Oil India Limited

(A Govt. of India Enterprise)

P.O. Duliajan – 786602, Assam , India

Telephone No. (91-374) 2800491

Fax No: (91-374) 2800533

Email: matdmmfd@oilindia.in ; erp_mm@oilindia.in

Tender No. & Date : SDG 3982 P15/08 of 24.06.2014

Tender Fee : INR 4,500.00 OR USD 100.00

Bid Security : Applicable

Bidding Type : SINGLE STAGE TWO BID SYSTEM

Bid Closing on : As mentioned in the Basic Data of the tender in OIL's e-portal.

Bid Opening on : As mentioned in the Basic Data of the tender in OIL's e-portal.

Performance Guarantee : Applicable

OIL INDIA LIMITED invites Global Tenders for items detailed below:

Item No. / Mat. Code	**Material Description**	QTY.	UOM
1.	Supply , installation and Commissioning of LP Booster Compressor as per the following Annexures: a) Detailed specification- Annexure –AA . b) Bid Rejection Criteria (BRC) and Bid Evaluation Criteria- Annexure-BB .	6	No.

2.	Supply , installation and Commissioning of *Gas Lift Compressor* as per the following Annexures: a) Detailed specification- Annexure –AA . b) Bid Rejection Criteria (BRC) and Bid Evaluation Criteria- Annexure-BB .	7	No.

Special Notes :

1.0 The tender will be governed by "General Terms & Conditions" for e-Procurement as per Booklet No. MM/GLOBAL/E-01/2005 for E-procurement (ICB Tenders) including Amendments & Addendum to "General Terms & Conditions" for e-Procurement.

2.0 Technical Check list and Commercial Check list are furnished . Please ensure that both the check lists are properly filled up and uploaded along with Technical bid.

3.0 The item qualifies for Nil duty / Deemed Export benefits. For Deemed Export benefits, please refer Addendum to the General terms and conditions for Global tender.

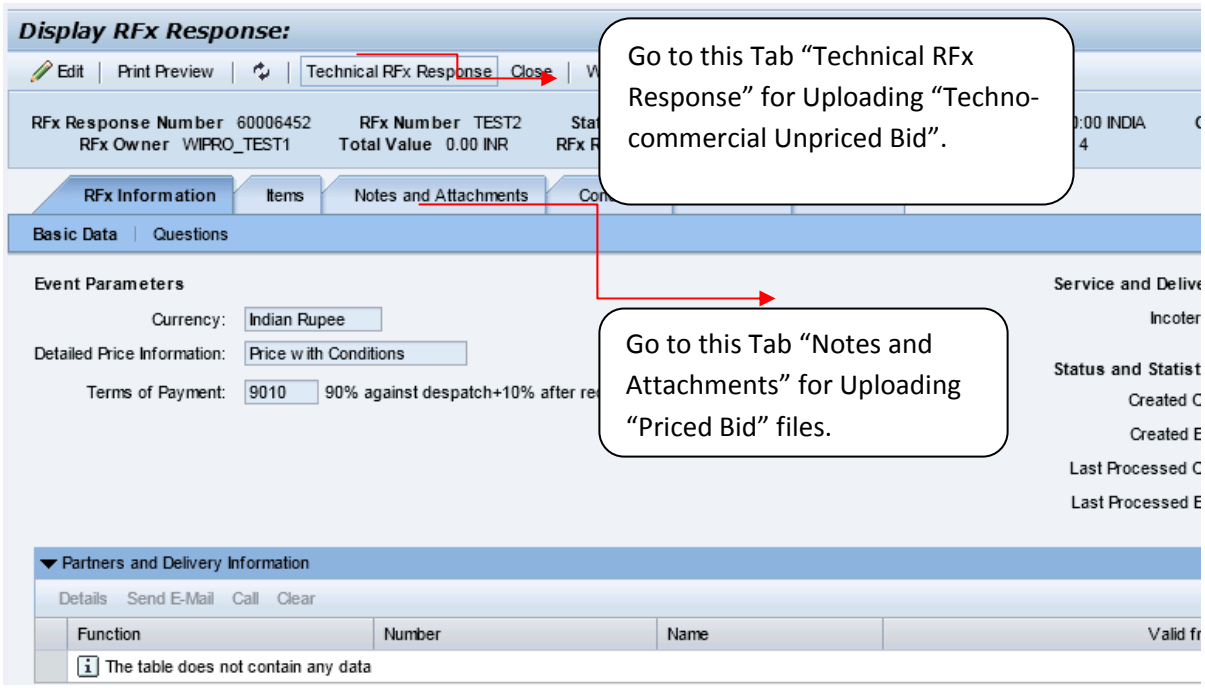
4.0 Please note that all tender forms and supporting documents are to be submitted through OIL's e-Procurement site only except following documents which are to be submitted manually in sealed envelope super scribed with tender no. and due date to The **Head Materials, Materials Department, Oil India Limited, Duliajan- 786602, Assam** on or before the Bid Closing Date and Time mentioned in the Tender.

a) **Original Bid Security.**
b) **Detailed Catalogue and any other document which have been specified to be submitted in original.**

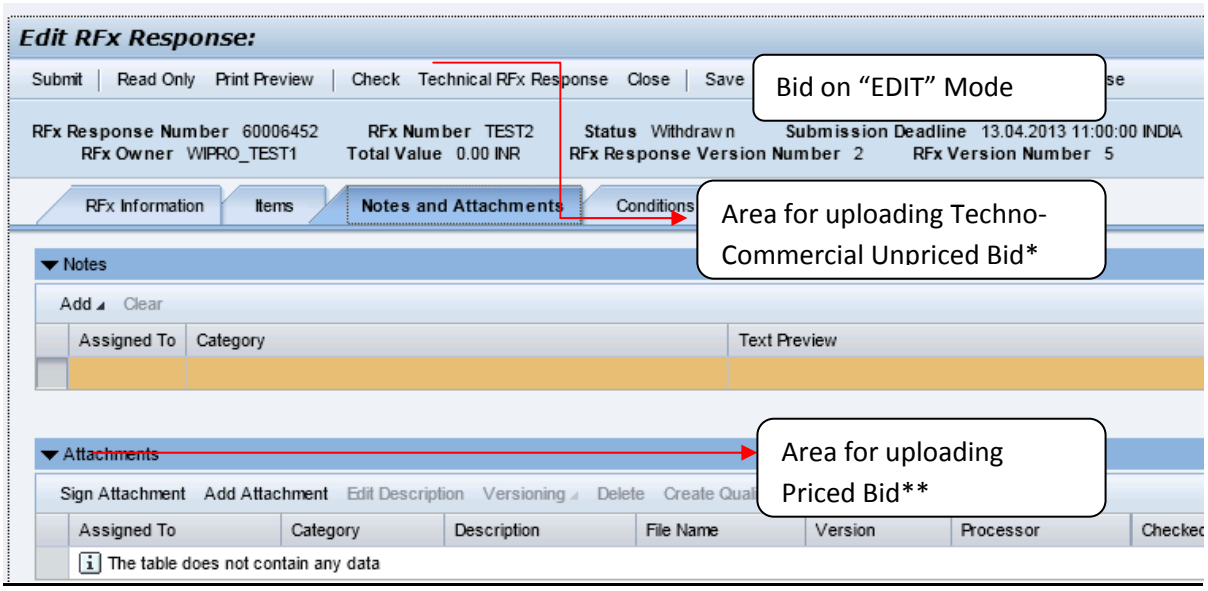
5.0 In case of SINGLE STAGE-TWO BID SYSTEM, bidders shall prepare the "Techno-commercial Unpriced Bid" and "Priced Bid" separately and shall upload through electronic form in the OIL's e-Tender portal within the Bid Closing Date and Time stipulated in the e-Tender. The "Techno-commercial Unpriced Bid" shall contain all technical and commercial details except the prices which shall be kept blank. Details of prices as per Bid format / Commercial bid to be uploaded as attachment in the Attachment Tab "Notes and Attachments".

