, gas detectors, flame detector, fittings, pressure vessels like blow down vessel, Inter stage condenser bottles, suction filters etc. Casting material & hydro test certificates of all the casted materials and pressure vessels.
4. Calibration certificates for all measuring and protection devices. Test records of mechanical running, performance test and noise level test.
5. Certificates from statutory authorities confirming suitability of design / construction of all electrical and electronic items for use in hazardous area classification. In case of foreign supply, the bidder shall get all certificates endorsed by office of Chief Controller of Explosives (CCOE), Govt of India within one month of delivery of compressors at site.
6. Complete bill of material of component along with assembly/ dis-assembly drawings.
7. Wear and clearance charts with limits, vibration limits, torque value of all components for assembly/ dis-assembly.
8. All the final drawings shall also be given in digitized form on CD ROM compatible to Auto Cad software.

Any other document required over and above aforesaid documents during engineering stage after placement of order shall be supplied by bidder. Bidder shall also supply above data in editable soft copy.

Section VII: QUALITY ASSURANCE PLAN

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QUALITY ASSURANCE PLAN – CNG BOOSTER COMPRESSOR					
Sl .No	**OPERARATION / PARAMETER**	**VENDOR**	**TPAI**	**CA**	**REMARKS**
1	HYDROTEST OF – CYLINDER, PRESSURTE VESSELS, HEAT EXCHANGER	P	W/R	R	
2	HYDROTEST OF - CYLINDER HEADS	P	W/R	R	
3	LEAK PROOF TEST OF CRANK CASE (4 Hours. with Kerosene)				
4	ULTRASONIC TEST OF CRANK SHAFT, CONNECTING ROD, PISTON ROD	P	R	R	
5	MAGNETIC PARTICLE TEST OF - CRANK SHAFT, CONNECTING ROD, PISTON ROD	P	R	R	
6	RADIOGRAPHY AS APPLICABLE - PRESSURE VESSELS, HEAT EXCHANGER. GAS PIPING (only 10% joints to be witnessed)	P	R	R	
7	BARRING OVER TO CHECK CYLINDER END CLEARANCE AND PISTON ROD RUNOUT	P	R	R	
8	NO LOAD MECHANICAL RUN TEST OF THE COMPR. WITH RATED (OR MORE) SPEED AND SHOP DRIVER. (4 HRS. Min.)	P	W	R	
9	STRIP CHECK AND INTERNAL INSPECTION AFTER "NLMRT" OF ALL COMPRESSORS	P	W	R	
10	ELECTRIC MOTOR PERFORMANCE TEST- AT SUB-VENDOR'S WORKS PER ISO STD.	P	W/R	R	
11	MATERIAL TEST CERTIFICATES FOR: CRANK SHAFT, CONNECTING RODS, CYLINDER. LINER, PISTON (COMPLIANCE CERT.), PRESSURE	P	R	R	
12	CANOPY STRUCTURE PAINTING INSPECTION AT WORKS. SURFACE PREPARATION TO BE INSPECTED AFTER CLEANING AND BEFORE APPLICATION OF FIRST COAT OF PRIMER.	P	W	R	
13	FUNCTIONAL / HV / CONTINUTY TEST FOR CONTROL PANEL (AT SUB VENDOR'S WORKS)	P	W/R	R	
14	MECHANICAL STRING TEST FOR 4 HOURS FOR EACH CNG COMPRESSOR PACKAGES	P	R	W/ R	
15	TEST CERTIFICATES FOR - SAFETY SWITCHES, SAFETY RELIEF VALVES, SOLENOID VALVES, GD & FD, CO2 cylinders, Motors.	R	R	R	
16	FINAL MOCK-UP ASSEMBLY OF THE PACKAGE - AS PER GAFD, P& I DRAWINGS. WIRING DIAGRAM	P	R	R	
17	PERFORMANCE TEST AT SITE AT GUARANTEED PARAMETERS.	P	W	W	
18	FIELD TRIAL RUN FOR 72 HRS.	P	W	W	
LEGENDS: W= witness; H=Hold; M=Monitoring; P=Perform; R=Review of documents; R/M=Random Check; A=Approved; TPAI=Third Party Inspection Agency CA- client acceptance					

