



BHAGYANAGAR GAS LIMITED

(A JOINT VENTURE OF HPCL & GAIL)

BID DOCUMENT FOR

**Tender for Procurement of Booster
Compressor for CNG Stations in Hyderabad**

**UNDER LIMITED DOMESTIC
COMPETITIVE BIDDING**

Bid Document No.: BGL/345/2016-17

VOLUME-II of II



BHAGYANAGAR GAS
LIMITED

**Tender for Procurement of Booster Compressors for
CNG Stations in Hyderabad**

Bid Document No. BGL/345/2016-17

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SECTION – 7

MATERIAL REQUISITION



Item	Description	Qty.	Destination
1.1	Design, Engineering, Manufacturing, Supply (including packaging and forwarding, insurance, custom clearance, handling and unloading at BGL's site of skid mounted electric motor driven daughter booster CNG Compressor Package of min average 400 SM3/hr capacity at suction pressure of 30 to 200 kg/cm ² and discharge pressure 220 to 250 kg/cm ² as per scope of work defined in Tender document.	04 Nos.	Hyderabad
1.2	Installation, commissioning & field performance test of Compressor Package at site.	04 Nos.	Hyderabad
1.3	Lump sum Annual operation & maintenance charges during warranty period of 1 (one) year inclusive of all consumables, manpower, spares, lubricants but excluding electric power charges.	04 Nos.	Hyderabad
1.4	Lump sum Annual operation & maintenance charges for a period of two years after warranty period of one year inclusive of all consumables, manpower, spares, lubricants but excluding electric power charges.	04 Nos.	Hyderabad
1.5	Special tools & tackles (list and price of each tools and tackles to be furnished by the bidder)	04 Nos..	Hyderabad
1.6	Design, Engineering, Manufacturing, Supply (including packaging and forwarding, insurance, custom clearance, handling and unloading at BGL's site of 1.5 KW electric motor driven air compressors with dryer and receiver.	04 Nos..	Hyderabad

Note: Exact delivery of Booster Compressor shall be intimated during dispatch.

All the Special tools and tackles shall be wrapped and packaged for prolonged so that they will be preserved in original as new condition:

- The Special tools and tackles shall be properly tagged and coded so as to facilitate easy identification, shall be packaged separately and clearly marked spares and shipped at same time as the main equipment.



A. REMARKS / COMMENTS

1. GENERAL NOTES

VENDOR's Compliance

Vendor shall submit his bid in full compliance with the requirements of this MR and attachments.

Vendor must include the following statement in his bid:

We certify that our bid is fully complying with your enquiry dated ----- and referenced -----

Compliance with this material requisition in any instance shall not relieve the Vendor of his responsibility to meet the specified performance.

2. COMPLIANCE WITH SPECIFICATION

The vendor shall be completely responsible for the design, materials, fabrication, testing, inspection, preparation for shipment and transport of above equipment strictly in accordance with the Material Requisition and all attachments thereto.

3. VENDOR'S SCOPE

Vendor scope of work includes the equipment with all internals and accessories shown on the data sheets, specifications and all unmentioned parts necessary for a satisfactory operation and testing except those which are indicated to be out of the Vendor's supply.

4. INSPECTION

Vendor shall appoint anyone of the following TPIA for inspection purpose after approval by consultant / purchaser:

- a) Lloyd Register of Industrial Services
- b) Technische Ueberwachungs Verein (TUV) SUD South Asia
- c) International Certification Service Pvt. Ltd
- d) TQ Services
- e) Moody International (India) Pvt. Ltd
- f) Bureau Veritas (India) Pvt. Ltd
- g) SGS
- h) Quality Services and Solutions Pvt. Ltd.
- i) Velosi Certification Services
- j) Certification Engineers International Ltd

Apart from inspection by TPIA, inspection shall also be performed by BGL delegate, as set out and specified in the codes and particular documents forming this MR. No Separate payment shall be made for TPIA's. Bidder to include TPIA charges along with the quote.



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5. APPLICABLE DOCUMENTS

General prescriptions, requirements and information are listed in Annexure of this Material Requisition.

6. VENDOR'S DOCUMENTS

Vendor shall supply the documentation as listed under Clause 12 of Special Conditions of Contract (SCC) in Bid Document.

All documents shall be supplied in English language.



Bhagyanagar Gas Ltd.

BHAGYANAGAR GAS
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SECTION – 8

SPECIAL CONDITIONS OF CONTRACT (SCC)



SPECIAL CONDITIONS OF CONTRACT (SCC)

C O N T E N T

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- 20.0 COMPLETION SCHEDULE**
- 21.0 EVALUATION BASIS**



SPECIAL CONDITIONS OF CONTRACT

1.0 GENERAL

The following article shall supplement the General conditions of Contract. Where any portion of the General Conditions of Contract and Instruction to Bidders is repugnant to or at variance with any provisions of the Special conditions of contract, then unless a different intention appears, the provision of the Special Conditions of Contract shall be deemed to override the provision (s) of General Conditions of Contract to bidders, only to the extent that such repugnancies of variations in the Special Conditions of Contract as are not possible reconciled with the provisions of General Condition of Contract to Bidders.

In case of an irreconcilable conflict between Indian or other applicable standards, General Conditions of Contract, Special Conditions of Contract, Specification, Drawings or Schedule of Rates, the following shall prevail to the extent of such irreconcilable conflict in order of precedence :

- i. Letter of Award/ Purchase Order
- ii. Letter of Acceptance/ FOI along with Statement of Agreed Variations.
- iii. Schedule of Rates as enclosures to Letter of Award/ Purchase Order
- iv. Special Conditions of Contract
- v. Drawings
- vi. Technical/ Material Specifications
- vii. Instruction to Bidder
- viii. General Conditions of Contract (Goods) for supply part of the contract and GCC (for procurement of works) for other than supply part of the contract.
- ix. Applicable standards as specified.
- x. Applicable standards not specified.

1.1 This enquiry envisages total responsibility for complete work from design, engineering, manufacture, supply/ shipment, port handing, clearance at port of entry in India, inland transportation within India upto the designated Project Sites, all taxes, duties, (except Custom Duty on the imported component in case of Foreign Bidder only) levies, fees, encumbrances, octroi, etc. as applicable and payable by the bidders under the Contract in India, all insurance handling of goods at all stages, storage, associated works including materials, tools/ tackles etc., for such civil works obtaining statutory approvals if any from the local authorities prior to start of work at sites till the time of handing over, installation, testing, pre commissioning, performance test, Site Acceptance Test, Trial Run, system commissioning and handing over at site to the Owner and Operation and Maintenance Work as specified in technical parts for the items stated in Price Schedule and in Technical Part.

In case of Foreign Bidder, all work related to collection of Cheque / Draft towards custom duty & deposition of same to the custom authorities shall be in the scope of the bidder.

1.2 Owner shall be issuing concessional forms like Form-C or any other such forms, for



availing concessional taxes/ duties by the bidder, if available. As such bidder shall include full rates of all taxes/ duties as applicable and percentages of the same shall be filled in at Agreed Terms and Conditions-Section-V of this tender document.

- 1.3 The quoted price shall be deemed to be inclusive of all applicable taxes & duties including Service Tax, works contract tax, sales tax, local taxes, import duty, excise duty, octroi and other levies etc. till the complete execution of the order as applicable in India under this contract and the bidder shall not be eligible for any compensation on this account.

Both Indian and Foreign Bidders shall not be eligible for compensation by the Owner for any variations whatsoever in the aforesaid taxes/ duties/ levies, etc. as included in the total price except for statutory variation as provided under tender document. Non-compliance to the provisions of this Article as aforesaid shall lead to rejection of offer.

- 1.4 At the designated site the Owner shall make available to the Bidder requisite open land for the purpose of storage, office and other related uses during the site work. Fencing of the demarcated area if necessary shall be done by the Bidder at their cost. All arrangements and temporary construction if any, within allocated area for adequate storage and safe custody of all goods received against the order and for all other allied activities of the Bidder, shall be done entirely by the bidder at their own cost. The total contract price shall be considered to be inclusive of all costs towards the above requirement. Bidder shall have no claim or lien on the land and shall clear the land of all structures prior to leaving the sites.

- 1.5 Foreign Bidder because of various constraints of distance, unfamiliarity with local and lack of any established branch office in India, may quote on the basis of tie up with any Indian Sub-contractor for the activities to be undertaken in India, they may do so provided their bid is submitted on PACKAGE BASIS WITH OVERALL CONTRACTUAL RESPONSIBILITY WITH THE FOREIGN BIDDER ONLY. All payments under the contract shall however, be payable to Foreign Bidders only. Payments shall be made as per 'Terms of Payment' Clause no. 3.0 of SCC enclosed herewith.

- 1.6 All Bidders are requested to indicate positively the division of work

- a) To be directly undertaken by the Bidder
- b) Envisaged to be undertaken by Bidder's Sub-contractor under Bidder's Overall responsibility.
- c) A copy of MOU (Memorandum of Understanding) shall be furnished along with the offer.

- 1.7 The activities listed in the scope of proposal in this document as well as in the price break-up shall be only broad categories and shall in no way absolve the Bidder in executing and completing of the turnkey philosophy of the Owner within the quoted lump sum price. Any item/equipment/services/ activities/taxes/duties, if not specifically identified in the Bid document or in the offer but is necessary for the completion of work, shall be deemed to be included in the quoted lump sum price and no extra charges are payable by the Owner.



- 1.8 As regards the Income tax, surcharge on Income tax or any other corporate tax payable by the Bidder for reason of the contract awarded, then Owner shall not bear any tax liability whatsoever irrespective of the mode of construction of contract. The bidder shall be liable and responsible for payment of such tax, if attracted under the provision of Indian Income tax Act.

Bidder may note that if any tax is deductible at source as Permanently Indian Income Tax Law, the same will be so deducted before releasing any payment of the bidders. Accordingly, bidder shall have the responsibility to check and include such provisions of taxes in their prices.

1.9 CONTRACT AGREEMENT

- 1.9.1 Contract Documents for agreement shall be prepared, after award of works to the successful tenderer by Telegram/Fax/Detailed letter of Intent in line with Anneure-II to GCC-Works. Until the final Contract documents are prepared and executed this tender document together with the annexed documents, modifications, deletions agreed upon by the OWNER and Tenderer's acceptance there of shall constitute a binding contract between the successful tenderer and the OWNER based on terms contained in the aforesaid documents and the finally submitted and accepted prices.

- 1.9.2 The Contract document shall consist of the following :-

- a) Original tender documents issued with its enclosures.
- b) Addendum/Corrigendum to tender documents issued, if any.
- c) Fax of Intent.
- d) The detailed letter of Intent/Acceptance along with statement of Agreed Variation (if any) and enclosures attached there with.

- 1.9.3 The statement of agreed deviations shall be prepared based on the finally retained deviations if any by the Tenderer and all correspondences and MOM's held between the OWNER and the Tenderer prior to issue of Telegram/Fax of intent shall be treated as Null and Void. Any deviation or stipulations made and accepted by the owner after award of the jobs shall be treated as amendments to the contract documents as above.

1.10 ADDITIONAL WORKS/EXTRA WORKS

OWNER reserves their right to execute any additional works/extra works, during the execution of work, either by themselves or by appointing any other agency even though such works are incidental to and necessary for the completion of works awarded to the contractor. In the event of such decisions taken by OWNER, contractor is required to extend necessary cooperation, and act as per the instructions of Engineer-in-Charge.

1.11 PRELIMINARY EXAMINATION:

- 1.11.1 The OWNER will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been



furnished, whether the documents have been properly signed, and whether the bids are generally in order.

1.11.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If the Bidder does not accept the correction of the errors, its Bid will be rejected. If there is a discrepancy between words and figures, the amount in words will prevail.

1.11.3 Prior to the detailed evaluation, the OWNER will determine the substantial responsiveness of each Bid with reference to the Bidding Documents. For this purpose a substantially responsive Bid is one which confirms to all other terms and Conditions of the Bidding documents without material deviations. The OWNER'S determination of a Bids responsiveness is to be based on the contents of the Bid itself without recourse to extrinsic evidence.

1.11.4 A bid determined as not substantially responsive will be rejected by the OWNER and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

1.11.5 The OWNER may waive any minor informality or non- conformity or irregularity in a Bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

1.12 Complete Scope of Work

The scope of work is mentioned in Tender Document. Offers of those Bidders who take total responsibility for complete scope of work for the SOR item in case evaluation is item wise basis otherwise for all the items as mentioned in Tender Document shall be considered for detailed evaluation.

1.13 Clarification of Bids

After opening of the Bids to assist in the examination, evaluation and comparison of Bids, the OWNER may, at its discretion, ask the Bidder for a clarification of its Bid. The request for such clarification and the response shall be in writing and no change in the price or substance of Bids shall be sought, offered or permitted.

1.14 Deduction at source

1.14.1 Owner will release the payment to the Contractor after effecting deductions as per applicable law in force & after offsetting all dues to the Owner payable by the Contractor under the Contract.

1.15 TESTS AND INSPECTION

The contractor shall carry out the various tests as enumerated in the technical specifications of this tender document and the technical documents that will be furnished to him during the performance of the work and no separate payment shall be made for Third Party Inspection unless otherwise specified in schedule of rates.

1.16 REGISTRATION UNDER SALES TAX ACT (Wherever applicable)



Attested copy of certificate for registration under State Government Sales Tax Act in the proforma prescribed by State Govt. should accompany the tender. The registration should be in the name of the Firm / Individual quoting for the work. In absence of the above registration, tenderer may not be awarded the work tendered for, in the light of State Govt. directive / instruction.

1.17 PROVIDENT FUND ACT (Wherever applicable)

1.17.1 The bidder shall submit the EPF code number along with the bid document.

1.17.2 The Contractor shall strictly comply with the provisions of Employees Provident Fund Act and register themselves with RPFCA before commencing work. The Contractor shall deposit Employees and Employers contributions to the RPFCA every month. The contractor shall furnish along with each running bill, the challan /receipt for the payment made to the RPFCA for the preceding months.