A screen shot in this regard is given below.

Any offer not complying with above submission procedure will be rejected as per Bid Rejection Criteria mentioned in the tender.



<u>On "EDIT" Mode- The following screen will appear. Bidders are advised to Upload "Techno-Commercial Unpriced Bid" and "Priced Bid" in the places as indicated above:</u>



Note :

* The "Techno-Commercial Unpriced Bid" shall contain all techno-commercial details **except the prices**.

** The "Price bid" must contain the price schedule and the bidder's commercial terms and conditions. For uploading Price Bid, first click on Sign Attachment, a browser window will open, select the file from the PC and click on Sign to sign the Sign. On Signing a new file with extension .SSIG will be created. Close that window. Next click on Add Atachment, a browser window will open, select the .SSIG signed file from the PC and name the file under Description, Assigned to General Data and clock on OK to save the File.

6.0 Bidders are requested to examine all instructions, forms, terms and specifications in the bid. Failure to furnish all information required as per the bid or submission of offers not substantially responsive to the bid in every respect will be at the bidders risk and may result in the rejection of its offer without seeking any clarifications.

7.0 The Integrity Pact is applicable against this tender. OIL shall be entering into an Integrity Pact with the bidders as per format enclosed vide Annexure X of the tender document. This Integrity Pact proforma has been duly signed digitally by OIL's competent signatory. The proforma has to be returned by the bidder (along with the technical bid) duly signed (digitally) by the same signatory who signed the bid, i.e., who is duly authorized to sign the bid. Any bid not accompanied by Integrity Pact Proforma duly signed (digitally) by the bidder shall be rejected straightway. Uploading the Integrity Pact with digital signature will be construed that all pages of the Integrity Pact has been signed by the bidder's authorized signatory who sign the Bid.

OIL's Independent External Monitors at present are as under:

(I) SHRI N. GOPALASWAMI,I.A.S (Retd) ,
Former Chief Election Commissioner of India

E-mail Id : gopalaswamin@gmail.com

(II) SHRI RAMESH CHANDRA AGARWAL , IPS(Retd)
Former Director General of Police

E-mail Id : rcagarwal@rediffmail.com

8.0 Pre –Bid Conference :

(A) A Pre-Bid Conference with the Parties will be held at Kolkata , India on 5th & 6th August '2014 to discuss on the technical specifications and other terms and conditions of the tender. All the Parties who purchase the Tender Document within the closing date of sale of the tender will be eligible to attend the Pre-Bid Conference. The exact venue and time of the Pre-Bid conference will be intimated to the Parties at a later date.

(B) Clarification on the technical specifications and other terms & conditions shall be provided to the parties during the Pre-bid Conference. Parties should come fully prepared to the Pre-bid Conference and submit their queries to OIL in the Pre-bid Conference for clarification. More than two persons will not be allowed from each party and they should depute representatives who are competent enough and authorized to take spot decision . The set of queries may also be sent to OIL well in advance for study by OIL.

(C) Any changes in the technical specifications and other terms & conditions arising out of discussion in the Pre-bid Conference shall also form part of the tender document.

(D) Parties, immediately after the purchase of the Tender documents, shall inform OIL at the following address about their participation in the Pre-Bid Conference with details of the persons to enable OIL to make arrangement for the Pre-Bid Conference.

HEAD – MATERIALS

OIL INDIA LIMITED

P.O DULIAJAN, PIN – 786 602

DIST. DIBRUGARH (ASSAM) INDIA

FAX NO. : +91 - 374 – 2800533

E-Mail : matdmmfd@oilindia.in
materials@oilindia.in

ANNEXURE-AA

TECHNICAL SPECIFICATION FOR GAS ENGINE DRIVEN GAS COMPRESSOR PACKAGES

1.0 GENERAL

OIL INDIA LIMITED invites tender for Turnkey implementation of Design, Manufacture, Fabrication, Package, Test, Supply, Erection and Commissioning of Gas Engine driven Reciprocating Gas Compressor Packages as under to be installed in different Gas Compressor Stations (GCSs) of OIL INDIA LIMITED, Duliajan in Upper Assam region of India.

Item No.	Unit	Qty	Duty of Compressors	Capacity (NM^3/Hr)	Design Pressure (Gauge) (Kg/cm^2)		Design Temp. (Deg C)
					Suction	Discharge	Suction
1.	No.	6	LP Booster Compressor	2700	1.50	25.00	50
2.	No.	7	Gas Lift Compressor	3200	12.00	120.00	50

The Gas Compressor Packages are procured as replacement of the existing units and shall be installed on the existing concrete foundations for space constraints. So, the compressor packages shall be mounted on concrete filled skids instead of normal structural skids that require heavy duty foundations. The existing foundation will be suitably prepared to suit the concrete filled skids.

1.1 Project Implementation Plan

Pre-bid Conference:

a. A Pre –bid conference will be held at suitable location (location details will be informed later) after tender but before bid closing date between the vendor's technical representative and OIL's representative.

The pre-bid conference will be held so that the vendor may completely understand the requirement of OIL and clarify any points.

The vendors may be asked to provide presentation on their company, product and experience in reference to the tender.

b. Please note that OIL expects the bidders to comply with the tender specifications / conditions which have been frozen after pre-bid conference before opening of Technical bids. Bids will be evaluated as per tender conditions.

c. Kick Off meeting between the vendor and OIL after issuing LOI.

A Kick-off meeting between OIL and vendor to whom the LOI will be placed will be held in Duliajan before formal order placement. The vendor shall provide detail project execution plan including stage-wise inspection plan and provide contact details of vendor's representative/ engineers who will handle the project. OIL expects the vendor to carryout the execution of the project within the shortest possible time.

2.0 SCOPE

Compliance with the requirements of this specification does not relieve the vendor of furnishing gas engine driven reciprocating compressors along with its accessories of proper design, meeting all the specified rated operating and service conditions.

The intent of this specification is to describe the minimum acceptable parameters for the design, manufacture and packaging of the Reciprocating gas compressors packages. It is not the intent of Company to deviate from good engineering practice. The absence of any specifications shall imply that the best engineering practices shall prevail, utilizing the best quality workmanship and new materials. Where different standards are specified, the most stringent shall apply.

3.0 DEFINITIONS

OWNER/ COMPANY: OIL INDIA LIMITED

Vendor / Supplier: Party(ies), which manufactures and/or supplies material, equipment and services to perform the duties as specified in the scope of supply.

Shall: Indicates a mandatory requirement.

Should: Indicates a strong recommendation to comply with the requirements of this document.

4.0 CODES AND STANDARDS

4.1 General

- All specifications and publications shall be the current issue on the date of Tender and it shall be the Vendor's responsibility to comply with the same.
- The Reciprocating Gas Compressor Package shall be designed and manufactured in conformity with the codes, specification listed below and with the equipment data sheets.