Section VIII: VENDOR DRAWING AND DATA REQUIREMENTS

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S. No.	DESCRIPTION	To be submitted with Bid	To be submitted for Approval		To be submitted for Shipment		Submit as certified Final / As Built	
			Require d	Days after PO	Requir ed	Days after PO	Require d	Days after PO
A.	**GENERAL.**							
1.	PROJECT SCHEDULE	✓	✓					
2.	DULY FILLED-IN "CHECKLIST FOR COMPLETENESS OF BID"	✓						
3.	DULY FILLED-IN "CHECKLIST FOR SCOPE OF SUPPLY"	✓						
4.	DEVIATION LIST (IF ANY) TO THE APPLICABLE SPEC., DATASHEETS	✓						
5.	UTILITIES REQUIREMENT SUMMARY	✓	✓				✓	
6.	FLANGE DETAILS OF PIPING CONNECTION WITH CONNECTION AT BATTERY LIMIT	✓	✓				✓	
7.	DULY FILLED IN EXPERIENCE RECORD PROFORMA	✓						
8.	GUARANTEE PARAMETERS AS SPECIFIED	✓	✓				✓	
9.	TENTATIVE LOAD DATA FOR FOUNDATION DESIGN	✓	✓				✓	
10.	LIST OF SUB-VENDORS FOR ALL BOUGHT OUT ITEMS INCLUDING ELECTRICAL & INSTRUMENTATION ITEMS		✓				✓	
11.	LEAFLET, CATALOGUES FOR ALL ITEMS	✓	✓				✓	
12.	O & M MANUAL	✓	✓		✓		✓	
B.	**COMPRESSOR**							
1	DATASHEETS FOR THE FOLLOWING							
A	COMPRESSOR	✓	✓				✓	
B	HEAT EXCHANGERS		✓				✓	
C	PRESSURE VESSELS		✓		✓		✓	

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D	ELECTRIC MOTOR		✓				✓	
2	CATALOGUE FOR COMPRESSOR	✓	✓					
3	**TYPICAL CROSS-SECTIONAL DRAWING AND LITERATURE TO FULLY DESCRIBE THE DETAILS OF OFFERING**							
A	COMPRESSOR	✓	✓					
B	SUCTION VALVE	✓	✓					
C	DISCHARGE VALVE	✓	✓					
D	PISTON ROD GLAND PACKING & PISTON RINGS	✓	✓					
E	LUBE OIL PUMP	✓	✓					
4	V-BELT & PULLEY WITH SELECTION CHART & CALCULATION		✓		✓		✓	
5	COOLER DATA / DRG WITH THERMAL & MECH DESIGN CALCULATION		✓		✓		✓	
6	DESIGN CALCULATION, GA DRGS FOR PULSATION DAMPNER		✓		✓		✓	
7	**PIPING & INSTRUMENTATION DIAGRAMS FOR THE FOLLOWING**							
A	PROCESS GAS		✓				✓	
B	LUBE OIL		✓				✓	
C	COOLING WATER		✓				✓	
8	TORQUE ANGLE DIAGRAM, PISTON ROD LOAD VS CRANK ANGLE		✓				✓	
9	TORQUE SPEED CHARACTERISTICS		✓				✓	
10	ACOUSTIC / MECHANICAL EVALUATION REPORT		✓				✓	
11	ITEMISED PRICE LIST OF MANDATORY SPARES WITH THREE YEAR VALIDITY	✓			✓		✓	