1.17.3 In case the RPFCA's challan/receipt, as above, is not furnished, Owner shall deduct 16 % (Sixteen percent) of the payable amount from contractor's running bill and retain the same as a deposit. Such retaining amounts shall be refunded to Contractor on production of RPFCA challan/receipt for the period covered by the related running bill.

1.18 LABOUR LICENCE

Before starting of work, contractor shall obtain a license from concerned authorities under the Contract Labour (Abolition and Regulation) Act 1970, and furnish copy of the same of Owner.

1.19 STATUTORY APPROVALS

1.19.1 Contractor shall be responsible for obtaining approval from statutory authorities like Municipal Corporation Development Authorities, Electricity Department and any other concerned authority as required for the completion of the work.

1.19.2 The application on behalf of the Owner alongwith required certificates / documents, complete in all respects, shall be submitted by the Contractor to the Engineer-in-charge, for onward transmission to statutory authority, well ahead of time, so that commissioning is not delayed for want of inspection by the authority. The necessary coordination, liaison and arrangements for statutory inspection and approval shall be the contractor responsibility. However, any fee paid to the concerned authority in this regard shall be reimbursed by the Owner on production of documentary evidence.

1.19.3 Inspection and acceptance of the work by statutory authorities shall not relieve the contractor from any of his responsibilities under this contract.

7.11.4 Any changes/additions required to be made to meet the requirements of statutory authorities, shall be carried out by the contractor, within the contract price, and to no additional cost to Owner.

2.0 SCOPE OF WORK

2.1 The Scope of Work shall be as set out in MR, Data Sheets and Technical



Specifications given Volume-II of tender document and supplemented by all stipulation in the total tender document.

3.0 **TERMS OF PAYMENT**

3.1 **FOR SUPPLIES**

Payments shall be released by the Owner against pre-receipted invoice, submission of valid performance guarantee and other documents complete in all respect meeting the requirement of contract document.

3.1.1 **For Indian Bidders**

a) 85% of supply value including string test as applicable will be paid progressively by Owner within 15 days against receipt of the following documents:-

- i) Invoice in triplicate (Invoice shall enable owner to claim CENVAT credit of ED and / or service tax, VAT setoff etc. as applicable. Invoice also to indicate all taxes and duties separately.)
- ii) Inspection Release notes issued by Purchaser/Purchaser appointed/Approved Third Part Inspection Agency.
- i) GR/ LR
- ii) Packing List
- iii) Insurance cover note covering transit insurance
- iv) A certificate from manufacturer that the all items/ equipment under supply including its component or raw material used with manufacturing are new and conform to the tender requirement. In case manufacturer is not the contractor this certificate will duly be endorsed by the contractor owning overall responsibility.
- v) Final technical file as per Technical Specifications/ Material Requisition including all test certificates , if applicable
- vi) Indemnity bond for the total price of delivered items. (which will be valid till equipment is taken over by Owner at site).
- vii) Performance Bank Guarantee(s) of 10% of supplied portion Value. (If already submitted, a copy of the same).
- viii) Document related to CENVAT credit to be claimed by Owner, if applicable.
- ix) In case of delay in supply the invoice value shall be reduced to take care of stipulation of PRS clause of the contract.

B) 5% payment: On completion of erection and alignment

C) 10% payment: On testing, commissioning and completion of PG test, all other works & final acceptance by the owner and submission following additional document: -



- Acceptance certificate
- Work completion certificate
- No claim certificate

3.2 Erection, Testing, commissioning & field performance etc.

100 % Payment on erection, installation, testing of individual items and successful trial-run of the system, completion of all works and on final acceptance.

3.3 Annual Maintenance Service charges

Monthly payment on pro-rata basis as certified by Engineer-in-charge shall be made against the invoices raised.

3.4 General Notes

- i) Invoice shall be raised on the basis of not less than one fortnight interval.
- ii) All efforts shall be made to release the payment within 30 days after receipt of relevant documents complete in all respects.
- iii) All bank charges incurred in connection with payments shall be to vendor's accounts.
- iv) The contractor shall be responsible, on completion of contract, or wherever required, to undertake customs reconciliation work with Indian customs authorities and finalise the customs assessment by furnishing the necessary technical information etc. to the said authorities.
- v) Unless otherwise specifically stated in bid document, all payments shall be made in the currency quoted.
- vi) No interest charges for delay in payments, if any, shall be payable by Owner.
- vii) In case of Indian bidder (Contractor), statutory variation, if any, on account of customs duty on their built-in import content, as per terms of bid document, shall be claimed separately by Contractor after receipt of goods at site(s). However, any price benefits to the Owner, on account of such variation as per terms specified in the bid document, shall be passed on to the Owner along with invoicing itself. Copy of necessary documentary evidence in support of statutory variation shall be submitted along with claim/ invoicing.

4.0 INSURANCE – FOR FREE ISSUE ITEMS/ MATERIALS

4.1 Insurance For Free Issue Material

All supplies at CIF Indian Port for foreign bidder and FOT site for Indian bidder shall be considered free issue material to contractor.



Contractor shall at his own expense arrange, secure and maintain insurance cover of value not less than the supply value (including custom duty, CVD, Special Duty, Cess etc. as applicable) during entire tenure of Contractor's custody till the material is handed over to Owner at site in a manner defined in Tender Document. Contractor's quoted price shall be inclusive of all costs on account of insurance liabilities covered under the Contract. Contractor to note that the beneficiary of insurance cover shall be the Owner.

Indemnity Bond to be executed by the supplier (in case of foreign bidders) while taking custody of all supplies at the time of custom clearance and transporting to site. However, in case of Indian bidders Indemnity Bond shall be executed at the time of reaching material to site as per format given in General Conditions of Contract.

4.2 Insurances In India

4.2.1.1 In addition to the insurance covers specified in the General conditions of Contract to be obtained and maintained by the Contractor, Contractor shall at his own expense arrange, secure and maintain insurance with Indian insurance companies to the satisfaction of the owner as may be necessary and to its full value including than for free issue material for all such amounts to protect the works in progress from time to time and the interest of Owner against all risks as detailed herein. The form and the limit of such insurance as defined herein together with the under writer works thereof in each case should be as acceptable to the Owner. However, irrespective of work acceptance the responsibility to maintain adequate insurance coverage at all times during the period of Contract shall be that of Contractor alone. Contractor's failure in this regard shall not relieve him of any of this responsibilities and obligations under Contractor.

4.2.2 Any loss of damage to the equipment during inland transportation, storage, erection and commissioning till such time the Work is taken over by Owner shall be to the account of Contractor. Contractor shall be responsible for preferring of all claims and make good for the damage or loss by way of repairs and/ or replacement of the parts of the Work damaged or lost. Contractor shall provide the Owner with a copy of all insurance policies and documents shall be submitted to the owner immediately upon the Contractor having taken such insurance coverage. Contractor shall also inform the Owner regarding the expiry cancellation and/ or changes in any of such documents and ensure revalidation/ renewal etc., as may be necessary well in time.

4.2.3 The risks that are to be covered under the insurance shall include, but not be limited to the loss or damage in handling, transit, theft, pilferage, riot, civil commotion, weather conditions, accidents of all kinds, fire, war risk etc. The scope of such insurance shall cover the entire value of supplies of equipments, plants and materials. The duration of insurance of free issue material shall be 1.5 months from the date of material reaching site.

4.2.4 The purchaser shall arrange insurance cover at his own expense after above period to cover the risks that is, limited to the loss or damage due to riot, civil commotion, earth quake, fire (not due to operation and maintenance fault) and war. Supplier may arrange insurance over and above this insurance coverage for entire operation and maintenance period if required.

4.2.5 All cost on account of insurance liabilities covered under this Contract will be to Contractor's account and will be included in Contract Price.



5.0 **INDEMNITY BOND**

After award of work, bidder has to furnish legal indemnity bond to owner equivalent to 110% of total value of equipment before Owner hands over such equipment to them for the purpose of further action as per scope of work in the format as per Annexure-I to GCC- Works.

6.0 **CUSTOM DUTY & EQUIPMENT CLEARANCE**

Owner shall pay custom duty to custom department . All other work related to custom clearance including port handling, transportation upto site etc. would be in the scope of bidder.

Owner's scope would be limited to handing over of cheque / draft towards custom duty to contractor upon receipt of copy of bill of entry duly assessed by custom authorities and indemnity bond from contractor.

7.0 **PROJECT SCHEDULING & MONITORING**

The following schedules/documents/reports shall be prepared and submitted by the Bidder/Contractor for review/approval at various stages of the contract.

7.1 **ALONGWITH BID**

a) **Time Schedule**

The Completion Time Schedule for the work (including mobilization period) as per Clause No. 20 in Special Conditions of Contract, Invitation for bid of PART-A of Tender in all respect, from the date of issue of telex/telegram/letter/Fax of Intent.

The Bidder is required to submit a Project Time Schedule in Bar Chart Form, along with the Bid. The Schedule shall cover all aspects like sub-ordering, manufacturing and delivery, indicated in the Bid Document. The Owner interface activities shall be clearly identified with their latest required dates. Owner reserves the right to disqualify the Bidder if the above Schedule submitted by the Bidder is not in line with the overall Project requirement.

b) **Scheduling & Monitoring System**

The Bidders should describe their system of Project Scheduling and monitoring, the extent of computerization, level of detailing, tracing methodology etc. with the name of computer package and sample outputs.

7.2 **AFTER THE AWARD OF CONTRACT**

a) **Overall Project Schedule**

The Contractor shall submit within 1 week of Fax of Intent, a sufficiently detailed over all Project Schedule in the activity network form, clearly indicating the major milestones, interrelationship/ interdependence between various activities together with analysis of critical path and floats.



The network will be reviewed and approved by Engineer- in-Charge and the comments if any shall be incorporated in the network before issuing the same for implementation. The network thus finalised shall form part of the contract document and the same shall not be revised without the prior permission from Engineer-in-Charge during the entire period of contract.

b) **Progress Measurement Methodology**

The contractor is required to submit within 1 week of award of WORK, the methodology of progress measurement of sub-ordering, manufacturing/delivery, sub- contracting construction and commissioning works and the basis of computation of overall services/physical progress informed. Owner reserves the right to modify the methodology in part or in full.

c) **Functional Schedules**

The contractor should prepare detailed functional schedules in line with network for functional monitoring and control and submit scheduled progress covers for each function viz. ordering, delivery and construction.

8.1 **RULES , REGULATIONS AND PROCEDURES**

8.2 CONTRACTOR shall observe in addition to Codes specified in respective specification, all National and Local Laws, Ordinances, Rules and Regulations and requirements pertaining to the WORK and shall be responsible for extra costs arising from violations of the same.

8.2 Various procedures and method statements to be adopted by CONTRACTOR during the construction as required in the respective specifications shall be submitted to OWNER in due time for APPROVAL. No such construction activity shall commence unless approved by OWNER in writing.

9.0 **FIELD INSPECTION**

CONTRACTOR shall have at all times during the performance of the WORK, a Competent Superintendent on the premises. Any instruction given to such superintendent shall be construed as having been given to the CONTRACTOR.

10.0 **ERECTION AND INSTALLATION**

The CONTRACTOR shall carry out required supervision and inspection as per quality Assurance plan and furnish all assistance required by the OWNER in carrying out inspection work during this phase. The OWNER will have engineers, inspectors or other authorised representatives present who are to have free access to the WORK at all times. If an OWNER's representative notifies the CONTRACTOR's authorised representative not lower than a Foreman of any deficiency, or recommends action regarding compliance with the SPECIFICATIONS, the CONTRACTOR shall make every effort to carry out such instructions to complete the WORK conforming to the SPECIFICATIONS and approved DRAWINGS in the fullest degree consistent with best industry practice.



11.1 SITE CLEANING

11.1.1 The contractor shall take care for cleaning the working site from time to time for easy access to work site and also from safety point of view.

11.1.2 Working site should be always kept cleaned upto the entire satisfactions of the Engineer-in-charge.

Before handing over and work to owner, the Contractor in addition to other formalities to be observed as detailed in the document shall clear the site to the entire satisfaction of Engineer-in-charge.

12.0 DOCUMENTATION

12.1 "AS BUILT" DRAWINGS

Notwithstanding the provisions contained in standard specifications, upon completion of WORK, the CONTRACTOR shall complete all of the related drawings to the "AS BUILT" stage and provide the OWNER, the following :-

- a) One complete set of all original tracings.
- b) One complete set of full size reproducibles.
- c) One complete set of reduced size (279 mm x 432 mm) reproducible copies of all drawings.
- d) One complete set of microfilm of all original drawings.
- e) Six complete sets of reduced size (279 mm x 432 mm) prints.
- f) Six complete bound sets of CONTRACTOR's specifications including design calculations.
- g) Six complete sets, in the form of hand bound volumes, of the manufacturer's data book for all the equipments, instruments etc. including certified prints and data. Data books shall be completed with index as to tag numbers associated with manufacturer's data shown, Equipment data shall include as a minimum requirement the principle and descriptions of operations, installation and maintenance instructions, drawings and dimensions, parts list and priced purchase orders including those of major sub-vendors and suppliers. Requirements pertaining to "VENDOR DATA REQUIREMENT" attached with standard specifications for the documents to be included in the Data Book for each equipment, instruments etc. shall also be complied with.
- h) Six bound copies each of the Spare Parts Data Books and the Lubricants Inventory Schedule.
- i) 2 set of CD (one for consultant and one for client) with above document in editable form.