4.2 International Codes and Standards:

- ISO 13631, Latest edition Specification for Packaged Reciprocating Compressors for (Formerly API 11P) Oil and Gas Production Services
- API 618, 5th edition Reciprocating Compressors for Petroleum, Chemical, and Gas Industry Services
- API 661, 6th edition Air-Cooled Heat Exchangers for General Refinery Services - Adoption of ISO 13706-1:2005
- API 520 (7th Ed.) Sizing, Selection, and Installation of Pressure – Relieving Devices in Refineries
- API 526 (5th Ed.) Flanged Steel Pressure Relief Valves
- API 670 (4th Ed.) Vibration, Axial Position, and Bearing-temperature Monitoring System.
- API 671 Special Purpose Coupling for Petroleum, Chemical & Gas Industry
- API 676 Positive Displacement Pumps – Rotary
- ISO 15664 Acoustic – Noise Control Design Procedure for Open Plant
- ISO 1217 Displacement Compressor Acceptance Test
- ISO 10441 Flexible couplings for mechanical power transmission, Special purpose applications
- ISO 3046 Reciprocating Internal Combustion engines
- ISO 10474 Steel and steel products – Inspection documents
- ISO 9001:2000 Quality Management System Requirements
- ISO 15156 Production
- ASME Sec. VIII Div. I Pressure Vessels
- ASME Sec. II Materials
- ASME Sec. V Non Destructive Examination
- ASME Sec. IX Qualification Standard for Welding Procedures
- ASME B31.3 Chemical Plant & Petroleum Refinery Piping
- ASME B16.5 Steel Pipe Flanges and Flanged Fittings
- ASTM American Society of Testing Materials
- ANSI/AWS D1.1 Structural Welding Code

4.3 Order of Precedence:

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

- Government of India Legislation/Regulation
- Purchase Order Data Sheets and Material Requisition
- Purchase Order Specification
- Basic Design Drawings
- International Codes & Standards

Compliance with these specifications 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.

In the event of any conflict of data or requirements in any of the above documents (excluding Govt. Legislation/Regulation), the most stringent requirement shall prevail.

However, Company's interpretation shall be final.

4.4 Language and Units of Measurement:

The governing language of the Contract shall be English language. All notices, correspondence, information, literature, data, manuals and other documents required under the Contract shall be in the English language.

Technical units, quantities, etc. shall be expressed, used and abbreviated according to the SI system except for the pipe sizes, which shall be imperial units. Preferred units of measure are as follows:

- Liquid Density: API and kg/m^3
- Flow Rate: m^3 / hr, MMSCFD (gas), BPD (condensate), BWPD (Water)
- Power, Duty: kW/HP
- Heat Transfer Coefficient: W / m^2 K
- Thermal Conductivity: W / m.K
- Heat Capacity: kJ
- Viscosity: cP
- Kinematic Viscosity :centistokes (cSt)
- Area : m^2
- Length : Meter (m), km, mm
- Pressure: $Kg/cm^2(g)$, psi(g), psi(a)
- Temperature: °C/ Deg F
- Volume: m^3
- Pipe Diameter: Inch, mm
- Stress: MPa, Kg/cm^2, Pa
- Weight: Kg / Ton

4.5 Environmental Conditions

The climatic conditions are as stated below:

- Maximum Ambient Temperature 42 DegC
- Minimum Ambient Temperature 7 DegC
- Relative Humidity
  - At 21 Deg C : 100 %
  - At 32 Deg C : 95%
  - At 41 Deg C: 70%
- Elevation Above Mean Sea Level : 170 metres
- Seismic Zone: V
- Yearly Average Rainfall : 300 cm

6.0 SCOPE OF WORKS

6.1 General:

The offered model of the compressor frame / crankcase (with specific cylinder configuration) with cylinder sizing, pressure ratings, rotational and piston speeds, rod loading, mechanical design and materials, gas handled shall be identical or similar as supplied earlier to others. At least 2 (two) such compressors with concrete filled skid design manufactured by the bidder should have operated 8000 hours individually and satisfactorily.

Documentary evidence in support of the above shall be submitted along with the bid in the form of valid purchase order copies, invoice/ performance report/ inspection report / bill of lading.

Vendor's scope of work includes engineering, design, manufacture, packaging, inspection, testing & supply and erection & commissioning at sites within an aerial distance of 100 Km from Duliajan, Assam, India in Gas Compressor Stations (GCSs).

For scope of the Reciprocating Gas Compressor package reference is made to the design data sheets (Annexure A, B & C enclosed) giving the operating conditions and design requirements.

The Vendor's scope of works shall include, but not be limited to the supply of the following items and services:

A. **Mechanical Engineering and Design**.

B. **Compressor Complete Package with Driver**:

C. **Items within the package are as under**;

a) **Reciprocating compressors** designed and manufactured as per ISO 13631: 2003 edition (Formerly API 11P). The compressors shall be horizontal, balanced opposed two stage compressors suitable to perform the process duties as defined in the attached data sheets (Annexure A, B & C).

b) **Driver**: Gas Engine Driver utilizing the same process gas as fuel gas.

c) **Coolers:** Common unitized aerial cooler of fin fan design shall be provided to cater to cooling requirements of the lube oil, packing oil, compressor cylinder jacket water (if any), gas engine jacket water, process gas (both interstage and discharge cooling).

d) **Coupling:** A standard dry shim pack coupling bolted to compressor and driver fitted with a non-sparking coupling guard.

e) **Flywheel**: A flywheel between compressor and gas engine attached to the compressor crankshaft, if required.

a) **Scrubbers**: Gas scrubbers with their supporting structure at suction of each compressor stage, complete with necessary valves and instrumentation.

f) **Pulsation Dampeners**: Suction and Discharge dampeners at each cylinder.

g) **Barring Device**: A manual barring device to be provided

h) **Valves and Safety Valves**: One each of automatic recycle valve with manual by pass valve, blow down valve, suction shutoff valve, discharge shutoff valve, discharge check valve and one each of safety relief valve on suction & discharge drums and final discharge line. Safety Relief valves shall be designed, manufactured, inspected and tested in accordance with API 520 and API 526.

i) **Suction Strainer**: A suction strainer in the process gas inlet of the compressor.

j) **Control Panel & Instrumentation**: Skid mounted Electronic Control Panel complete with Instrumentation required for safe operation and control of the compressor package. Instrumentation shall complete with junction boxes installed, wired and tested on the compressor skid and on the associated equipment skids. The control panel shall be skid mounted.

Supply shall complete with cable trays, instrument installation materials etc. required within the skid.

k) **Concrete Filled Base Frame**: Heavy duty concrete filled base frame for the compressor, gas engine, process equipment, and all the other auxiliary equipment.

l) **Lubrication System**: Forced Feed Lubrication system as detailed under;
The major components of the forced feed lube oil system shall be as follows:

- Main oil pump.
  - Driven from crankshaft.
  - Shall be sized to deliver 110% of the maximum anticipated flow rate at operating rpm
- Pre-lube Pump
  - Manual and automatic.
- Lube Oil Cooler
  - Shell and tube exchanger with jacket cooling water
  - Sized for 110% of the maximum anticipated duty.
- Lube Oil Filter
  - Dual filters, each 100 % capacity (full flow), non-bypassing with isolation valves arranged so that switching can occur without causing a low-pressure shutdown of minimum particle size 25 micron.
  - Size shall be determined by Vendor in lieu of other information as per API 618 requirements.
- Cooler surge Tank

- Piping lube oil system:
  - All lube oil piping down stream of filter shall be series 300 Stainless Steel.
  - All high-pressure double ferrule fitting and 2/3 way valves shall be from SWAGELOC/ Hy-Loc/ PARKER makes & shall be S.S. material only. Material of tube shall also be SS316 as per ASTM A269 Sandvik make.
  - 200 mesh screen before lube oil pump
  - Frame lubrication system for frame bearings, connecting rod bearing, cross head shoes.

m) **Cylinder and Packing Lubrication System**: A high pressure lubrication system for cylinder and packing lubrication, using divider block technology along with requisite nos. of gauges and safety systems for troubleshooting. The system shall be complete with digital display of lube oil consumption. The packing shall provide a dynamic seal between cylinder and piston rod.

n) **Compressor cooling system** if any.

o) **Compressor Main Components**: Frame, cylinder, distance piece, cross head, crank shaft, piston, bearings, packing, compressor valves, and capacity control devices etc.

p) **Auxiliary Pipe work**: All necessary auxiliary / ancillary pipe-work including fittings, valves and pipe supports, terminating at the package skid edge for both compressor, accessories, gas engine and accessories. Interconnected Piping between different components of the package.