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12.	DRG. FOR TESTING ARRANGEMENT & TEST PROCEDURE TO BE ADOPTED						✓	
13.	**CERTIFICATE FOR FOLLOWING:**							
A	HYDRAULIC TESTING				✓		✓	
B	NON-DESTRUCTIVE TESTING				✓		✓	
C	MATERIAL COMPOSITION & PHYSICAL PROPERTIES				✓		✓	
D	LEAK PROOFNESS TEST OF FRAME				✓		✓	
E	LUBE PUMP, FRAME OIL PUMP, HYD OIL PUMP				✓		✓	
14	DESIGN / ACTUAL ASSEMBLY CLEARANCE CHART				✓		✓	
15	TEST RECORDS OF FOLLOWING				✓		✓	
A	MECHANICAL RUNNING				✓		✓	
B	PERFORMANCE TEST / PACKAGE TEST				✓		✓	
C	NOISE LEVEL TEST				✓		✓	
16	LIST OF SPECIAL TOOLS & TACKLES FOR INSTALLATION & MAINTENANCE				✓		✓	
C	**ELECTRIC MOTOR**							
1	MOTOR DATA SHEET		✓				✓	
2	TECHNICAL LITERATURE / CATALOGUE, SELECTION CHARTS, NOMOGRAPHS ETC.		✓				✓	
3	GA DRAWING		✓				✓	
4	TERMINAL BOX ARRANGEMENT DRAWING		✓				✓	
5	MOTOR CHARACTERISTIC CURVES		✓				✓	
6	TORQUE SPEED CURVES		✓				✓	
7	CURRENT TIME CURVES		✓				✓	
8	P.F AND EFFICIENCY		✓				✓	
9	TYPE TEST CERTIFICATES						✓	

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10	Certificate from the relevant statutory authority (based on the country of manufacture) for suitability of the offered motor for installation in the specified area classification						✓	
11	Pre-commissioning and Commissioning procedure		✓				✓	
D	**INSTRUMENTATION**							
1	G.A. OF INSTRUMENT PANEL WITH BILL OF MATERIAL & WIRING DIG. FOR LCP		✓				✓	
2	INSTRUMENT DATASHEET		✓				✓	
3	LOGIC DIAGRAM / LADDER DIAGRAM / FUNCTIONAL DIAGRAM		✓				✓	
4	**LOOP SCHEMATIC**							
5	INTERCONNECTING DIAGRAM		✓				✓	
6	OPERATING / CONTROL WRITE UP		✓				✓	
7	ALARM / SHUT DOWN LIST7		✓				✓	
8	WIRING DIAGRAM / INTERCONNECTING PIPING		✓				✓	
9	START UP AND SHUT DOWN WRITE UP		✓				✓	
10	START UP AND SHUT DOWN INLET LOCK DIAGRAM		✓				✓	
11	ALARM AND SHUTDOWN LIST WITH SET POINT		✓				✓	
12	LOAD CONTROL PANEL LAYOUT		✓				✓	
13	TERMINATION DIAGRAM, PANEL WIRING DETAIL		✓				✓	
14	LOOP SCHEMATIC		✓				✓	
15.	INTERCONNECTING DIAGRAM		✓				✓	
16.	CABLE SCHEMATIC		✓				✓	

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17.	BILL OF MATERIAL		✓				✓	
18.	TEST / INSPECTION CERTIFICATE		✓				✓	
19.	LIST OF RELIEF VALVES WITH SETTINGS		✓				✓	
20.	Certificate from the relevant statutory authority (based on the country of manufacture) for suitability of the offered instruments for installation in the		✓				✓	

Section IX: 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 Mandatory spare with quantity and price having validity of 03 (three) years	
4	Compliance statement duly filled and stamped enclosed.	
5	GA & assembly drawings, cross section drawings including part list & material list enclosed.	
6	Other technical details & vendor's product catalogues enclosed.	

Section X: COMPLIANCE STATEMENT

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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 List of Mandatory spare with quantity have been quoted with validity of 03 (three) years 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).	

Section XI: 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.

Section XII: INFORMATION/ DOCUMENTS / DRAWINGS TO BE SUBMITTED BY SUCCESSFUL BIDDER

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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.