12.2 Completion Document

The following documents shall be submitted in hard binder by the CONTRACTOR in THREE sets, as a part of completion documents :-

- a) Test results and reports.
- b) Pre-commissioning/commissioning check list.
- c) Performance certificate
- d) Completion Certificate issued by Owner's Site Engineer.
- e) No claim certificate by the Contractor.

13.0 **ORDER OF WORKS/PERMISSIONS/RIGHT OF ENTRY/CARE OF EXISTING SERVICES**

The order in which the WORK shall be carried out shall be subject to the approval of the Engineer-in-charge and shall be so as to suit the detailed method of construction adopted by the CONTRACTOR, as well as the agreed joint programme. The WORK shall be carried out in a manner so as to enable the other contractors, if any, to work concurrently.

OWNER reserves right to fix up priorities which will be conveyed by Engineer-in-Charge and the CONTRACTOR shall plan and execute work accordingly.

14.0 **QUALITY ASSURANCE / QUALITY CONTROL PROGRAMME**

14.1 Bidder shall include in his offer the Quality assurances Programme containing the overall quality management and procedures which is required to be adhered to during the execution of contractor. After the award of the contract detailed quality assurance programme to be followed for the execution of contract under various divisions of work will be mutually discussed and agreed to.

14.2 The Contractor shall establish document and maintain an effective quality assurance system as outlines in recognised codes.

14.3 Quality Assurance system plans/procedures of the Contractor shall be furnished in the form of a QA manual. This document should cover details of the personnel responsible for the Quality Assurance, plans or procedures to be followed for quality control in respect of design, Engineering, Procurement, Supply, Installation, Testing and Commissioning. The quality assurance system should indicate organizational approach for quality control and quality assurance of the construction activities, at all stages of work at site as well as the manufacturer's works and despatch of materials.

14.4 The Owner or their representative reserve the right to inspect witness, review any or all stages of work at shop/site as deemed necessary for quality assurance.

15.0 **DEDUCTION FROM CONTRACT PRICE**

All costs, damages or expenses which the OWNER may have paid, for which under the CONTRACT the CONTRACTOR is liable, shall be cleared by the OWNER. All such claims shall be billed by the OWNER to the CONTRACTOR, regularly as and when they fall due. Such bills shall be supported by appropriate and certified vouchers



or explanations, to enable the CONTRACTOR to properly identify such claims. Such claims shall be paid by the CONTRACTOR within fifteen (15) days of the receipt of corresponding bills and if not paid by the CONTRACTOR within the said period, the OWNER may then deduct the amount, from any amount due or becoming due by OWNER to the CONTRACTOR under the Contract may be recovered by actions of law or otherwise, if the CONTRACTOR fails to satisfy the OWNER of such claims.

16.0 CONSTRUCTION AIDS, EQUIPMENT, TOOLS & TACKLES

CONTRACTOR shall be solely responsible for making available for executing the work, all requisite Construction Equipments, Special Aids, Cranes, Tools, Tackles and testing equipments and appliances. Such construction equipments etc. shall be subject to examination by owner and approval for the same being in first class operating condition. Any discrepancies pointed out by OWNER shall be immediately got rectified, repaired or the equipment replaced altogether, by CONTRACTOR. OWNER shall not in any way be responsible for providing any such equipment, machinery, tools and tackles.

The OWNER reserves the right to rearrange such deployment depending upon the progress and priority of work in various sections.

17.0 MAKE OF MATERIAL/BOUGHT OUT ITEMS

Approved vendors for various major items are given in technical specification. The bidder shall consider such names only as indicated in the aforesaid list and clearly indicate in the bid the name(s) as selected against these items. However, for any other item not covered in the list enclosed with this tender document, prior approval shall be obtained by the contractor for its make/ supplier's name.

18.0 INSPECTION OF SUPPLY ITEMS

All inspections and tests shall be made as required by the specifications forming part of this contract. Contractor shall advise Owner in writing at least 10 days in advance of the date of final inspection/tests. Manufactures inspection or testing certificates for equipment and materials supplied, may be considered for acceptance at the discretion of Owner/ Consultant. All costs towards testing etc. shall be borne by the contractor and shall be included in quoted rates. No separate payment shall be made for Third party Inspection Agencies. All inspection of various items shall be carried out based on Quality Assurance Plan, which will be submitted by the Contractor and duly approved by Owner/ Consultant.

19.0 DELIVERY BASIS

Delivery basis is to be on FOT site basis.



**20. COMPLETION SCHEDULE FOR JOB AWARDED TO THE BIDDER ON
TOTAL PACKAGE BASIS.**

<u>Item Description</u>	<u>Completion Period</u>
i) Design, Engineering, Testing, Supply (FOT Site basis) Including packaging forwarding, transportation, Custom clearance etc.	16 weeks from date of Fax of Intent
ii) Installation and Commissioning of Compressor Package, excluding AMC as defined in the TS	2 weeks from date of intimation for commissioning

Notes:

1. Price reduction schedule shall be applicable on sl. no. (I) & (II) separately. Contract value for sl. no. (I) & (II) for PRS purpose shall exclude price for AMC's
2. PRS shall be applicable on individual package in case nos of packages are more than one.

21.0 EVALUATION BASIS

Evaluation will be done on total package cost basis as per MR and order shall be placed on L1 bidder.



BHAGYANAGAR GAS
LIMITED

**Tender for Procurement of Booster Compressors for
CNG Stations in Hyderabad**

Bid Document No. BGL/345/2016-17

VOLUME
II OF II

SECTION – 9

**TECHNICAL SPECIFICATION FOR CNG
COMPRESSOR**



C O N T E N T S

SL NO:	DESCRIPTION
1.	GENERAL
2.	UTILITIES & BATTERY LIMITS
3.	BIDDERS ELIGIBILITY CRITERIA (TECHNICAL)
4.	EQUIPMENT QUALIFICATION CRITERIA
5.	BASIC DESIGN CRITERIA
6.	ELECTRICS
7.	INSTRUMENTATION
8.	CABLING
9.	INSPECTION AND TESTING
10.	PAINTING AND PROTECTION
11.	ERECTION, TESTING AND COMMISSIONING AT SITE
12.	PACKAGE PERFORMANCE TEST AT SITE
13.	SPARE PARTS, SPECIAL TOOLS AND TACKLES
14.	DATA AND DRAWING
15.	GUARANTEED PARAMETERS OF COMPRESSOR
16.	GAS COMPOSITION
17.	DATA SHEETS
18.	OPERATION & MAINTENANCE SERVICES
19.	CHECK LIST OF SCOPE OF SUPPLY
20.	FORMAT OF DEVIATION TO THE TECHNICAL SPECIFICATION.



1.0 GENERAL

Bhagyanagar Gas Limited (BGL) is a joint venture company of M/s GAIL (India) Limited and M/s Hindustan Petroleum Corporation Limited (HPCL). BGL has been set up to supply natural gas to domestic, commercial and industrial sectors including setting up of CNG filling stations to cater to the automobile sector for vehicle in Hyderabad, Vijayawada & Kakinada.

1.1 Scope of work

This specification along with applicable codes as referred describe the minimum requirements for design, engineering, manufacturing, inspection, testing, supply including packaging, forwarding, insurance, custom clearance, handling and unloading at port as well as at PURCHASER stores, package performance test at Bidder 's shop, supply, erection & commissioning at site of " ELECTRIC MOTOR DRIVEN BOOSTER GAS COMPRESSOR PACKAGES" as required for dispensing CNG to vehicles at various locations in Hyderabad, Vijayawada & Kakinada. The Compressor Packages shall be identical in all technical respects. Various parts of this specification shall be read in conjunction with each other and in case where the different parts of this specification differs the more stringent requirement shall govern.

Any additional work/equipment or technical requirement not mentioned in the specification but required to make the offered system complete in accordance with the specification and for safe and proper operation, shall be deemed to be included in the scope of work by the Bidder .

1.2 Codes & Standards

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, 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.

The following codes and standards (versions/ revisions valid on the date of order) are referenced to & made part of specification:

- API-11P, Second edition ,API 618
- NFPA-37, OISD 179, NFPA-52: 2006,NFPA -496, NFPA -68, NFPA-70
- ANSI, ASTM, NEC, NEMA
- Indian Electricity Rules, Indian Explosives Act.
- EUROPEAN NORM P.E.D. , italian NORM D.P.R. 547/55
- EUROPEAN NORM P.E.D , D.M. 24.5.02 - D.M. 28.6.02

- D.M 24.11.84 parte prima - sez. II° , D.M. 24.5.02 - D.M. 28.6.02, DIN 2413,SAE J 514
- EUROPEAN NORMS , CEI EN 60079-10/CEI EN 60079-14/CEI, EN 60204-1/ CEI EN 60439-1 , ATEX STANDARD



1.3 **Precedence**

In case of any conflict among the various documents of this requisition the following preferential order shall govern:

1. Data sheets/drawings
2. This Technical Specification
3. International standards/codes as applicable
4. Indian Standards / codes applicable

Compliance with this specification shall not relieve the Bidder of the responsibility of furnishing equipment and accessories of proper design, material and workmanship to meet the specified operating conditions.

No deviations to the technical requirements and to the scope of supply specified in this enquiry document shall normally be accepted and offers not in compliance to the same shall be rejected summarily. In case a deviation is required due to inherent design of the equipment offered, the Bidder shall list all such deviations at one place giving reasons thereon.

1.4 **DOCUMENTS/DATA REQUIRED ALONG WITH BID**

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

- a. Proven Track Record Formats duly filled in
- b. Checklist duly filled in with regards to scope of supply
- c. Completely filled in Data Sheets of compressor, Electric motors
- d. Deviations if any to this Technical Specification
- e. Tentative Lay out / key plan/ General Arrangement indicating size of skids, center distance between skids and space required along with maintenance requirements
- f. (a) Utilities requirements (b) Electrical Load summary
- g. Catalogues of compressor, electric motor and instrumentation items.
- h. Other details are given in VDR.

1.5 **SCOPE OF SERVICES**

Engineering, design and manufacturing. Procurement of raw materials etc. from sub-vendors. Preparation of documentation for design approval by Purchaser. Inspection and testing as per T.S. Surface preparation, protective coating and painting as per T.S. Packaging for transportation to site and supply. Erection testing & commissioning as per T.S. Field trial run and performance test at site. Post commissioning annual maintenance with all spares and consumables.

1.6 **SCOPE OF SUPPLY FOR EACH COMPRESSOR PACKAGE**

Each compressor Package shall be complete with:

- Lubricated or non-lubricated two throw balanced opposed reciprocating compressor or hydraulic booster with lube oil system and cooling system as



required.

- Electric motor as compressor driver.
- Instrumentation and control system as specified in the tender.
- 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, other required cables from owners PDB to main control panel of the compressor 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.
- Common structural steel skid for the compressor- electric motor and for all auxiliary systems. Booster skid to be designed to mount above of stationary cascade above.
- Structural supports within the compressor package for all piping, electrical and instruments etc
- Inter-stage and discharge gas, air cooled heat exchangers
- Priority Panel at Package Discharge as per Priority fill system
- All interconnecting oil, gas, water, air piping within the compressor package.
- Impulse and pneumatic piping/Tubing for all valves, fittings as specified & required for mounting the instruments.
- NRV as required for smooth operation.
- Y- type strainers, valves, sight flow indicators, check valves, manual drain/ traps etc. as required for various auxiliary systems i.e. lubrication system, cooling water systems etc.
- Coupling/V-belt/pulleys.
- Single Acoustic enclosure for both Compressor, electric motor and all its accessories as specified.
- CO2 extinguishing system consisting of one cylinder, piping and valves.
- Inlet and outlet manual isolating valves.
- Complete Erection, Testing & Commissioning of compressor packages.
- O&M (operation and maintenance) during 1st year warrantee period and second & third year post warrantee period with spares, consumables, coolant and lubricants except electricity.
- Training of 4 persons (2 supervisors + 2 operators) at packager's workshop and at sub-vendors workshop. The traveling boarding and lodging of Purchaser's engineers shall be borne by PURCHASER. Training module shall span shall be suitable to cover the equipment



constructional features, operational and maintenance procedures etc.
(Bidder to indicate separate price, if any).

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 pedestal/ foundation. Grouting of equipment including supply of material is a part of erection.
- CNG storage cascade.
- Bidder to note piping from air compressor and CO₂ cylinders up to enclosures in the scope of bidder.

1.7 Safety

1.7.1 All controls shall operate in a fail-safe mode i.e. failure of any control shall not lead to running of equipment in unsafe mode. Fail-safe control shall be available through hardware for all trips and also in software if PLC is used for controlling.

1.7.2 **Area Classification :**The hazardous area classification Class-I, Division I, Group D as per NEC or Zone I, Group II A/ II B as per IS/ IEC. 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.

1.7.3 All exposed rotating parts shall be provided with adequate guards of non-sparking type.

1.7.4 Drive belt if used shall be of fire retardant and anti-static type.

1.7.5 Piping shall be arranged in a manner so as to provide clear headroom and accessibility within the package. Adequate clearances shall be provided for all the engineered components for O&M point of view..

1.7.6 Package enclosures shall have one IR-L.E.L detectors and one Ultra Violet (UV/IR) fire detectors in each enclosure to cover the enclosures effectively.

1.7.7 All material used in the package shall be flame retardant.

1.7.8 The Compressor Package shall trip if any of the enclosure is opened while the machine is running. However, the bidder shall provide enclosure door bypass selector switch to facilitate routine checking while compressor is running.

1.7.9 Relief Valves shall be provided at suction and discharge and each inter stages of compressor with setting as per cl. 7.20.3 of API – 11P with R.V. venting as per cl. 7.20.4 of API-11P. All vented to common relief valve header.