All on skid termination points shall be flanged as per ASME B 16.5, Weld neck, RF, Smooth finish. The terminal points shall be as shown in the P&ID. The terminal points include suction / discharge flanges, valved drains, vents, etc.

q) Electrical:
Cable termination kits for termination of LV cables shall be provided by Vendor.
Cable glands, boots and lugs for all LV cable connections are in Vendor's scope.
Two earthing bosses on the equipment skid.

r) **Special Tools and Tackles**: These shall include all non-standard equipment needed to remove the compressor cover, bearings, valves and piston rod packings or perform maintenance. All special tools shall be supplied in sectionalized purpose built cases with hinged lids.

s) **Spares**: Spare parts for start up and commissioning and recommendation for two years of normal operation (Insurance Spares).

t) **Name Plate**: All major components of the compressor package shall be fitted with a stainless steel SS316 identification plate.

u) **Earthing Lugs**: Minimum two earthing lugs shall be provided on the skid.

v) **Vibration**: The standard vibration limit shall be included in the bid. Vendor shall specify vibration effect of compressor to piping battery limit.

D. **Surface Preparation and Painting**:

The equipment and skids are to be externally painted for environmental protection after thorough cleaning. As a minimum, this is to include zinc rich primer (1 coat) and epoxy based final covering. Vendor to provide the detailed specification. Cleaning shall be done through sand blasting as per SSPC # SP6 before painting with spray except compressor and engine block.

E. Inspection and Testing

OIL reserves the right to inspect, test and if necessary reject any part / parts after delivery at site (including incomplete manuals, catalogue etc.) in case of any fault on the part of the supplier. OIL shall be no way be waived by the reason that the unit/ item was previously inspected and passed by OIL as per inspection clause detailed anywhere in the enquiry.

Inspection and Testing include performance testing of the complete assembled package at Vendor's works prior to shipping and shall be witnessed and certified / approved by OIL's Representative

F. Vendor Documentation

a) Six hard copies along with soft copy each of

- General lay out drawing
- Torsional analysis,
- Cross head load (rod load) reversal diagrams for each load step of every specified condition,
- Pulsation study, total weight of compressor and prime mover with center of gravity and other relevant information shall have to be provided within two months of placement of order.

b) Eight copies of installation, commissioning, operation and maintenance manual with illustrated parts list for each item covering all accessories of each of the packaged units should be furnished before shipment of unit along with soft copy.

c) Eight copies of Compressor Part list with dimensions to be provided along with part nos. and Bill of materials with the supply of the items along with softcopy.

G. Site assembly, erection and commissioning

a) The bidder shall provide footprint drawings (six copies) and other design details with weight, CG etc. at least 2 (two) months within the placement of order.

b) The vendor shall provide services of their commissioning team for assembly, erection and commissioning at site. OIL will assist the vendor for placing the compressor at site and will hook up process and service piping with the compressors at the battery limit. All other arrangement for installation and commissioning the compressor shall be done by the vendor. After installation /commissioning the vendor shall run (continuous run) each compressor for 72 (Seventy Two) hours at maximum rated rpm of engine/compressor on site load condition satisfactorily prior to handing over to OIL for regular operation. Installation and commissioning price including accommodation, local transport, manpower etc. for the same shall be borne by the vendor and to be quoted separately in commercial bid. The vendor to measure vibration of the units at the maximum rated speed, which should not exceed standard limit.

c) **Erection and Commissioning**:

i) The packaging and shipment of the package should be in such a way that the unit could be placed at site with necessary ancillaries, auxiliaries, pining etc., within a short span of time during erection and commissioning. Proper tagging of the auxiliaries/ ancillaries/ dismantled item should be done according to their unit and bill of materials to make them easily identifiable at site. Packaging should be such that HOT (welding/gas cutting/grinding) job requirement site is nil.

ii) Vendor shall supervise the placement of compressor packages at location. After placement of the units, the vendor shall commence erection of the packages within (3) three days and complete the erection/commissioning jobs within (4) four weeks of the same.
iii) The package shall be considered fully commissioned only after the supply and acceptance of all related items of the package, documentation including DGMS approval for all electronic/ electrical field instruments and control Panel.

Bidder is to quote for installation and commissioning charges separately.

H. Training to Operations staff of Company at site:

Vendor will provide 2 (two) days classroom training at OIL field office, Duliajan to the operating staff and officers. Moreover 7 (seven) days training shall be provided at each site to the operating staff to enable them to operate the units in safe and efficient manner.

OIL will provide the classroom including projector, laptop etc. free of cost for the classroom training at Duliajan.

Bidder is to quote for training charges separately.

I. Design & Engineering Services:

a) Complete design, engineering of the compressor package including all accessories, gas engine, coolers etc.
b) Conducting acoustical simulation and mechanical response studies as per design approach 3 specified in API 618 and carrying out the pulsation design studies as per Appendix M of API 618 5th Edition.
c) Carrying out the valve dynamic response study
d) Carrying out full torsional and lateral analysis and rotor response studies including stress calculations of the complete rotating assembly. This analysis shall indicate the vibration levels expected for each case of operation including start-up, shutdown, and upset cases.
e) Carry out an analog study of the system including the suction and discharge piping.
f) Design of Concrete filled skid taking into consideration of worst case operating parameters with special significance to vibration.
g) To Provide stress analysis and recommendation to mitigate vibration.
h) Providing all documentation for tie-in provisions and as required by the purchase order, the specifications and the standards referred to herein.
i) Furnishing monthly progress reports and ensuring timely execution of the job.
j) Process and Mechanical guarantee.

J. The requirements set out in this document shall not be construed to eliminate consideration of the manufacturer's standard design. The manufacturers standard design may be accepted, if found to be equivalent or superior to the requirements of these specifications. The Vendor shall provide any material, equipment, instrumentation and any other accessory, over and above that specified herein, which is required to provide a safe and efficient unit. The Vendor is to provide a Process performance and Mechanical guarantee.