Section XIII: 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

Section XIV: REFERENCE LIST

Sl. No.	Project	Year of Supply	Client, Address and Contact No.	Email	Size and Rating/Thk	Service

Section XV: LIST OF SUPPLIERS OF MAJOR BOUGHT-OUT ITEMS

1. Mass flow meter

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a. Micromotion CNG 50
b. Endress + Hauser (E&H)

2. Pressure Transmitter

a. Druck
b. Wika
c. Honeywell
d. ABB
e. Rosmount

3. Pressure Regulator & slam shut valve

a. M/s Pietro Fiorentini S.p.A (Italy)
b. M/s Emerson Process Management
c. M/s RMG Regel Messtechnik (Germany)
d. M/s Mokved Valves BY (Netherlands)
e. M/s Tartarini
f. M/s Fisher
g. M/s Gorter controls (Netherlands)
h. M/s Dresser

4. Pressure Safety Valve

a. M/s BHEL, OFE & OE Group (New Delhi)/
b. M/s Keystone Valves (India) Pvt. Ltd. Baroda
c. M/s Sebim Sarasin Valves India (P) Ltd. (New Delhi-Halol-Gujarat)
d. M/s Tyco Sanmar Ltd. (New Delhi)
e. M/s Parcol SPA, Italy
f. M/s Sarasin, France
g. M/s Tai Milano SPA, Italy
h. M/s Fisher Rosemount (Now M/s Emerson Process)
i. M.s. DK-LOk
j. M/s. Faiger Leser

5. Pressure Gauges & temperature Gauges

a. M/s AN Instruments Pvt. Ltd., New Delhi
b. M/s Altop
c. M/s General Instruments Ltd., Mumbai
d. M/s WIKA,

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6. RTD

a. M/s General Instruments Ltd. Mumbai

b. M/s Nagman Sensors (Pvt.) Ltd.

c. M/s Pyro Electric, Goa

d. M/s Altop

7. Soft starter

a. Siemens

b. ABB

c. Rockwell

d. Schneider

8. FLP Motors

a. ABB

b. Compton Greaves

c. Kirloskar

d. Siemens

e. Bharat Bijlee

f. LHP

9. FLP Switchgear

a. Baliga

b. FCG

c. FPE

d. Flexpro

e. Sudhir

10.Switches/Fuses/Contractors

a. L & T

b. GEC

c. Siemens

d. Schneider

11.MCCB

a. Siemens

b. Legrand

c. Schneider

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12.Vibration Switch

a. Robershaw control

b. Murphy

13.PLC

a. Rockwell Automation

b. GE Fanuc

c. Siemens

d. Allen Bradley

e. Telemechnique

f. Schneider

14.Push Button

a. L&T

b. Vaishno

15.IR Gas Detectors

a. General Monitors

b. Crowcon

c. Honeywell

d. Sieger

e. Detronics

f. Khrome Schroder

g. Net safety.

h. ESP Safety

i. Ambetronics

j. Drager Safety

16. UV Flame Detectors

a. General Monitors

b. Crowcon

c. Honeywell

d. Sieger

e. Detronics

f. Khrome Schroder

g. Net safety.

h. ESP Safety

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i. Ambetronics

17.SS Tubes for CNG application

a. M/s Sandvik, Sweden
b. M/s Tubacex
c. M/s. BMT Superlock
d. Jindal Saw

18.SS Fittings for CNG application

a. M/s Swagelok (USA)
b. M/s Parker (USA)
c. M/s SSP, USA
d. M/s. Dk LOK
e. M/s. OEM make
f. panam

19.Solenoid Valve

a. M/s ASCO
b. M/s Rotex
c. M/s Parker Hanifen

20.On Off ball/needle valve for CNG application

a. M/s Parker
b. M/s Swagelok
c. M/s. Dk LOK
d. M/s. OEM Make

21.Cables and wires

a. INCAB/ Universal
b. ASEAN/CCI
c. FORT Gloster
d. Finolex
e. KEI Associated Cables
f. Polycab

22.Barrier/isolators/surge protector

a. MTL

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b. Phoenix
c. P&F

23.Air exchanger

a. GEI Hamon Ind Ltd.
b. GEA India
c. Patel Air temp

24. Thermoplastic Hoses for CNG Application

a. M/s Parker
b. M/s Swagelok
c. ZEC Italy
d. ETON

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