1.7.10 **CO₂ flooding system:**



The package shall be protected by automatically operated CO₂ flooding system designed as per NFPA-12 which should have minimum following features: -

- 1.7.10.1 Minimum one no Gas Detector IR type which have self check function to generate fault alarm and have 4 to 20 MA transmitter for 0 to 100% LEL shall be provided . Bidder shall provide suitable comparator like trip amplifier of MTL/phoenix /P&F make to generate alarm signal at 20 % LEL and trip signal at 50% LEL. Indication lamp shall be provided for fault, alarm and trip signal in LCP.
- 1.7.10.2 Flame detector (UV-IR type) with self-check function and transmitter, alarm on detection of flame shall be provided. Package should have at least one no. flame detectors. self check function to generate fault alarm and trip alarm in case of flame detection Indication lamp shall be provided for fault and trip signal in LCP.
- 1.7.10.3 CO₂ flooding system shall consist of one min 45 kg CO₂ cylinders. However actual size of the cylinder shall be as per compressor enclosure size. The bidder shall submit necessary calculation during detailed engineering. The cylinders shall be protected from weather and direct sunrays as per Gas Cylinder Rules, 2004. Cylinders shall be fitted with actuated Valves, Solenoid valves etc. for automatic actuation. Control philosophy shall be such that in case detection fire by fire detector cylinder shall discharge CO₂ automatically. One pressure gauge to be located at gauge panel to detect the pr in Cylinder shall be provided.
- 1.7.10.4 FRLS (Fire resistant low smoke) cables shall be used for the wiring of the system.
- 1.7.10.5 Interlock of CO₂ Flooding system with compressor as per following sequence: -
- i. Compressor shall trip on detection of gas at preset level.
 - ii. Compressor shall trip on detection of flame at preset level and automatic discharge of CO₂ gas shall take place from the cylinder.
 - iii. Maintenance Override Switch shall be provided to keep the system off during maintenance.
 - iv. Compressor shall not start if the CO₂ Flooding System is faulty, not working, switched OFF during maintenance etc.
- 1.7.10.6 One blinking aviation lamp shall be provided at top of compressor canopy suitable for hazardous area for fire indication.
- 1.7.10.7 CO₂ Cylinder shall be provided preferably inside the package. Provision of manual, operation from outside shall be provided.
- 1.7.10.8 All installation shall be compatible for hazardous area Class 1, Division 1, Group-D for Methane Gas.
- 1.7.10.9 Technical specifications, Operation and Maintenance Manual, CCOE Certificate, Approval/ Manufacturing certificates for cylinders and cylinder valves, gas detectors, flame detectors, solenoid valves etc. shall be furnished by



the supplier along with system. Software and hardware, calibration procedure shall be provided by the supplier along with the supply sufficient enough to handle the system independently.

- 1.7.10.10 System shall be tested by the supplier after commissioning at site by creating fire signal and actual discharge of CO₂ Gas from the Cylinders. The cylinders have to be refilled by the vendor at no extra cost to purchaser after testing. If the system fails during testing, subsequent testing and refilling would be at vendor's cost.
- 1.7.10.11 Warning and Operating instructions to be displayed at equipments as per the statutory/ safety regulations.

2.0 UTILITIES & BATTERY LIMITS

2.1 Utilities

2.1.1 Bidder shall make his own provision for Instrument air with an electric motor driven air compressor, receiver and air dryer system.

2.1.2 Air compressor with discharge pressure of 7 kg/cm² suitable for 1.5 KW electric motor rating with dryer shall be supplied by the bidder. Compressor to be supplied should be preferably of IR/KPCL/Elgi/CP make; air receiver of min 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.

2.1.3 Tapping from air recover and dryer shall be provided as follows;

- a) For dispenser: One ½" tapping with isolation valve from air receiver.
- b) For booster compressor: One ½" tapping with isolation valve from air receivers.

2.1.4 Cooling water is not available as utility and the package shall be provided with self sufficient cooling water system for Compressor, as required, with make up tank. However cooling water for make up tank is available.

2.1.5 All electrical and instrumentation terminals shall be as specified.

2.1.6 Electric power shall be made available by bidder as mentioned in cabling 8.0.

2.1.7 For running the compressor and illumination 415 Volt (±10 %) 3-phases 4 Wire, 50 Hz (±5%) shall be provided by bidder near air compressor. **Bidder shall**



indicate power/ Feeder (KW/Amp) requirement in the offer.

2.1.8 Purchaser shall provide UPS (240 \pm 1 % V, 50 \pm 1 % Hz) for control supply requirements at a single point (feeder in UPS ACDB) near the booster compressor. **Bidder shall indicate power/ feeder (KW/Amp) requirement in the offer.** Surge protection devices of MTL/Phoenix make shall be provided in the control panel.

2.2 Battery limits

2.2.1 All customer interface connections, gas Inlet shall be brought out to the package edge and terminated with 3/4" pipe OD. Discharge connection shall be terminated with 3/4" pipe OD.

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

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

2.2.4 Electronics earth pit shall be made available at a distance of about 5 mt. from compressor package. Electronic 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.

3.0 BIDDERS ELIGIBILITY CRITERIA

Bidder's eligibility criteria are given in commercial portion of tender.

4.0 EQUIPMENT QUALIFICATION CRITERIA

The Gas Compressor model offered shall be from the existing regular manufacturing range of the Gas Compressor manufacturer. At least 2 identical units must have manufactured, tested and supplied from the proposed manufacturing plant in the last five years and out of the above 2 units at least one unit must have been operating satisfactorily in the field for a period of 8000 hours without any major overhaul as on the bid due date.

5.0 BASIC DESIGN CRITERIA

5.1 Following specification is intended to give the bidder the technical and operating conditions the compressor must fulfill. Compressor shall be either hydraulic booster type of reciprocating type suitable for variable suction pressure.

5.2 The bidder shall meet all applicable statutory codes, national law and local regulation



for safety and environment protection.

- 5.3 Offered package shall be complete with compressor, electric motor, hydraulic pump and piping, cooling system, suction and discharge filters, control panel safety and control devices and other accessories required for automatic and safe operation the system. The supply shall include all interconnecting piping/tubing/cables. Cooling system shall be of closed circuit type. Ultimate cooling shall be by air only.
- 5.4 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 falls below 200 kg/cm²g and stop once the pressure in all three banks reaches to 250 kg/cm²g.
- 5.5 Compressor shall be suitable for continuously variable suction pressure from 200 kg/cm²g to 30 kg/cm²g, supplied through LCV mounted CNG storage cascade.
- 5.6 Compressor shall be suitable for discharge pressure of 250 to 220 kg/cm²g corresponding to suction of 200 kg/cm²g to 30 kg/cm²g,.
- 5.7 Compressor shall be designed to ensure flow capacity as indicated in data sheet.

5.8 Cooling System

5.8.1 Compressor Cylinder

Compressor cylinders may be air-cooled or water-cooled. The CW shall be cooled by an air-cooled heat exchanger.

5.8.2 Inter / After Gas Coolers

Water or Air-cooled inter-stage and final stage discharge coolers shall be provided which shall limit the gas temperature after the after cooler to 50 °C. For calculating the surface area of the air cooler the ambient air temperature of 40 °C and 80% RH shall be considered. Cooler design shall be on the basis of 20% extra load corresponding to max severe operating conditions based on the thermal duty. Gas coolers shall be designed as per API-661 requirements.

For cooling of the Heat Exchangers a cooling fan to be provided

Cooling system to be preferably installed on same skid along with compressor due to space constraints. Bidder shall submit cooler sizing calculation for review.

5.9 Enclosure of CNG Compressor Package

- 5.9.1 The maximum allowed temperature within the enclosure shall be 5°C above ambient temperature. Adequate ventilation fans shall be provided to meet the above and also to account for heat dissipation of the coolers. Interlock shall be provided to start the exhaust fan to vent out any entrapped gases in the enclosure before starting the main compressor. In case heat exchanger fan is compressor shaft driven, the same can not be utilized as ventilation fan.



- 5.9.2 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 70 dB(A) at 1 meter from the enclosure.
- 5.9.3 Enclosures shall be provide with a degree of protection equivalent to IP 54 as defined in AS 1939, shall be flame proof and provided with forced ventilation system.
- 5.9.4 The enclosures shall have doors for normal access and removable wall panels for ease of maintenance.
- 5.9.5 All the pressure, temperature, oil level, lube oil pressure, coolant temperature, coolant level indicators shall be visible from outside of enclosures and shall be mounted on gauge panel visible from outside.
- 5.9.6 Enclosures shall have internal flame proof lighting arrangement.
- 5.9.7 For handling of all heavy parts for maintenance purpose lifting arrangement i.e. beam fitted with chain hoist shall be provided in enclosure.
- 5.9.8 The Compressor shall be located inside an acoustic enclosure . All Coolers, Knock Out Drums, Scrubbers, Cooling System, lubrication system along with interconnecting piping shall be inside an enclosure. Enough headroom shall be made available for easy access and maintenance of all equipment. The piping layout with respect to the compressor, intercoolers, KOD and auxiliaries location shall be subject to Purchaser's approval during detailed engineering stage.
- Components such as pressure gauges, temperature , pressure switches, filter automatic ball valves, safety valves etc., which require in-situ adjustment, maintenance 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, crank case oil filters, inter stage gas filters, inlet and outlets gas filters and drive belt shall be located to facilitate easy one-man servicing.
 - One person should be able to access crank case oil inlet and drains to allow addition or drainage of oil without removing panels or adjacent components and without the need of the pump.
 - Items which must be operated & monitored during operation shall be readily accessible without opening the door.
 - Suitable gradients shall be provided on the enclosure roof for rain drainage and to avoid water pockets.

5.10 Piping

- 5.10.1 All gas piping shall be designed, fabricated & tested in accordance with ANSI B 31.3 and shall be SS 316 material upto 1" size. Above 1" size the CS pipe material with welding & flanged joints is acceptable.
- 5.10.2 All rigid piping, tubing & other components of compressor package shall be designed for full range of pressure & temp 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.

5.10.3 The instrument air tubing material shall be SS 304.

5.10.4 All high-pressure double ferrule fitting and valves shall be from SWAGELOC/PARKER/HOKE makes & shall be S.S. material only. Material of tube shall also be SS316 as per ASTM A269 Sandvik make..

5.10.5 External drain & vent piping shall be Carbon Steel and not less than 1" nominal size. However, all the internal drains shall be SS 300 series material.

5.10.6 Ethyle Mercaptane dosing is envisaged hence all materials coming in contact with gas shall be compatible to such gas with Ethyle Mercaptane dosing and be of compressor manufacture's standard. The use of SA 515 material is prohibited.

5.10.7 The instrument air header SS 304 material upto compressor enclosure from air compressor shall be supplied by purchaser. Further connection shall be taken by supplier. Low pressure CO₂ piping; GI heavy duty from CO₂ flooding system to nozzles shall be in supplier's scope. High pressure CO₂ pipe shall be seamless CS.

5.10.8 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 compressed gas. The offered oil mist removal system shall restrict the oil less than 1 PPM in discharge of compressor

5.10.9 PP support shall be used for all tubes.

6.0 **ELECTRICS**

6.1 **Starter/Control Panel/ Control philosophy**

All electrical / instrument item shall be suitable for the following :

Power supply for electric control panel : either 230 V AC / 115 V AC however bidder to note that all control electric / electronic compressor shall be capable of with standby voltage fluctuation with $\pm 15\%$ of rated voltage (230 V AC / 115 V AC). In case card / component are not capable for with standing above voltage fluctuates the scope of supply of compressor package shall include UPS / voltage stabilizer / voltage conditioner, surge protection, etc.

Power supply for local control panel

- a) Same as Power supply for electric control panel
- b) 24 V DC power for gas detector flame detector, etc. AC to DC converter of either tele-mechanism / Siemens / Phoenix shall be provide with surge protector, if required.

6.1.1 The compressor package control system shall be so designed that the first item to go into trip condition shall lock out to indicate the cause of trip though the cause of trip may have disappeared. The lock out condition shall be manually reset. Compressor Package shall be provided with either micro PLC based LCP or relay based LCP which shall be mounted on the package enclosure, which shall be mounted on the package enclosure. All the interlocking, monitoring and controlling of the booster compressor



shall be done through digital signal only by providing either PLC or relay. If PLC is used hardware shall be in accordance with IEC-61131-2 and programme shall be made only in ladder diagram. Bidder provides one set of licensed software (window XP/2000 based) both configured to access PLC through

Following push button / switch shall be provided:

- Emergency stop
- Shut / Stop
- Auto / Manuals
- Fault accept
- Fault reset
- CO₂ cylinder by pass
- Test button for lamp & hooter

Panel provided with following indication lamps :

- All process alarm trip
- Indication for filling sequence

- Fire detector related indication
- Compressor running
- Control power supply ON for 24 V DC and 230 / 115 V AC

6.1.1 All solenoid coils, power contactors etc. shall have operating voltage of 230 V AC, and 50 Hz. For any other Voltage requirements, it will be in bidder's scope.

6.1.2 Motor shall be TEFV squirrel cage type in standard frame size as per IS/IEC rated for continuous duty with high efficiency and designed for star/delta starting. Motors shall be suitable for starting under specified load conditions with 75% of rated voltage at the terminals. Motor torque shall be compatible with speed torque curve of compressor. Motor windings shall be class 'F' insulated with temperature rise limited to class 'B'. Minimum degree of protection of motor enclosure shall be IP55 as per IS. Motors for use in hazardous areas shall have protection Ex (d) as per area classification.

6.1.3 The motor name plate rating (exclusive of service factor) shall be minimum 110% of the greatest HP required under any of the specification operating conditions. All motors shall be tested in accordance with IS/IEC

6.1.4 Each motor shall compulsorily be protected with thermal-magnetic over current relay.

6.1.5 The electrical power supply distributions panels, switchgear panels and starter panels shall be skid mounted construction, **explosion proof** suitable for installation on nearby compressor package in hazardous area classification.. There shall be FLP push button panel available at the compressor skid. The switchgear shall have one incomer and adequate number of outgoing feeders. All explosion proof panels and FLP push button shall be CMRS certified. The incomers shall be provided with suitably rated switch fuse unit, ammeter, voltmeter with selector switch, energy meter, hour meter, PF meter, etc. Motor feeders shall be provided with heavy-duty switch. HRC link type fuses, contactors (AC-3 duty), bi-metal relay, single-phase prevention, ammeter, push



buttons, earth leakage relays, indication lamps for Start/Stop/Trip, etc. Adequate number of MCB feeders for control and lighting shall be provided. Supplier shall furnish single line diagram of the panel with the bid.