K) **OIL Scope of Utility Services**

OIL shall provide the following:

a) **Electrical Power Supply:** For Control Panel: Rated voltage : 240 V-AC (± 10%), single (1) phase, Rated frequency : 50 Hz (± 3%). Work site illumination and any other utility power requirement shall be provided.
b) **Fuel Gas:** The composition of the fuel gas is stated in the Annexure-C.
c) **Instrument Air:** Operating Pressure : 6 - 9 $kg/cm^2(g)$ Temperature : 65°C Maximum
d) **Area:** Main unit will be placed in a bay having a shed area of 10 m Long x 6 m Wide and 4.5 m High. In case the total length of the packaged unit does not exceed 10 metres, the unit will be placed inside the shed. In such package, the cooler design should take into account of the reduced air circulation, if any, due to height restriction.

e) Sun shelter with overhead standard lifting facilities above the compressor skid. Vendor to furnish the required lifting capacity.
f) Process piping up to and from Package Inlet and Outlet.
g) Connecting pipe-work from Package skid end connections of the scrubber and other drains to the station drain system.
h) Connecting pipe-work from the Package skid edge connections of the relief valve discharge pipe to the station flare / Vent system.
i) Piping connection to the control panel and starting air piping end from the air supply mains.
j) Unloading, local transportation and placement of compressor package at site.
k) Earthing connection from earth busbar on the skid to the package earthing system

7.0 DESIGN REQUIREMENTS

7.1 General

The reciprocating gas compressor package shall be designed, constructed, inspected and tested in accordance with API 11P/ISO13631 Latest Edition, equipment data sheets and this specification. The most stringent requirement shall apply. The equipment (including auxiliaries) shall be designed for a minimum service life of Twenty (20) years & 5-6 years of uninterrupted continuous operation except for the routine scheduled maintenance outages. The Reciprocating gas compressor package shall be complete with all accessories such as interconnecting piping, instruments, etc. all mounted on a common base frame.

Design, construction, inspection and testing requirements are for two types of gas engine driven compressor packages namely Low Pressure Booster (LPB) Compressor and Gas Lift (GL) Compressor.

7.1.1 Package Layout

The vendor shall provide 3D layout diagram showing all accessories, piping etc. Isometric views with hard copies shall be provided for each of Low Pressure Booster and Gas lift Compressors. A Soft copy of the drawing shall be provided in Autocad format.

The equipment layout shall be such that it enables safe and easy access to each item for operation and maintenance. Location of platforms /walkways and ladders for operation and maintenance activities shall be shown. In particular, ease of maintenance shall be borne in mind during the design stage of the ancillary equipment such as coolers, lube oil system etc. Optimization of package battery limit interfaces with other facilities shall be considered.

The normal limiting dimensions and weight for journey to upper Assam are as under;

Length (Max)	9.0 metres.
Width (Max)	2.54 metres.
Height at Centre	2.44 metres.
Height at Maximum Width	2.21 metres.
Top Width at Maximum Height	0.61 metres.
Weight	28 *Tonnes*

7.1.2 Reliability and Availability

The overall availability required for the compressor package shall be > 98% and the reliability shall be > 99%. Vendor shall confirm the reliability and availability figures in the bid along with the spares holding philosophy.

7.2.2 Required Turndown

The compressor train shall be capable of operating from 100 to 50% minimum of the design throughput at the design operating suction and discharge pressures. This turndown shall be achieved as far as possible by speed variation of the compressor train.

7.3 Mechanical:

7.3.1 Reciprocating Compressor Package Design

The compressor and auxiliaries shall be designed, manufactured, tested and supplied strictly in accordance with the requirements of API 11P/ISO13631 latest edition.

The compressor shall be reciprocating, 2 (two) stage; two throw, double acting, horizontally balanced opposed design. The operating parameters are provided in the data sheets. All operating conditions mentioned in the data sheets are at the battery limit.

The compressor may be cooled or non-cooled cylinder type.

Piston rods shall be forged and coated with tungsten carbide coating. The Vendor shall carry out lateral and torsional analysis. Torsional analysis shall be carried out for the complete compressor/driver system and shall cover all the possible resonance conditions that may occur during run-up, run-down, and within the complete operating speed range.

The suction and discharge pulsation dampeners shall be designed and manufactured as per ASME section VIII Div 1 with code stamping. Intercooler and after cooler shall not be used as pulsation suppression devices.

During the detailed design stage, acoustical simulation shall be carried out as per design approach 3 specified in API 618 in order to verify its satisfactory performance in all respects but especially mechanical/fluid stability over the entire relevant operational flow rates, temperatures and gas compositions. The conduct of this study and the implementation of necessary recommendations emanating from it are included in the scope of supply of the Vendor.

In addition to this, the Vendor shall carry out valve dynamic response study. Noise levels of compressor assembly together with drive unit shall not exceed 85 dB(A) at 1 meter distance from the equipment.

Compressor vibration and bearing temperature monitoring shall be carried out in accordance with API 670.

The package shall be designed for, continuous unattended operation in a fail-safe manner.

The compressor package shall be suitable for starting & stopping as part of an automatic control sequence to be executed from the compressor control system.

Compressor Suction and discharge flange rating is as per data sheet. Allowable forces and moments on the compressor suction and discharge nozzles shall be as per API 618 fifth edition.

7.3.2 Lubrication

The lubrication of the compressor cylinders and packing lubrication System shall be as per API 618 with divider block technology. Vendor is to provide detail lube oil requirement calculations.

7.3.3 Cooling Water System (for Prime Mover / Engine/ Compressor (if required))

Closed loop engine jacket water cooling shall be provided along with coolant expansion tank. The expansion tank shall be designed as per Engine manufacture's recommendation of coolant expansion factor with necessary pressure cap, level glass etc. taking into consideration the total volume of coolant in the system including the aerial cooler sections.

7.3.4 Compressor Flexibility

To operate the compressor at variable throughput a suction pressure controlled (pressure controller) by-pass control valve from delivery to suction side shall be provided for LPB compressors only. The sizing of the control valve shall be done

considering 100% bypass of compressor throughput. The control valve shall be provided with a by-pass valve and isolation valves (2 Nos.). By-pass and isolation valves shall be gate valves as per API Spec, 6D.

7.3.5 Coolers

Common unitized cooler of fin fan design shall be provided to cater to cooling requirements of the lube oil, packing oil, compressor jacket cylinder water cooling (if any), gas engine jacket water, process gas interstage and discharge after coolers.

The cooler shall be forced draft, air-cooled heat exchangers designed, manufactured, tested and supplied in accordance with ISO 13706 / API 661. The cooling fans shall be forced draught type with airflow outward.

The cooling fan shall be capable of cooling up to 125 % of the duty requirements.

The tube bundle shall be provided with 1" flanged valves for vent and drain connections. Central, accessible greasing facilities shall be provided for fan bearings, if not greased for life.

Vendor shall submit fan performance curves along with the bid.

The air-cooled heat exchangers shall comply with the following requirements:

- Finned type tubes shall be provided and the tube tubes shall be tested hydrostatically at 1.5 times of the maximum operating pressure.
- A corrosion allowance of 3 mm shall be provided on all wetted carbon steel surfaces except for tubes.
- The tube sizes shall be at least 1" NB size.
- Thermal rating of the air cooled heat exchangers shall be based on a maximum flow at 125% of rated mass throughput for the worst design case (highest flow rate).
- Discharge cooler shall be sized for full flow recycle operation at maximum power.
- For cooling of engine coolant, the cooler shall be designed for 125% of the engine heat rejection of the engine service power at site conditions with the absolute maximum ambient temperature.
- Fans shall be driven by V belt and pulleys. Belt design with four V's shall be considered.
- Fan tip speed shall not exceed 60 m/sec. However, it may be further reduced, if noise levels exceed the specified levels of 85 dbA at 1 m distance from the unit.
- It shall be possible to manually adjust the pitch of the blades to increase the fan capacity.
- Tube bundles shall have finned tubes, with full accessibility for inspection, cleaning and replacing. Maximum unsupported length of tubes shall be 1.8 m.

- Each tube bundle shall be provided with 1-1/2 inch valved drain and vent connections.
- Vibration probes shall be provided for each cooler fan for high vibration alarm / trip.
- All elevated working locations shall be equipped with at least two escape routes in separate directions. Two ladders with railing shall be provided for the same. Location of the ladder shall be marked on the detailed drawing. A 50 mm square mesh arrangement (for hail guard) above the tube bundle shall be provided for all air coolers.
- Fan hub bearing lubrication is by grease at the grade level.
- Loadings for pipe supports shall be considered in the structural design load.
-

7.3.6 Scrubbers / K.O. Drums

The compressor package shall be complete with compressor suction and inter stage scrubbers. The scrubbers are to be designed to remove any condensed hydrocarbons, water and any entrained lube oil in the gas stream.

• Scrubbers shall be vertical type with demister mat on the gas outlet. The scrubber vessel and the scrubber internals shall be designed as per design data sheet provided. The vessel internals shall be complete with Vortex breaker and Mist Eliminator (Demister) among others.

- The mechanical design, fabrication and testing of the scrubbers shall be carried out in accordance with ASME Sec VIII Div I with code stamping.
- A corrosion allowance of 3.0 mm shall be provided.
- Desired Nos. of Nozzles of proper size as per design requirement shall be provided.
- One No. Inspection / Access hole of not less than 6 inch size shall be provided.
- Vessel internals shall be firmly attached and it must be possible to clean the internals, through the manholes.
- All scrubber nozzles shall have valve or blind flanged connections to enable flushing with water or purging with nitrogen.
- The scrubber shall have suitable supporting structures to prevent vibration.
- All vessel connections shall be flanged as per ASME B 16.5. The flanges shall be weld neck, raise face type with smooth finish of 125 – 250 micron.

• Each scrubber shall be fitted with the accessories as under;
  - One no. Safety Relief valve designed for overpressure
  - One No. Manual drain valve
  - One No. Level gauge to check liquid level inside the vessel
  - One No. diaphragm operated liquid dump valve to be operated by high liquid level controller mounted on the nozzles made for the purpose on the vessel.

- The following minimum instrumentation to be fitted in the vessel:
  - High level Switches
  - Automatic high liquid level controller to operate liquid dump valve.

7.3.7 Vibration Acceptance Levels

The Vendor shall be responsible for achieving vibration acceptance levels at site for all items of equipment in his supply. Site acceptance levels shall not exceed the agreed factory acceptance limits as per API 618 5th edition. Structural vibration of base plate shall also be considered and checked in the field.

7.3.9 Dry Flexible Couplings

Dry Flexible Couplings shall be designed, manufactured and supplied as per ISO 10441. Flexible element spacer couplings, coupling membranes shall be stainless steel. An assembly balance shall be performed. All coupling guards shall be totally enclosed, spark proof. The guard shall be rigidly supported and manufactured from non-sparking material.

The coupling shall be designed to minimize coupling temperature & windage effects. It shall be designed to meet the torque transmission and misalignment criteria in accordance with API 618.

7.3.10 Gas Engine

H.P. Requirement: The gas engines power must satisfy the following requirements;

BHP (Continuous rating Under site condition)	=	120% of both the total BHP required to drive the compressor at full load and the total BHP required to drive the auxiliaries

The Gas engine shall be naturally aspirated type. The composition of the fuel gas is stated in the compressor data sheets. Engine shall be suitably derated for the fuel gas composition and as per the local environmental conditions (altitude and temperature).

The gas engine shall be designed as per ISO 3046.

Among others the gas engine shall be complete with the following;

- **Intake air filter**: The air filter shall be dry type. It shall remove 98% of all particles greater than 10 µm. Air filters shall be sheltered from rain ingress. The filter shall be fitted with a differential pressure indicator to show when the filter requires attention. The filter housing shall be in Stainless steel SS 316.
- Air engine starter
- Lube oil system
- **Engine cooling system**: Closed circuit coolant water system to be used for engine cooling. The engine coolant water shall be cooled in the air cooler as stated in Aerial Cooler section.
- **Exhaust System Silencer with spark arrestor:** The exhaust silencer shall be hospital type with integral spark arrester capable of sound attenuation in the range of 35 to 40 dB (A). An expansion bellow with flue gas duct is to be provided at the engine exhaust termination. All external connections from the engine shall

terminate in flanges to ASME B16.5. Suitable supports are to be provided to avoid vibration.

- **Engine Management system** with troubleshooting tools with necessary software/hardware/cables/license and other special tools for maintenance and troubleshooting purposes.
- **Engine Ignition System** shall be Shielded ignition system.
- **Fuel Filtration**
- Auxiliary water pump (if required)

7.4 Piping

Piping and appurtenances shall be designed, fabricated, installed, inspected and tested in accordance with ASME B31.3 & ASME B16.5.

Among others, the following piping shall be included in the supply:

- All piping within the compressor skid and auxiliaries such as scrubbers etc.
- Process gas piping between scrubbers (suction / discharge) and main compressor skid
- Interconnected process gas piping between coolers skid and main compressor skid
- Interconnected piping between lube oil skid and the main compressor skid
- Thermal insulation required for all surface greater than 60°C.
- Piping vibration analysis and recommendations for piping outside compressor skid shall be provided by Vendor.
- Care shall be exercised in pipe sizing to minimize acoustical pulsations and mechanical vibrations.
- All piping wetted by the process gas shall be manufactured from carbon steel SA 106 Gr B seamless with corrosion allowance
- The flanges shall be of SA 106.
- All piping shall be butt welded and designed with flanged joints to allow complete removal.
- Socket welded, seal welded or screwed fittings shall not be used. All termination points shall be WNRF flanged and conform to ASME B16.5. All flanges up to ANSI 300 class shall have weld neck, raised face, smooth finish. The flanges above ANSI 300 class shall be weld neck, RTJ jointed. Both types of joints shall be complete with either jointing sheet or RTJ ring.
- Compressor casing drains and vents shall be valved and routed to edge of the base plate and shall allow for complete drainage of compressor assembly. Each casing drain shall be individually valved.
- The end connection shall be flanged as per ASME B16.5.
- All relief valves and depressurizing valves shall be positioned above the relief header and the equipment being protected. The piping should be routed to eliminate liquid pockets both upstream and downstream of these valves.
- All isolation valves provided on the compressor skid drain shall be ball valves.
- The compressor vent, blowdown valve shall be valved and routed to edge of base plate. The end connection shall be flanged as per ASME B 16.5.

- Suitable piping supports for all piping shall be provided. A detailed stress analysis for the package piping shall be done. The analysis reports shall be attached with the final documentation. Vendor shall provide the requirement of acoustical insulation (if any) for the piping in his scope as well as for suction and discharge piping.
- For positive isolation of equipment / items for maintenance purposes double block and bleed valves shall be mandatory and provided by compressor Vendor.
- All isolation valves shall be as per the valve specification. All check valves shall be of non-slam type.
- The package shall be complete from the suction skid edge connection to the discharge connection. Suction and discharge lines shall be sized for a maximum actual velocity of 9 m/sec to 12.8 m/sec.The Vendor shall carry out the analog study of suction and discharge piping complying with the scrubber nozzle forces and moments.
- The guideline for suction and discharge piping design and preparation for an acoustical simulation analysis shall be as per API 618. The Vendor shall provide the details of special supports (if any).
- To minimize pipe vibrations Vendor shall design pipe runs so that the acoustic length of the pipe run shall not create standing wave that amplifies the pressure pulsation system.
- Typical pipe run with respect to acoustic length to be considered are:
  - Pipe length from suction pipe line to suction scrubber.
  - Pipe length from scrubber to suction dampeners.
  - Pipe length from discharge scrubber to pipeline.
  - Pipe length from discharge pulsation dampeners to cooler.
  - Pipe length from cooler to scrubber.