- 6.1.6 There shall be separate panel for main incoming switch (MCCB) and the starter of main motor. There shall be a minimum clearance of 30 mm between the two power contractors. Indication lamp for start stop/trip etc shall be provided.
- 6.1.7 The compressor panel shall have phase reversal relay to detect the electrical supply phase sequence and trip the compressor on wrong phase sequence.
- 6.1.8 Supplier shall make provisions for earthing of the complete package as required as per IS. All electrics shall comply with latest IS/IEC. Epoxy based paints shall be applied on all electrical equipments. Supplier's scope shall include obtaining statutory approvals for the complete package, wherever necessary. All hardware used for earthing systems shall be hot dip galvanized or Zinc passivated.
- 6.1.9 Earthing: Metallic part of all equipment not intended to be alive shall be connected to earth as per provisions of IS: 3043/IEC recommendation. Grounding of all electronics shall be separately connected to earth using insulated copper wire. Grounding of electronic equipment shall not be connected to earthing for electrics or equip-potential bonding.
- 6.1.10 Pre-lubricated sealed bearings for all motors may be considered provided a full guarantee is given for 4 to 5 years of trouble – free service without necessity of re-lubrication.

6.2 Emergency shut down devices

The emergency shut down (ESD) system is also in scope of vendor. This shall be in accordance with NZS5425. 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. ESD shall activate either on pressing emergency push button (red button) or on fire detection. Red button shall be located near control panel and at compressor side.

6.3 Electric Motor And Drive Arrangement

6.3.1 Electric motors

- | | | |
|----|--|---|
| a) | Type of drive totally enclosed fan ventilated (TEFV) high efficiency as per IEEMA standard-19-2000 | |
| b) | Protection | Flame proof & weatherproof enclosure. |
| c) | Insulation | Class "F" with Class "B" temperature rise |
| d) | Mounting | Horizontal foot mounting |
| e) | Specification Standard | By Bidder |
| f) | Supply Voltage (assumed) | 415 ± 10% volt, 3 phases, 50 ± 5% Hz |
| g) | Synchronous Speed | By Bidder |
| h) | Motor rating | By Bidder |
| i) | Motor efficiency | % Bidder |
| j) | Power factor | By Bidder |
| k) | Speed of motors | By Bidder |
| l) | Nos. of hot starts of motors | 4 per hours |



- | | | | |
|----|---|----|--------|
| m) | Coupling type | By | Bidder |
| n) | Torque-Speed curve | By | Bidder |
| o) | Starting Torque-Current with curve load and no load | By | Bidder |

6.3.2 Motor accessories

- a) Compressor grooved flywheel
- b) Motor grooved drive pulley
- c) Drive vee belts
- d) Flexible coupling for direct drive
- e) Drive guard
- f) Adjustable motor slide rails for vee belt tensioning be used.

6.3.3 Preferred makes shall be as follows:

- | | | |
|----|---|--|
| a) | FLP motors | ABB / Compton Greaves / Kirloskar / Siemens / Bharat Bijlee. |
| b) | FLP Switchgear | Baliga/FCG/FPE/ Flexpro |
| c) | Switches/fuses/contractors | L&T/GEC/Siemens |
| d) | Cables and wires | INCAB/Universal/ASEAN/CCI/FORT Gloster/ Finolex/KEI |
| e) | IR Gas detectors | General Monitors / Crow on / Honeywell / Sieger |
| f) | UV Flame detectors | General Monitors / Crow on / Honeywell / Sieger |
| g) | Barrier/ Isolators/ Surge protector | : MTL / Phoenix / P&F |
| h) | Pressure Transmitter | Druck/ Wika/ Honeywell/ABB/ Rosmount |
| l) | Pressure Safety Valve | M/s BHEL, OFE & OE Group (New Delhi)/ M/s Keystone Valves (India) Pvt. Ltd. Baroda M/s Sevim Sarasin Valves India (P) Ltd. (New Delhi/ Halol-Gujarat)/ M/s Tyco Sanmar Ltd. (New Delhi/ M/s Parcol SPA, Italy/ M/s Nuopignone, Italy/ M/s Sarasin, France/ M/s Tai Milano SPA, Italy/ M/s Fisher Rosemount (Now M/s Emerson Process) Singapore |
| m) | Pressure Gauges & Temperatures Gauges | M/s AN Instruments Pvt. Ltd., New Delhi/ M/s General Instruments Ltd., Mumbai/M/s WIKA, |
| n) | RTDs | M/s General Instruments Ltd. Mumbai/M/s Nagman Sensors (Pvt.) Ltd./ M/s Pyro Electric, Goa |
| o) | SS Tube, Tube Fittings for CNG application | M/s Swagelok (USA)/ M/s Parker (USA)/ M/s Sandvik |
| p) | Plug Valve for air water | M/s Nordstrom Valves Inc. USA/ M/s Serck Audco Valves, UK/ M/s Breda Energia Sesto Industria Spa, Italy/ M/s Sumitomo Corporation, New Delhi/ M/s Fisher Xomox Sanmar India Ltd., New Delhi/ M/s Larsen & Toubro Ltd. (Audco India Limited, Chennai) |
| q) | Solenoid Valve | M/s ASCO / M/s Rotex / M/s parker Hanifen |
| h) | On Off ball/needle Valve Swageloc for CNG application | M/s Parker / M/s Swageloc for CNG application |



- i) Pressure switch / temp switch shall also be included this Indfos / Switzer / CCS .

Notes:

- 1) Successful bidders shall take prior approval of the make for the items not covered above for which complete technical credentials of the proposed vendors shall be required to be submitted for evaluation by Purchaser/Consultant.
- 2) The some Items indicate only Indian Makes. Successful Foreign bidders may take prior approval of any other make also for which complete technical credentials of the proposed vendors shall be required to be submitted for evaluation by Purchaser/Consultant.

6.3.4 Bidder shall furnish following electrical data also along with bid:

S NO.	ITEM DESCRIPTION	CONFIRMATION BY TENDERER	REMARKS
1	INCOMING CABLE SIZE FOR PROPOSED SUPPLY OF COMPRESSOR Indicate size of all cables: a) b) c) d) e)		If bidder revises the cable size, it shall be supplied, erected and terminated by him free of cost.
2	INCOMING FEEDER RATING IN CONTROL PANEL		for providing feeder in PDB by client
3	UPS LOAD in kW		
4	NON UPS LOAD in kW		
5	CMRI CERTIFICATION FOR COMPLETE CONTROL PANEL		
6	COMPRESSOR MOTOR		
a)	DATA SHEET OF MOTOR		
b)	TYPE TEST CERTIFICATION		
c)	STARTING TIME WITH STAR DELTA STARTER AT RATED SUCTION PRESSURE OF GAS		
d)	COMBINE LOAD AND MOTOR CHARACTERISTIC CURVE WITH STAR/DELTA STARTER AT RATED SUCTION PRESSURE		

7.0 INSTRUMENTATION

7.1 INSTRUMENTATION & CONTROLS

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

7.1.2 All package mounted transmitters & temperature elements shall be intrinsic safe "ib" as per IEC 79-11 and solenoid valves, switches and related junction boxes shall be flame



proof 'd' as per IEC 79-1. Other special equipment / instrument, where intrinsic safety is not feasible or available, shall be flame proof/explosion proof as per IEC 79-1.

7.1.3 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.

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

7.1.5 Separate junction boxes shall be provided for each type of signal i.e. e\analog digital, solenoids RTD, thermocouple and for power supply. No cable shall share power & signal.

7.1.6 All temp and pressure gauges shall be mounted on gauge panel visible from outside.

7.1.7 Compressor package shall be provided with min following instruments;

- All tripping shall be with lamp indication and annunciation.
- Temp indicator 1st , 2nd stage discharge and after- after cooler
- Pr indication 1st,2nd stage discharge, high & med bank. Pr switch, 2nd stage discharge, high & med bank
- Hydraulic oil tank : Level switch & gauge, temp indication & switch ; pump pr indication , return oil pr indication.
- Coolant: Temp & pr indication & switch and temp indication after cooler.
- Hour meter.

7.2 PRIORITY FILL SYSTEM

Vendor shall supply a suitable priority fill system with compressor top-up facility inclusive of regulating valves, by pass valve & liquid filled pressure gauges all mounted in a stainless steel structural. The priority fill system shall be installed to ensure that vehicle filling takes precedence over cascade filling. Full bore ball valves shall be provided so that compressor can take suction either from LCV cascade or stationary cascade. Tubing and valves from LCV cascade and stationary cascade to compressor shall be 3/4" SS 316 OD and other tubing and valves shall be 1\2" size. End connections shall be 3\4" size pipe OD.

7.3 Case -I; Valves positioned to take suction from LCV cascade.

- a) If the LCV cascade pressure is more than 200 kg/cm², 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 200 kg/cm².The priority of filling shall be as follows;
 - I) First priority: Priority panel shall first fill the vehicle through dispenser.
 - II) 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 250 kg/cm² or pressure in mobile



cascade is less than 30 kg/cm².

7.4 Case -II ; Valves positioned to take suction from stationary cascade

- a. Dispensing shall be done through stationary cascade without compressor running, if stationary cascade pressure is more than 200 kg/cm².
- b. Compressor shall start on pressing of manual start push button if stationary cascade pressure is less than 200 kg/cm². Dispensing into the vehicle should take place as usual. Compressor shall trip if either there is no vehicle for fuelling or pressure in stationary cascade is less than 30 kg/cm².

8.0 CABLING

- 8.1 Cabling inside the enclosure shall be of 1.5 Sq. mm core.
- 8.2 Cabling outside enclosure shall be minimum 2.5 Sq. mm core.
- 8.3 Cables shall be 1100-volt grade, stranded copper conductor, PVC insulated, PVC sheathed, round wire armoured, FRLS cables.
- 8.4 Cables shall be terminated using double compression type metallic frame proof glands and copper lugs.
- 8.5 Spare cores to be kept in each control cable.
- 8.6 All JB's shall have flame proof metallic enclosure
- 8.7 All the signal cables shall be screened armoured cables.
- 8.8 All the control and power cables shall be armoured cables only.
- 8.9 All the communication cables shall be screened and shall be terminated to JB through threaded GI conduits only.
- 8.10 All the cables shall be laid in through galvanized cable tray.
- 8.11 Following electrical cables shall be supplied and laid by Bidder.
 - a) Cables from PDB to compressor skid.
 - b) Cables from compressor to hooter.
 - c) Cables from PDB to air compressor.
 - e) Power and signal communication cables from compressor to mass flow meter during PG test.
 - f) Cables from purchaser's terminating points to compressor package's components.
 - g) Termination of cables in compressor control panel and in electrical panel including cable lugs and cable glands are in bidder's scope.
 - h) All cable shall be laid through GI cable tray of suitable size.

Any other cables not mentioned above but needed shall be in the scope of bidder for supply and laying.



9.0 INSPECTION AND TESTING

9.1 General

- a. Inspection and Test Requirements shall be as per approved QAP
- b. Bidder shall confirm compliance to all inspection and testing requirements stipulated therein and included the inspection charges in the lump sum cost.
- c. Purchaser/approved TPIA shall 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 Purchaser. Vendor shall depute approved TPIA for witnessing the tests. Approved 3rd party inspection agencies as mentioned Under Material requisition as Remarks Point 4. Inspection shall be carried out. Cost of TPAI will be borne by Vendor and no separate payment shall be made for TPAI.
- d. Bidder shall submit detailed Test Procedure for Approval of the Purchaser two months in advance of the actual date of conducting each test.

9.2 Mechanical running test (MRT)

9.2.1 The MRT for the each compressors shall be carried out in presence of Purchaser or by a approved 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
- Bearing temperature
- Oil cooler inlet and outlet temp
- Bidder shall submit test procedure for approval.

10.0 PAINING AND PROTECTION

10.1 Packing shall be sufficiently robust to withstand rough handling during ocean shipment & in-land journey. Sling points shall be clearly indicated on crates.

10.2 SURFACE PREPARATION

- (a) Rust, rust scale and foreign matter shall be removed fully to ensure that a clean and dry surface is obtained. The minimum acceptable standard for blast cleaning shall be Sa 2-1/2 or equivalent as per Swedish Standard SIS-055900-1967 or equivalent.
- (b) Blast cleaning shall not be performed where dust can contaminate surfaces undergoing such cleaning or during humid weather conditions having humidity exceeding 85%.
- (c) The first coat of primer must be applied by brush on dry surface. This should be done immediately after cleaning.
- (d) Surface shall be inspected by Purchaser/ third party before application of



primer.

10.3 PAINTING (PRIMER & FINISH COAT)

Following primer and finish coats to be applied on the canopy and all structural parts as a minimum: -

- a) Primer Two component epoxy zinc phosphate primer with minimum volume solids of 59%, an initial cure of 75 minutes at 25 deg. C and a weight of around 2.52 kg/litre.

No. of Coats: 1

DFT 75 (micron) μ each

- b) Primer Two component intermediate coat with epoxy high build MIO (micaceous iron oxide) of minimum volume solids of 80%, an initial cure of 60 minutes at 25 deg. C and a weight of around 2.1 kg/ litre.

No. of Coats 1

DFT 100 micron

- c) Finish Coat :
Acrylic Polyurethane paint

No. of Coats: 2

DFT 50 (micron) each coat

Total DFT 100 μ

Total DFT after application of primer and paint shall be 275 μ (micron) minimum.

- 10.4 The vendor to ensure that exterior steel surface of equipment and piping painted shall have a fade free life without oxidation of paint surface for atleast 5 years in an environment of bright sunlight with an intense UV content.

- 10.5 The headers of air-cooled exchanger shall be zinc sprayed.

11.0 ERECTION, TESTING AND COMMISSIONING AT SITE

- 11.1 Bidder shall be responsible for erection commissioning; performance test, field noise level test and field trial run of all compressor packages at site.

- 11.2 Bidder shall be liable to pay all local taxes, levies applicable and comply with rules, laws prevailing in concerned state.

- 11.3 Arranging crane, unloading at store, shifting from store to site , arranging special tools & tackles , grouting & grouting cement, lodging & boarding of bidders personnel, providing mobile phone facilities shall be included in the offered cost.

12.0 PACKAGE PERFORMANCE TEST AT SITE

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.

Complete package shall be performance tested as a module along with electric motor. Supplier 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 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 supplier.

13.0 SPARE PARTS, SPECIAL TOOLS AND TACKLES

13.1 All spare parts, special tools & tackles for erection and commissioning and operation & maintenance of compressor package shall be supplied by the packager and shall form his scope of supply.

13.2 A brand new separate set of special tools and tackles as required for Normal maintenance beyond the operation period shall be supplied by the packager along with Package despatch to site.

14.0 DATA AND DRAWING

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

- i) Completely filled in Data Sheets of compressor, Electric motors
- ii) Deviations if any to this Technical Specification
- i) Tentative Lay out / key plan/ General Arrangement indicating size of the package indicating overall dimension.
- ii) Utilities requirements
- iii) Electrical Load summary
- iv) Catalogues of compressor, electric motor , instrumentation items.
- v) P&I diagram
- vi) Full technical details of the compressor
- vii) Cross sectional drawings of the compressor unit.
- viii) Flow v/s suction pressure and power v/s suction pressure graph or full range suction pressure I.e. 250 to 28 hg/cm²
- ix) Safety code for CNG application
- x) Electrical line diagram,
- xi) O&M manuals of compressor.

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.



15.0 GUARANTEED PARAMETERS - BOOSTER COMPRESSOR

Sr No	Description	Bidder to indicate
1	Average flow capacity (over range of suction pressure from 200 to 30 KG/CM2 at varying on continuous basis): Required 400 Sm3/h	
2	Electric power consumption in KWH with no (+) tolerance with overall full range of suction pressure (from 200 kg/cm ² to 30 kg/cm ² varying on continuous basis) to compress 400 Sm3 gas with no (-) tolerance for loading and penalty purpose . *	
3	Minimum flow capacity in Sm3/h corresponding to suction Pressure of 200 kg/cm ² : bidder to indicate	
4	Minimum flow capacity in Sm3/h corresponding to suction Pressure of 30 kg/cm ² : bidder to indicate	
5	Minimum flow capacity in Sm3/h corresponding to suction Pressure of 60 kg/cm2(g): Required 250 Sm3/h	
6	Sound level of enclosure in dBA (required 70)	

Note:

1 Parameters under Sl. No. 3 & 4 are for reference only.

2.* Bidder must indicate the guaranteed KW including all losses such as mechanical, transmission, power absorbed by compressor driven auxiliaries like cooler fans etc but excluding air compressor.

3. * No loading and penalty shall be applicable for power consumption up to 20.0 K WH.

16.0 GAS COMPOSITION AND CLIMATE

16.1 Gas composition

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

Component	mole %	Deign case mole %
Methane	92.53	92.53
Ethane	2.22	2.22
Propane	1.84	1.84
Butane	0.95	0.95
.Pentane	0.31	0.31
Hexane	0.26	0.26



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Heptane	0.00	0.00
Carbon Dioxide	1.82	1.82
Nitrogen	0.07	0.07
SUM	100.00	100.00

NOTE:

1.0 Specific gravity: = to calculated by Bidder

2.0 Calorific value Net Kcal/SCM = to calculated by Bidder

16.2 Climatic Conditions

Wind Velocity : 120.0 Km/Hr

Minimum ambient temperature : 05 °C

Maximum ambient temperature : 45 °C

Maximum relative humidity : 90% non-condensing

Altitude : 123 m above MSL (Mean Sea Level)



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17.0 DATA SHEETS

17.1 DATA SHEET OF DAUGHTER BOOSTER COMPRESSOR

1	GENERAL				
2	PROJECT: : CNG & CITY GAS PIPELINE PROJECT OF BGL				
3	OWNER: M/S BGL				
4	SERVICE: PROCUREMENT OF CNG COMPRESSORS				
5	SITE:	HYDERABAD, VIJAYAWADA & KAKINDA			
6	NO. REQD : As per MR				
7	COMPRESSOR CAPACITY : 250 SCMH at suction pr. 60 KG/CM2(g)	DRIVER: ONE ELECTRIC MOTOR			
8	NOTE: <input checked="" type="checkbox"/> SCOPE OPTION / INFORMATION SPECIFIED BY PURCHASER <input type="checkbox"/>				
9	MANUFACTURER:		MODEL NO.:		
10	PLACE OF MANUFACTURE:				
11	NO. OF STAGES: bidder		CYLINDER ARRANGEMENT:		
12	CYLINDER LUBRICATION: <input type="checkbox"/> LUBRICATED <input type="checkbox"/> MINIMUM LUBRICATED <input type="checkbox"/> NON LUBRICATED				
13	<input checked="" type="checkbox"/> DRIVER TYPE: ELECTRIC MOTOR				
14	<input type="checkbox"/> DRIVE: <input type="checkbox"/> V – BELTS (ANTI-STATIC TYPE) <input type="checkbox"/> DIRECT				
15	<input type="checkbox"/> WITH COUPLING				
16	<input type="checkbox"/> DIRECTION OF ROTATION (FACING DRIVEN END): <input type="checkbox"/> CLOCKWISE <input type="checkbox"/> COUNTER CLOCKWISE				
17	EARTH QUAKE ZONE V WIND VELOCITY (KM/HR) 120 (MAX)				
18	INSTALLATION: <input checked="" type="checkbox"/> OUTDOOR				
19	MOUNTED ON A COMMON SKID ALONGWITH DRIVER, ENCLOSED INSIDE A ACOUSTIC ENCLOSURE				
20	Total Utility Consumption				
21	Cooling Water (Make UP) (m ³ /hr)				
22	Power (Auxiliaries) (kW)				
23	Power (Heaters) (kW)				
24	REMARKS: Vendor/Bidder should estimate the requirement for all the Utilities and indicate the same in tabular form.				
25	CONSTRUCTION / DESIGN FEATURES				
26	Nomenclature	Unit	Stage#1	Stage#2	Stage#3
27	Cylinders				
28	No of Cylinders -				
29	Single Acting (SA) / Double Acting (DA)				
30	Cylinder Bore / Stroke	mm / mm			
31	Rotational Speed of motor	RPM			
32	Linear Average Piston Speed	M/sec			
33	Piston Displacement	M ³ / hr			
34	Nos of strokes per hour				
50	<input type="checkbox"/> Lubrication/Hydraulic oil System				
51	Type of lube system	Piping material			
52	Quantity of lube oil for first filling	Carbon Steel			
53	Main Oil Pump Driven By :	Stainless Steel (all piping & valves Trims)			
54	Standby Oil Pump, Driven By :	Oil tank capacity			
55	Suction Strainer	Lube Oil Consumption			
56	Pressure Control Valve	Main Pump	Make :	Model :	
57	Level Sight Glass on the Crankcase		Type :	Material :	
58	Type of Oil Cooler :	Standby Pump	Make :	Model :	
59	Size of Filter:		Type :	Material :	
60	Oil Heater (if required).				
61	Electric Heater with thermostat (Kw) (if required).				
62	Thermostatic Valves				



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76	INSPECTION AND TESTS		
77	Material Composition and Physical Properties Certificates Required For:		
78	Cylinder and Liner	Piston	
79	pressure Vessels	Heat Exchangers	
80	X-Ray Examination for components: Pressure Vessels (certificates to be furnished).		
81		Certificate	Witnessed
82	Mech. Running Test with shop Driver (4 Hours min.)	■	■
83	Performance Test at Works	■	■
85	Functional/Continuity Tests Control Panel.	■	
86	Field Trial Run 20 Hrs. under Vendor's Supervision (Package)		
87	Valve Leak Test	■	
88	Lube Oil Console Run test	■	
89	Closed Circuit C.W. System test	■	
90	During package performance test		
91	Test Certificates Required For:		
92	Auxiliary Motor & Pumps	Safety Relief Valves	
93	Safety Switches	Solenoid Valves	
94	<input type="checkbox"/> WEIGHTS		
95	Overall supply (excluding driver and gear box, if any) Kg. approx.		
96	Maximum erection weight Kg. approx.		
97	Maximum maintenance weight Kg. approx.		
98	Gear Box Kg. Approx.		
99	Driver Kg. approx.		
100	SCOPE OF SUPPLY		
101	Compressor Assembly complete with frame, cylinder		
102	Motion work lubrication system		
103	Cylinder and packing lubrication system		
104	Cooling system		
105	Process Gas system		
106	Local instrumentation		
107	Local Gauge Board		
108	Local Control Panel		
109	Main driver electric Motor		
112	V-Belts with Pulley		
113	Couplings		
114	Driver Compressor		
115	Guards for moving parts		
116	Base plate Common for Compressor and Driver		
117	Fabricated Steel skid Common for compressor, driver and accessories		
118			
119	Special Tools -		
120	Anchor Bolts for Complete Package		
121	Piping supports and brackets : prefabricated for piping in Vendor's Scope		
122	Supports For Cylinders & Auxiliaries, Prefabricated & fitted in the Package		
123	Commissioning Spares, erection and commissioning spares		
124	Spares as specified in the Job Specification		
125	Vendor Data as specified		
126	NOTE : Refer checklist for scope of supply		



17.2 DATA SHEET OF COMPRESSOR MOTOR

1	Project name:	BGL
2	Driven equipment	Compressor
3	Tag No. / Equipment No.	
4	Duty	
5	Manufacturer	
6	Type	THREE PHASE, SQUIRREL CAGE INDUCTION MOTOR.
7	Frame designation	
8	Output _____ KW	
9	Voltage _____ VOLT	415 V+/- 10%
10	Full load current _____ AMP	
11	Full load speed _____ RPM	
12	Enclosure	TEFC/FLAMEPROOF/IP55 AS PER IS:4691- 1985
13	Mounting	
14	Insulation Class	F' - Temp. rise limited to Class - 'B'
15	Ambient temperature _____ °C	Temp inside canopy
16	Temp. Rise by resistance _____ °C	
17	Applicable Code	
18	Full load torque _____ Kg-m	
19	Starting torque _____ FLT	
20	Efficiency at _____ 100% Load	
	_____ 75% Load	
	_____ 50% Load	
21	Rotation viewed from DE	
22	Bearing type No.	
23	Type of Lubrication	
24	Coupling / pulley	
25	Net weight (approximate) _____ kg	
26	Cable size / type _____ mm sq.	
27	Phase / connection / No. of terminal	
28	Frequency _____ Hz.	50 Hz + / - 5%
29	No. of poles	
30	Locked rotor current _____ %FLC	
31	LR withstand time (HOT) _____ Sec (COLD) _____ Sec	
32	Startor / rotor time constant _____ Min	
33	Power factor at – 100% Load	
	- 75% Load	
	- 50% Load	
34	Break down or pull out torque _____ %FLT	
35	Space heaters _____ WATT / VOLT	
36	GD Sq. of load _____ Kg-m ²	
37	GD Sq. of motor _____ Kg-m ²	
38	Starting time at 100% / 80% V-Sec	
39	No. of starts – Hot	4
40	Vibration Level / Noise Level	As per IS12065 / IS12075



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41	Area classification	CLASS - I, ZONE (DIV)-1, GAS GROUP IIA / II B
42	CMRI CERTIFICATION FOR COMPLETE CONTROL PANEL	
43	COMPRESSOR MOTOR	
a)	DATA SHEET OF MOTOR	
b)	TYPE TEST CERTIFICATE	
c)	STARTING TIME WITH STAR DELTA STARTER AT RATED SUCTION PRESSURE OF GAS	
d)	COMBINE LOAD AND MOTOR CHARACTERISTIC CURVE WITH STAR/DELTA STARTER AT RATED SUCTION PRESSURE	