7.5 Instrumentation and Controls

The control philosophy is to initiate machine trip in case of all mechanical upsets (e.g. temperature rise, vibrations, low coolant flow, low suction pressure etc), which might result in a major mechanical breakdown. A Process Shutdown (PSD) or an Emergency Shutdown (ESD) shall stop the gas compressor.

The Vendor shall supply a local control panel (PLC based) mounted on-skid and designed for operation, control and safeguarding of the compressor system. All operating parameters for the compressor shall be available from the control panel. The control logic shall be done in the local control panel.

Vendor will size and select all instrumentation located within the scope of the skid package, as per the attached P&ID. Sizing calculations shall be provided for approval and verification.

Datasheets in ISA / PTS formats shall be provided by the Vendor for review and approval. Instrumentation and control panel shall be supplied from the recommended instrumentation Vendors approved by the Company.

All equipment, instrumentation, valves etc. shall be tagged in accordance with the approved P&ID. Instruments shall be labelled and cross-referenced in an instrument list which will also indicate the manufacturer, size, model number, calibration range, span limit and set point. Vendor shall also provide other engineering documents such as wiring diagrams, layout drawings, etc., for review and approval. Operating and control philosophy shall be submitted as a part of the offer.

All Instruments shall be intrinsically safe wherever required and approved for use as per electrical area classification. Refer to details of instrumentation and control panel specification as per Annexure-E,F,G&H

7.5.2 Speed Control: Speed control of the compressor unit will be carried out in compressor local control panel.

7.5.3 Vibration: Vibration switch shall be provided for compressor frame, each cylinder and cooler.

7.6.1 General

The package shall be set on a single structural steel skid / base frame with **concrete filling** suitable for installing on packed pad. Vendor is to provide details about design, concrete grade, and structural design. Vendor to note that **conventional concrete foundation** would not be available for placement of the compressor package for space constraints.

7.6.2 Structural Steel Skid:

The structural design of the skid(s) shall include the following minimum general requirements:

- Steel design shall be in accordance with BS 5950 or AISC.
- Bi-directional moment resistant frames shall be avoided.
- The minimum thickness of any structural steel plate shall be 8 mm.
- The thickness of gusset and stiffener plates shall be 10 mm minimum.
- The skid shall be designed to minimize field assembly and installation. All shop connections to be designed as fully welded. Field welds shall be avoided, and field connections shall be designed as bolted connections.
- The lifting lugs shall be located on the outside of the longitudinal perimeter beams in order to minimize deflections. A transverse beam must be provided at lifting lug locations.
- The skid shall be designed for a 4 point lift only. Exception for this requirement must be authorized by OIL.
- Tie down lugs or brackets shall be welded to structural members of the skid(s) to allow tie down during transportation.
- Spreader bar, if required for lifting / handling of skid / Unit shall be supplied by Vendor.
- Vendor shall supply all chocks / packing pieces, shims and the anchor bolts.

- For the purpose of levelling, jacking bolts with locknuts shall be supplied by the Vendor.
- The base frame shall incorporate fixtures, rails, space, etc., as required to expedite maintenance. The base frame shall incorporate a sloping drip pan (for oil collection) collecting area covering whole skid, compressor, engine, coupling, piping etc. including a drain point and valve at the lowest point.

7.6.3 Platforms

Vendor shall provide suitable platforms for the following items to the extent indicated below unless the equipment or the facilities described are accessible from grade or from any other permanent platforms.

- Compressor and main driver
- Coolers to attend the inlet/return headers with vent and drain valves, driver and fan assemblies

8.0 NOISE

The noise levels quoted shall be representative of the whole equipment working at its design duty. The maximum noise level shall not exceed 80 dB (A) at a distance of 1m from surface of the equipment. Noise levels shall be measured at 1 m from the equipment surface on all four sides.

9.0 INSPECTION AND TESTING

9.1 Quality Assurance

Vendor and his major Sub-Vendor's shall demonstrate that they operate a quality system in accordance with an internationally recognized standard such as ISO 9001:2000 or agreed equivalent standard, commensurate with the goods and services provided. The effectiveness of the quality system and the Vendor's compliance with it shall be subject to monitoring by the Company and in addition, may be audited by an agreed period of notice.

The format and outline content of the quality plan shall be agreed between Vendor and Purchaser, prior to order placement. The Vendor shall submit with his tender an Inspection and Test plan specific to this scope of supply. Detailed quality plan, the scope of testing and the "hold points" shall be mutually agreed between the Purchaser and the Vendor during the technical bid submission.

The Vendor shall submit a quality control program for Company's review at the time of proposal. The Vendor shall provide facilities for and cooperate with the Company and its designated authorized inspectors during manufacturing, assembly and testing. The Vendor shall inform the Company at least four (4) weeks in advance for pre-production meeting.

9.2 Pre-Inspection Meeting

The Company will initiate this meeting as required. The specification, inspection, testing and packaging will be reviewed with Vendor's manufacturing and quality control personnel.

The Vendor shall provide a Quality Plan/ Inspection and Testing Plan for manufacturing. The plan shall cover all quality related aspects of each piece of equipment in the specification and shall indicate inspection points, review points and milestones where the inspector will examine the equipment. At no time will inspection by Company relieve the Vendor of his quality control responsibilities.

9.3 Inspection and Testing

Inspection & testing of all the components of this package shall be performed by vendor / OIL's representative. Vendor shall provide a complete Inspection & testing plan for review by Company. Inspection, testing and material certification shall be in accordance with the requirements of API 618 (latest edition) codes and standards and also the requirements of the certification/ Approval Authority.

In order to enable a proper scheduling of the inspection visits, Vendor is requested to notify Company at least two (2) weeks prior to the date of inspection. When components or services are obtained from Sub-Vendor's the Company's inspector and/or his agent reserves the right to inspect these items at the point of manufacture. It is the Vendor's responsibility to include Company's inspection and notification requirements in all sub-orders.

Vendor shall provide free access to his works and that of Sub-Vendor's for the authorized representative of Company. All certification on the materials, shop test data, etc., shall be made available to verify that the requirements of the purchase order are being met.

The Vendor shall provide test certificates for all tests carried out on component equipment, as detailed in the Vendor Data Requisition Form.

Test certificates shall be approved by Company's Inspector prior to dispatch and official certificates shall be forwarded within one week of test completion. A witnessed full functional test, simulating site operating conditions and including a noise test, shall be carried out on complete package.

For Major components supplied loose, where applicable and for skid mounted, fabricated packages, as minimum, the OIL's Inspector reserves the right to:

- Review Vendor's schedule
- Review Vendor's quality control procedures.
- Review welding procedures and welder's qualifications before fabrication commences.
- Check code material specifications, mill certificates (when applicable), thickness and pressure ratings.
- Check welding procedures are being followed.

- Witness air receiver / piping hydro test.
- Check equipment layout and that interconnecting piping, wiring and tubing matches layout drawings, material lists, and P&ID's; and is suitable for operation and maintenance.
- Check surface preparation for painting and coating.
- Check painting and coating for number of layers and thickness.
- Function testing of the control and shutdown logic.
- Confirm that all loose components are shipped.
- Other test as stated on the data sheets.

Vendor may use any method of inspection necessary to establish quality control and ensure adherence to specifications. Any weld which does not meet the specifications or the applicable code requirements or is unacceptable for the service for which it is intended shall be cut out or repaired at no expense.

9.4 Material Testing and Certification Requirement

The final non-destructive examination of welds for acceptance purposes shall be carried out after completion of PWHT, if any. Radiography shall be performed before PWHT, in which case an ultrasonic examination shall be performed after PWHT for acceptance purposes.