17.3 Data sheet- heat exchangers

1	GENERAL		
2	PROJECT:		
3	OWNER :M/S BGL	SITE :	
4	Service : Intercooler / After cooler for Compressor Package		
5	No. Reqd.: FOUR		
6	NOTE: ■ SCOPE OPTION / INFORMATION SPECIFIED BY PURCHASER □ INFORMATION REQUIRED FROM VENDOR.		
7	<input type="checkbox"/> Manufacturer :	Type : <input type="checkbox"/> Forced Draft <input type="checkbox"/> Induced Draft	
8	<input type="checkbox"/> Bundle Size : m x m x m	Bundles/Section	<input type="checkbox"/> Number of Units
9	<input type="checkbox"/> Bundles/Unit :	In Parallel / Series	<input type="checkbox"/> Section Size :
10	<input type="checkbox"/> Surface/Bundle : m²	Bare Tube : m²	<input type="checkbox"/> Section/Unit :
11	<input type="checkbox"/> Surface/Unit : m²	Bare Tube : m²	<input type="checkbox"/> Plot Area/Unit :
12	PERFORMANCE (Of One Unit)		
13	<input type="checkbox"/> Heat Exchanged : kcal/hr		MTD (Corrected) : °C
14	<input type="checkbox"/> Transfer Rate : kcal/hr m² °C	(Finned Surface)	(Bare Surface)
15	■ TUBE SIDE		
16	■ Fluid Circulated	GAS	Gravity : Liquid API SG @ 15.4EC
17	■ Total Entering Gas	kg/hr	Enthalpy / Latent Heat kcal/kg
18	<input type="checkbox"/> Operating Temperature	In : Out :	Fouling Resistance hr m² °C/kcal
19	<input type="checkbox"/> Operating Pressure Passes / Bundle kg/cm²		
20	AIR SIDE		
21	■ Temperature	■ In: 40 Out :	■ Altitude m:16 MSL
22	<input type="checkbox"/> Total Flow/Unit kg/hr	Static Pressure kg/cm²	
23	<input type="checkbox"/> Quantity/Fan kg/hr	Power/Fan kW	
24	<input type="checkbox"/> Face Velocity m/sec	Power/Unit kW	
25	CONSTRUCTION (Each Bundle)		
26	<input type="checkbox"/> Design Pressure : kg/cm²g	<input type="checkbox"/> Test Pressure : kg/cm²g	<input type="checkbox"/> Design Temperature : °C
27	□ Code Requirements :		
28	■ Type of Tubing :	■ Tube Material :	■ Fin Material : Al
29	■ Tube Bare Tubes (no's):	<input type="checkbox"/> No. of rows: O.D.	<input type="checkbox"/> BWG/Thk <input type="checkbox"/> Length
30	<input type="checkbox"/> Fins: Spacing /inch. O.D.	<input type="checkbox"/> Root Dia	<input type="checkbox"/> Thickness :
31	■ Header Type: Plug / Cover	<input type="checkbox"/> No. of Splits:	Material :
32	<input type="checkbox"/> Plugs/Gaskets	■ Side Frame : C.S. Inside Zinc Protected	
33	<input type="checkbox"/> Nozzles	In :	Out :
34	<input type="checkbox"/> Couplings	<input type="checkbox"/> Vent:	<input type="checkbox"/> Drain :
35	CONSTRUCTION (Each section)		
36	■ Structure	CS <input type="checkbox"/> Sec. /Gr. No.	<input type="checkbox"/> Design Wind Load : kgf/m
37	■ Plenum Chamber	CS inside Zinc Protected Type :	
38	<input type="checkbox"/> Fans	No. Dia. RPM	Mfr.
39	<input type="checkbox"/> Blades	Material	No./Fan Pitch Angle(Design) :
40	<input type="checkbox"/> Hubs	Material:	Pitch: Auto variable / Adjustable (No.)
41	<input type="checkbox"/> Louvers	Material	Type : Mfr.
42	<input type="checkbox"/> Weights kg Each Section(Dry) :	Full of Water:	
43	<input type="checkbox"/> Each Bundle (Dry) :	Full of Water:	
44	■ APPLICABLE SPECIFICATIONS API Standard 661		
45	■ REMARKS 1. Air coolers should be designed for 10% excess capacity than required normally.		
46	■ Exchanger should be designed with air side temperature of 40 °C.		
47	■ Separate data sheet should be filled by the bidder for each service i.e. Inter cooler and After cooler		



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Bid Document No. BGL/345/2016-17

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17.4 DATA SHEET GAS DETECTION SYSTEM (IR TYPE)

1	TECHNICAL GENERAL				
2	PROJECT:				
3	OWNER: M/S BGL		SITE:		
4	EQUIPMENT: GAS DETECTOR				
5	NO.		GAS DETECTION TYPE:		
6	NOTE: <input checked="" type="checkbox"/> SCOPE OPTION / INFORMATION SPECIFIED BY PURCHASER <input type="checkbox"/> INFORMATION REQUIRED FROM VENDOR.				
7	<input type="checkbox"/> MANUFACTURER:		<input type="checkbox"/> MODEL NO.:		
	SIGNAL TRANSMISSION				
8	<input type="checkbox"/> ANALOG: TRANSMISSION BY 3CORE SHEILDED CABLE				
9	<input type="checkbox"/> MEASUREMENT CONTROL: 4mA to 20mA				
10	<input type="checkbox"/> SENSOR DRIFTS BELOW ZERO:				
11	<input type="checkbox"/> MEASURING RANGE EXCEEDED:				
12	<input type="checkbox"/> TRANSMITTER FAULT:				
13	<input type="checkbox"/> MAINTENACE SIGNAL:				
14	<input type="checkbox"/> HART COMPATIBLE:				
	<input checked="" type="checkbox"/> SITE / ENVIRONMENTAL DATA				
15	SITE DATA:				
16	AMBIENT TEMP. (°C):	MAX:			
17	RELATIVE HUMIDITY	MIN:			
18	(%):	MAX:			
	ALTITUDE (M):				
19	INSTALLATION: <input checked="" type="checkbox"/> INDOOR				
20	<input checked="" type="checkbox"/> ELECTRICAL AREA HAZARD:				
21	CLASS/ZONE: CLASS I ZONE I DIVISION: I GAS GROUP: D, GROUP IIA, IIB				
	<input checked="" type="checkbox"/> APPLICABLE CODES AND STANDARDS				
22	<input checked="" type="checkbox"/> GAS DETECTION APPROVALS: CENELEC :Exd IIC 6		<input checked="" type="checkbox"/> UL, CSA: Class 1, Div 1, Groups B,C,D		
	VOLTAGE OF SUPPLY				
23	OPERATING VOLTAGE 20 – 36 VDC, 24 VDC @ 150mA max.			<input type="checkbox"/> COMM. FAULT	
24	<input type="checkbox"/> IN-RUSH CURRENT: A.C/D.C				
25	<input type="checkbox"/> POWER INPUT A.C/D.C				
	PHYSICAL SPECIFICATIONS				
26	<input type="checkbox"/> ENCLOSURE: Nema 4+7 (IP65)				
27	<input type="checkbox"/> SIZE				
28	<input type="checkbox"/> WEIGHT				
	<input checked="" type="checkbox"/> INSPECTION AND TESTS				
29	<input type="checkbox"/> Physical Tests on site:				
	REMARKS				



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17.5 DATA SHEET- UV/IR FIRE DETECTION SYSTEM

	TECHNICAL GENERAL			
1	PROJECT:			
2	OWNER: M/S BGL	SITE:		
3	EQUIPMENT: UV FIRE DETECTION FOR CNG STATIONS			
4	NO.	FIRE DETECTION TYPE:		
5	NOTE: <input checked="" type="checkbox"/> SCOPE OPTION / INFORMATION SPECIFIED BY PURCHASER <input type="checkbox"/> INFORMATION REQUIRED FROM VENDOR.			
6	<input type="checkbox"/> MANUFACTURER:	<input type="checkbox"/> MODEL NO.:		
7	<input type="checkbox"/> WAVE LENGTHS:	<input checked="" type="checkbox"/> TYPICAL RESPONSE TIME: < 3 SEC @ 50FT		
8	<input type="checkbox"/> FIELD OF VIEW:	<input type="checkbox"/> MINIMUM SENSOR RESPONSE TIME:		
9	<input type="checkbox"/> SENSITIVITY	<input type="checkbox"/> MAINTENACE SIGNAL:		
10	<input checked="" type="checkbox"/> CLASSIFICATION: CLASS I, DIV 1, GROUPS B, C & D: Eexd IIC, T5, IP66	<input checked="" type="checkbox"/> CLASS II, GROUP E,F & GCLASS III, TYPE 4X		
11	<input checked="" type="checkbox"/> APPROVALS: CSA, FM, ATEX, CENELEC, CE MARKING			
12	<input checked="" type="checkbox"/> ENVIRONMENTAL SPECIFICATIONS			
13	<input checked="" type="checkbox"/> OPERATING TEMPERATURE RANGE: -40 (P ^{OP} C) to 85 (P ^{OP} C)			
14	<input checked="" type="checkbox"/> STORAGE TEMPERATURE RANGE: -50 (P ^{OP} C) to 85 (P ^{OP} C)			
15	<input checked="" type="checkbox"/> OPERATING HUMIDITY RANGE: 0% TO 100% RH NON-CON-DENSING			
16	<input checked="" type="checkbox"/> ALTITUDE (M):			
17	<input checked="" type="checkbox"/> EARTH QUAKE ZONE V			
18	<input checked="" type="checkbox"/> INSTALLATION: <input checked="" type="checkbox"/> INDOOR			
	<input checked="" type="checkbox"/> ELECTRICAL SPECIFICATION:			
19	<input checked="" type="checkbox"/> OPERATING VOLTAGE 20 – 36 VDC, 24 VDC @ 150mA max.	<input type="checkbox"/> COMM. FAULT		
20	<input checked="" type="checkbox"/> ANALOG SIGNAL: 4-20mA (600 Ohms Max.)	<input type="checkbox"/> READY SIGNAL		
21	<input type="checkbox"/> FAULT SIGNAL: 0Ma	<input type="checkbox"/> UV SIGNAL:		
22	<input type="checkbox"/> IR SIGNAL:	<input type="checkbox"/> WARN SIGNAL:		
23	<input type="checkbox"/> ALARM SIGNAL:	<input type="checkbox"/> BAUD RATE:		
24	<input checked="" type="checkbox"/> RELAY CONTACT RATING: 8A, 250VAC, 8A @ 24VDC	<input type="checkbox"/> RS-485 OUTPUT:		
25	<input checked="" type="checkbox"/> RFI/EMI PROTECTION: COMPLIES WITH EN40081-2	<input type="checkbox"/> STATUS INDICATOR:		
26	<input type="checkbox"/> FAULT MONITORING:			
	<input checked="" type="checkbox"/> MECHANICAL SPECIFICATION:			
28	<input checked="" type="checkbox"/> HOUSING:	<input checked="" type="checkbox"/> LENGTH:		
29	<input checked="" type="checkbox"/> DIAMETER:	<input checked="" type="checkbox"/> MOUNTING:		
30	<input checked="" type="checkbox"/> CABLE ENTRY:	<input checked="" type="checkbox"/> WEIGHT:		
	SCOPE OF SUPPLY			
31	<input checked="" type="checkbox"/> UV FIRE DETCTION SENSORS COMPLETE:			
32	<input checked="" type="checkbox"/> DATA SHEET COMPLETED			
33	REMARKS:			



18.0 OPERATION & MAINTENANCE SERVICES

The date of successful commissioning and performance test at site will be considered as date of start of the annual maintenance contract. However, bidder shall be paid 50% O&M charge for operating and maintenance of the compressor from the date of commercial operation to the date of PG test. The bidder must follow the OPERATION & MAINTENANCE REQUIREMENT as stated below but not limited to and ensure to provide trouble free services to the satisfaction of the owner.

18.1 General

The operation and maintenance services shall be provided in terms of shift pattern on the round the clock basis as mentioned in the tender document

- i) The supplier shall deploy adequate number of technicians / supervisors / Engineers / helpers as well as tools & equipment for smooth and proper operation & maintenance of the compressors supplied in terms of the contract. In case required to meet operational requirements, the supplier shall augment the same as per direction of Engineer –in- Charge.
- ii) The supplier 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.
- iii) The supplier shall allow weekly rest and daily working hours to his workmen as per the relevant Act/Law/and Rule made thereunder. 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 authorised representative shall provide the services on daily basis to interact with Engineer-in-charge and deployed workman
- iv) The work force deployed by the supplier for O&M services at CNG installation shall be of sound relevant technical professional expertise which is otherwise also essential from the safety point of view of the personnel of the supplier as well as for the installation.
- v) Supplier 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.
- vi) Regarding work completion, the decision of the Engineer-in-Charge will be final and binding.
- vii) The supplier shall make his own arrangements to provide all facilities like boarding and transport etc. to his workmen.
- viii) All personnel of the supplier entering on work premises shall be properly and neatly dressed and shall wear uniform, badges while working on premises of the company including work sites.



- ix) Supplier shall maintain proper record of his working employee's attendance and payment made to them.
- x) The contractor's representative/supervisor shall report daily to the Shift-in-Charge for day to day working.
- xi) All the safety rules and regulations prevailing and applicable from time to time at the installations as directed by PURCHASER will be strictly adhered to by the contractor.
- xii) The rates quoted by the bidder must be inclusive of all the taxes, duties, services tax, work contract tax and any other levies, contractor's share of P.F. and insurance charges, contractor's profit and any other expenditure etc.
- xiii) It will be the responsibility of the supplier to pay as per the minimum wages of the appropriate government applicable under the Minimum Wage Act 1948.
- xiv) The services shall be provided in terms of shift pattern on the round the clock basis. The supplier 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.
- xv) The supplier 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 supplier shall deploy adequate number of technicians/ supervisors / engineers at various site offices in consultation with Engineer-in-Charge to provide trouble free operation & maintenance of the compressors.
- xvi) All arrangements for communication from control room to the contract person working on job under the services shall be the responsibility of the contractor, viz pagers / walky-talky.
- xvii) 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 authorised representative.

18.2 Accommodation/transportation/medical

The supplier 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 supplier personnel.

18.3 Discipline:

The supplier shall be responsible for the discipline and good behavior of all his personnel deployed in the services contracted out and should any complaint be



received against any of his employee, he shall arrange to replace such persons within 24 hours of notice issued by the Engineer-in-Charge. The decision of the Engineer – in-Charge in this matter shall be final and binding on the contractor.

18.4 Gate pass/identity card

The contract shall arrange to supply / renew identity card to his workforce at his own cost, if so required by PURCHASER 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.

18.5 Right to get services carried out through other agencies

Nothing contained herein shall restrict PURCHASER from accepting similar service from other agencies, at its discretion and at the risk and cost of the contractor, if the supplier fails to provide the said services any time.

18.6 Sub-letting of contract

Sub-letting of contract: The bidder may sub let/ assign the installation and O&M services to an agency having experience of CNG compressor installation and O&M for min two years. However, complete responsibility including composite bank guarantee shall be furnished by the bidder/supplier. Bank guarantee for O&M shall start from the date of commercial operation by the purchaser which will be 10% of total cost of O&M services.

18.7 Compliance of laws

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

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

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

The installations where job is to be carried out are live and have hydrocarbon environment. Supplier shall comply with all safety and security rules and regulations and other rules laid down by PURCHASER for its operation. It shall be the duty/responsibility of the supplier to ensure the compliance of fire, safety, security and other operational rules and regulations by his personnel. Disregard to these rules



by the contractor's personnel will lead to the termination of the contract in all respects and shall face penal/legal consequences.

The supplier shall arrange for insurance of all this workers engaged on the job as per the relevant Acts, rules and regulations, etc. In case by virtue of provisions of worker's compensation Act, 1923 or any other law in force. PURCHASER has to pay compensation for a workman employed by the supplier due to any cause whatsoever the amount so paid shall be recovered from the dues payable to the supplier and /or security deposit. Insurance of equipment after performance test shall be arranged by owner.

18.8 The officer in charge shall have power to

- i) Issue the supplier from time to time during the running of the contract such further instructions as shall be necessary for the purpose of proper and adequate execution of the contract and the supplier shall carry out and bound by the same.
- ii) During the currency of this contract, PURCHASER can increase and/or decrease the number of the services / technicians to meet contractual requirements.
- iii) Order the supplier to remove or replace any workman whom the company considers incompetent or unsuitable and opinion of the company representative as to the competence of any workman engaged by the supplier shall be final and binding on the contractor.

18.9 Repatriation and termination

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

18.10 Indemnity agreement

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

18.11 Compensation for non-fulfillment of obligation under Annual Maintenance Contract (AMC)

During the AMC in warranty period of 1 year and 2 years post warranty period, the supplier must ensure that the compressor is available for a minimum of 18 continuous hours a day and 365 days a year for performing the required services as



defined in the tender document. The timing of 18 hours will be decided by client. If the supplier fails to provide the required services for any day, the supplier shall compensate the owner @ Rs 200/-per hr for compressor for the default period. For calculation of default period will be recorded jointly by the supplier and owner on daily basis. However, compensation will be on monthly cumulative basis rounded to nearest hour. During 6 hours supplier can carry out cleaning and preventive maintenance. Supplier in consultation with owner can club these 6 hours for two consecutive days for 2 times a month only without any penalty. In addition to above supplier shall also be allowed downtime of the compressor package cumulative up to 18 hours per month to carry out the periodic / scheduled / breakdown maintenance/ routine checking of compressor package. In case supplier has utilized less down time of the compressor package than that allowed, the supplier can carry forward only max unutilized 9 hours downtime to immediate next month. The max penalty per month shall not be more than 70% of per month charge against O&M quoted by the supplier.

18.12 Contractor's responsibility

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

18.13 Employment liability of contractor

The supplier shall ensure and will be solely responsible for payment of wages and other dues latest by 7th of the following month to the personnel deployed by him in the presence of the Company's representative.

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

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

The supplier shall be liable for making good all damages/losses arising out of loss or theft of each handled, leakage, pilferage of any office, furniture equipment fitting and fixtures what-so-ever as may be caused directly or indirectly by the engaged persons through him/work carried out by them.

18.14 Maintenance of compressor packages during one-year warranty period and 2-year post warranty period.

18.14.1 Scope of supply during one year warranty period:

Any spare parts required during one year warrantee period for one year warrantee period normal O&M services" shall be supplied by bidder free of cost. All the consumables, lubricants, lubricating oil , coolant , sealant, man power etc required for carrying out the Operation and maintenance of the complete compressor package during the warranty period, including periodic, breakdown maintenance for continuous and uninterrupted operation of the compressor packages shall be in scope of the bidder and shall be kept in stock. Electricity shall be supplied free of cost to the bidder.



18.15 Scope of supply during 2 year post warranty period:

Any spare parts required during 2 year O&M service shall be supplied by bidder free of cost. All the consumables, lubricants, lubricating oil, coolant, sealant, man power etc required for carrying out the Operation and maintenance of the complete compressor package during the warranty period, including periodic, breakdown maintenance for continuous and uninterrupted operation of the compressor packages shall be in scope of the bidder and shall be kept in stock. Electricity shall be supplied free of cost to the bidder.

18.15.1 Scope of services:

18.15.1.1 The bidder shall have to keep all the spares, consumables, lubricants, coolant, etc required for carrying out periodic, breakdown, emergency maintenance etc of the package so as to minimise the down time of the compressor. Non-availability of compressor package for non-availability of spares shall be liable for compensation.

18.15.1.2 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 like crane, forklift, chain pulley block, etc required during the any maintenance activity.

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

18.15.1.4 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.
- 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.

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

18.15.1.5 The bidder shall use only OEM's certified spares 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 be replaced or used further only on approval from the PURCHASER representative. However any unto ward consequences for non-replacement of such parts shall be the responsibility of the bidder.



- 18.15.1.6 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 caliper, micrometer screw gauge, fill gauges, bore gauge etc shall be in scope of the bidder and these instruments shall be calibrated every year.
- 18.15.1.7 All parts replaced by the bidder during the above contract period shall be properly packed and handed over to PURCHASER's on replacement.
- 18.15.1.8 The supplier shall submit a copy of the daily / weekly / fortnightly / monthly / bimonthly / quarterly and yearly performance report to the EIC in both soft and hard form. All stationery including the printed material shall be in scope of the bidder.
- 18.15.1.9 All the maintenance / inspection job carried out by the bidder shall be recorded and the report of the same shall be jointly signed by PURCHASER representative.
- 18.15.1.10 The EIC will be final authority to take decision with regards to maintenance or replacement of parts or any disagreement between the bidder and PURCHASER, during the execution of the contract.
- 18.15.1.11 The bidder shall carryout calibration of gas detectors and flame detectors every six months or earlier as per requirement or instruction of EIC of PURCHASER. Also yearly calibration of all instruments such as pressure gauges, transmitters, switches, mass flow meters etc shall be in the scope of he bidder. In addition to the above all safety relief valves shall also be tested and calibrated every year.
- Calibration 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 as per Gas Cylinder rules 1981 or Static & Mobile Pressure Vessels Rules.
- The periodic maintenance required to be done as per OEM recommendation shall be taken up promptly. The bidder shall plan such maintenances during non peak hours and in consultancy with the Engineer In Charge (EIC) of Purchaser .Any maintenance that needs to be taken up shall be well planned in advance with due approval of the EIC. The scope shall include preparation of maintenance schedule for carrying out the maintenance during the contract period.
- 18.15.1.12 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 replaced in the presence of PURCHASER representative.



18 CHECK LIST OF SCOPE OF SUPPLY

Notes :

- (i) 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 operation of the equipment package shall be included by the Bidder in his scope.
- (ii) Bidder to write YES/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 reasons for the same:
- (iii) Bidders' scope of supply shall include but not be limited to the following:

Sr. No.	Description	Specified by Purchaser (Yes/No)	Included by Bidder (Yes/No)	Remarks
1.0	Each Compressor package complete with :			
1.1	Air cooled or water cooled, lube oil cooling water, inter-stage and discharge gas coolers with necessary air cooling arrangement	Yes		
1.2	Combined or separate closed circuit cooling water system for compressor (As required)	Yes		
1.3	Lubricating oil system for compressor.	Yes		
1.4	Safety relief valves on each suction and discharge stage of the compressor	Yes		
1.5	All interconnecting oil, gas, water, air piping within the compressor package	Yes		
1.6	All valves, tubing, fittings as specified and required within the compressor package	Yes		
1.7	Fuel supply hardware complete with SS piping, control valves, Mass Flow-meter, filter, vent/drain within the package suitable for the specified fuel gas	Yes		
1.8	Common skid for compressor and other auxiliary systems	Yes		
1.9	Acoustic enclosures for compressor for noise attenuation up to 70 dBA @ 1 m distance fitted with LEL and fire detection and Co2 flooding system as specified.	Yes		
1.10	Instrumentation and control system as specified.	Yes		
1.13	Cabling with cable trays for all the electrical devices within the package.	Yes		
1.14	Supply of Gas mass flow meter with	NO		



20.0 PRICE LOADING ,COMPENSATION, ERECTION, TESTING AND PG TEST

- This section describes the guaranteed parameter, which the booster compressor package must fulfill, the penalty for shortfall in guaranteed parameters and rejection of compressor package by the Purchaser.
- The guaranteed parameter shall be adjusted to account for variation in gas composition and prevailing ambient condition during testing.
- Necessary calculations correction curves shall have to be furnished by Bidder along with bid, which shall be final & no deviation shall be permitted afterwards.
- In case of any inconsistency in manufacture and/or operation of supplied compressor package, Bidder shall at his own risk and cost, eliminate the defects to the satisfaction of Owner.
- For loading and compensation purpose, power consumption with suction pr of 30 to 200 kg/cm² and discharge pr equal to dispensing pressure may be considered. Dispensing pr will depend on empty vehicle pr. to be fuelled and compressor discharge pr may not be 250 kg/cm² continuously.
- Bidder shall furnish guaranteed value as per Clause N0 15(Guarantee Parameters.) of TS enclosed with this specification.

20.1 Compressor Capacity

Bidder shall guarantee average capacity of 400 Sm³/h from suction pressure 30 to 200 kg/cm² at suction temperature of 30⁰ C, discharge pressure of 220 kg/cm² with the no negative tolerance for errors in instruments and measurements.

20.2 Price Loading Criteria of compressor

The guaranteed KW including all losses such as mechanical, transmission, power absorbed by compressor driven auxiliaries like cooler fans etc but excluding air compressor at guaranteed flow with zero percent positive tolerance, of all the technically qualified Bidder shall be compared. On the basis of the lowest KW quoted by the Bidder, other shall be loaded as follows;

Differential operating cost (Ex)

Ex (in Rs) = (Eb-E₀) X Re X 6570 X D_F Where,

Ex = Differential electric cost.

E_b = Average total power quoted by the Bidder to be loaded for compressor package in KW

E₀ = Lowest average total power quoted by the any Bidder for compressor package in KW.

Re -- Unit rate of electricity i.e. Rs 4.0 per KWH

D_F = 3.274 (Discounting factor based on 5 years of operating years)

The financial loading on account of power consumption shall not exceed 5 % of compressor supply cost on FOT basis.



20.3 Penalty against non performance of compressor

20.3.1 Penalty due to Power consumption.

During compressor package performance test, in case the absorbed electric power at guaranteed parameters for entire compressor package including auxiliaries but excluding air compressor is more than the guaranteed power consumption mentioned at the time of bidding, penalty on the following basis shall be imposed on the Bidder :

$$EY \text{ (in Rs)} = 2.0 \times (EB_{TB} - EB_{GB}) \times Re \times 6570 \times D_F$$

Where,

EY = Differential electric cost.

EB_{TB} = Average total power absorbed by the compressor package in KW, at the time of performance test the compressor package at site.

EB_{GB} = Total absorbed power guaranteed for the complete package at the time of bidding.

Re -- Unit rate of electricity i.e. Rs 4.0 per KWH

D_F = 3.274 (Discounting factor based on 5 years of operating years)

The total penalty on account of Power consumption to be charged for non-conformance of guaranteed parameter shall not exceed 10% of compressor supply cost on FOT basis.

20.3.2 Penalty due to Compressor Capacity.

Over and above the penalty due to power consumption, If during PG test, the compressor capacity is found less than tender requirement (as per 20.1 above), penalty for the reduction in capacity shall be imposed on the Bidder on prorated basis based on FOT cost of compressor without any upper limit.



BHAGYANAGAR GAS
LIMITED

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SCHEDULE OF RATES (SOR)

SL. NO	Description	Qty.	Unit Price Ex-works Including cost of Imported raw material/components & Porject Rate of Customs Duty thereon, pkg/fwd, but excluding ED &ST on finished goods	Per Unit Terminal Excise Duty on Col.4		Per Unit Sales Tax (With 'C' Form on col.(4+5)		Per Unit Freight upto Site Including Transit Insurance	Per Unit FOT Site	Total FOT Project Site (3x8)
				%	Amt	%	Amt			
(1)	(2)	(3)	(4)	(5)		(6)		(7)	(8):(4+5+6+7)	(9)=(3x8)
1.1	Design, Engineering, Manufacturing, Supply (including packaging and forwarding, insurance, custom clearance, handling and unloading at BGL's site) of skid mounted electric motor driven hydraulic CNG Booster Compressor Package of 400 SCM3/hr capacity at suction pressure of 30 to 200 kg/cm2 and discharge pressure 220 to 255 kg/cm2 as per scope of work and Technical Specifications defined in Tender document.	4								



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1.2	Design, Engineering, Manufacturing supply(including packaging and forwarding, insurance, custom clearance, handling and unloading at BGL's site of 1.5KW electric motor driven air compressors with dryer and receiver	4							
1.3	Special tools & tackles (list and price of each tools tackles to be furnished by the bidder)								
A. Sub-Total Amount incl. of all taxes & Duties (Rs.)									
SL. NO	Description	Qty.	Unit Rate	Per Unit Service Tax	Per unit Amount including service tax	Total Amount including all taxes and duties			
1	2	3	4	5	6=(4+5)	7 = (6 X 3)			
1.4	Installation, commissioning & field performance test of Compressor Package at site.	4							
1.5	Lump sum Annual Operation & Maintenance charges during Warranty period of 1(one) year inclusive of all consumables, manpower, spares, lubricants but excluding electric power charges..	4							

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1.6	Lump sum Annual Operation & Maintenance charges for a period of two years after warranty period of 1 year inclusive of all consumables, manpower, spares, lubricants but excluding electric power charges.	4				
B. Sub-Total Amount incl. of all Taxes & Duties (Rs.)						
Grand Total Amount incl. all taxes & duties (Rs.) (C)= (A+B)						