All weld joints of shell, heads, nozzles and attachments shall be 100% MPI tested and 100% ultrasonic tested (from remote surface) after PWHT.

All non-destructive testing shall be performed by the vendor.

Full traceability of all welds is required. The Vendor shall provide a weld map with full traceability to individual weld numbers. The traceable data shall include NDT reports, welding procedure and welder number.

Certification requirements shall be as follows:
- Pressure containing parts in accordance with ISO 10474 3.1
- Non pressure containing parts in accordance with ISO 10474 2.2

Certificate shall be provided in accordance with material requisition Vendor Document Requirement List (VDRL) covering each item. All certificates should be fully traceable to the item covered and shall be marked with the purchaser order number, item number and tag/part number. They shall be clearly legible, in the English language.

9.5 **Gas Engine Performance Test**:
Performance testing of the engine shall have to be carried out in accordance with ISO 3046 or equivalent test procedure at manufacturer's works. All relevant certificates to be submitted to OIL for scrutiny and record.

9.6 Factory Acceptance Test

The Company reserves the right to visit the Vendor's premises to witness an acceptance test of the equipment and shall be given tentative dates at least 2 months in working days notice, in case of Foreign Country and 1 month in case of India, in writing of readiness for this Testing. The equipment will be thoroughly tested by the Vendor prior to the acceptance test. Prior to the start of the Vendor's testing, a detailed schedule of the tests shall be supplied to the Company. The acceptance test will check compliance with the specification and the vendor is to make available all necessary equipment and services for this test. Notwithstanding the above notice periods the Vendor shall, following receipt of the Company's order submit a schedule identifying details of timing of design, construction and testing activities.

Factory Acceptance Test procedures shall be submitted by Vendor for Company's review and approval. The compressor package shall be tested at Vendor's work.

The Vendor shall submit test procedures for the FAT of the entire compressor machinery train including gas engine, Dry flexible coupling, auxiliary skids such as scrubbers, air cooled heat exchangers etc. No negative tolerance is permitted on capacity and discharge pressure at any point within the operating envelope subject to condensation and/or water droplets.

Testing shall include as a minimum for the following:

a) Material inspection
b) Balancing of the crankshaft
c) A witnessed hydrostatic test.
d) A witnessed No load mechanical run shop test for at least 4 hours
e) All pressure vessels and equipment subjected to pressure shall be tested in accordance with ASME section VIIII Division I. This includes scrubbers, gas coolers etc.
f) Cooler fans shall be subjected to mechanical run test, vibration and noise test system at the sub Vendor's works.
g) Testing of auxiliaries such as lube oil system, coolers etc. shall be carried out as specified in respective codes at the respective sub Vendor's shops.

Bidder is to quote for the cost of such Factory Inspection test . All to & fro ,boarding , lodging etc. cost of OIL personnel will be borne by the company.

9.6.1String test:

Vendor has to specify the infrastructure available to carryout the string test of the compressor package. The location of the site where the string test will be carried is to be mentioned in the bid.
One no. complete package of each duty i.e. Low Pressure Booster (LPB) compressor unit and one no. Gas Lift (GL) unit shall be taken up for string test at vendor's works.

A witnessed running string test of the complete unit comprising compressor, seal system, dry flexible coupling, base plate, gas engine, lube oil system, auxiliary skids, instrumentation and all ancillaries.

a) A witnessed compressor performance test with all auxiliaries and process equipment interconnected and assembled.
b) A witnessed sound level test.
c) Vibration measurements of all elements including base plate vibrations and natural frequencies.
d) Pressure measurements of all test berth fitted pressure transmitters.

During the string / performance test all original components supplied under the Purchase Order shall be used, with slave / test berth monitoring equipment hooked up to the contact temperature probes.
The compressor and ancillaries shall not leave the factory before all factory acceptances tests (FAT) have been satisfied.

9.7 Site Acceptance Test / Final Acceptance Criteria

After installation and commissioning at OIL's site, the SAT shall be executed in accordance with ISO 1217 for at least 72 hours without any interruptions. Every interruption during the SAT will result in restarting the SAT by resetting the elapsed time of the test to zero (0) hours.

After satisfactory completion of the SAT the Vendor or authorized representative shall sign the 'System Acceptance Note' that shall mean acceptance of the system for operation and the subsequent sustained performance test.

Vendor's representative must be available at site during the SAT period to carryout the test. The final acceptance criteria for the package shall be in accordance with scope of supply and data sheets, applicable codes, standards and regulations together with additional requirements noted on the functional Operation and Maintenance Philosophy. The package shall be considered fully commissioned only after the supply and acceptance of all related items of the package, documentation including DGMS approval for all electronic/ electrical field instruments and control Panel.

9.8 Technical Integrity

The Vendor shall be responsible for the technical integrity of the Compressor package, including: mechanical design, supply of material, manufacture, quality assurance, assembly, testing, performance and specified engineering services. All of these activities shall be in accordance with the scope of supply, this functional specification and data/interface information supplied by the Purchaser. The Vendor shall have single point responsibility for all aspects of the works, inclusive of all components subcontracted or purchased from other parties.

9.9 General Requirement

All costs related to OIL's representatives to & fro journey, accommodation, food for the purpose of inspection, technical meeting will be borne by OIL. However all costs related to carrying out the inspection, run test etc shall be borne by the vendor.
The Vendor shall provide COMPANY with reasonable access to his and his sub-Vendor's plant facilities in order to verify that equipment is manufactured and tested as specified.
The Vendor shall provide calibration certificates of testing instrumentation for review by the inspector prior to each test. The Vendor shall provide weekly reports during procurement and fabrication phases indicating progress status.

10.0 PREPARATION FOR SHIPMENT AND PACKING

All items shall be suitably protected against damage during shipment and storage. On completion of inspection and tests, equipment shall be thoroughly cleaned and dried internally and externally and prepared for shipment. The package shall be adequately rotected against corrosion and mechanical damage during shipment to plant site and outdoor storage for period up to one year. Contractor shall consider transit route to site and pack accordingly.

If dispatched in pieces, Vendor shall submit the procedure of assembling for Purchaser's information. Vendor shall provide recommended procedures and checklists for commissioning, start-up.

All special tools and calibration tools required for assembly and commissioning shall be in Vendor's scope of supply.

All flanges shall be covered with metal covers, soft rubber gaskets and held by at least four (4) bolts. Other openings shall be taped closed. Threaded connections shall be capped or plugged for thread protection. Any external components, which may be subject to damage during transit and are not easily protected, shall be removed and packaged separately, to the equipment, for shipment with all openings plugged. Extent of loose supplied items to be marked on equipment drawings.

All internal parts of carbon steel shall be sand blasted and then brushed to remove particles. The equipment shall be sealed closed and contain bags of desiccant to prevent rust. Silica gel or other drying agents must, where installed, be clearly labelled and separately listed on a removal checklist. This list is to be attached to the equipment. All insurance spares shall be packaged suitable storage without opening for condition monitoring.

Exposed shafts and shaft couplings shall be coated with a preservative and wrapped with waterproof moldable cloth, then sealed entirely with waterproofed, cloth-backed duct tape.

Oil lubricated pump bearing housings, equipment cases, stuffing boxes and gearboxes shall be fogged and filled 10 to 50 percent of the internal volume with VSI circulating Oil and then all openings shall be tightly sealed.

Internals of equipment that can be made airtight by use of flanges or plugs shall have openings sealed.

Equipment shall be tagged to indicate the type of internal preservative used. Tags shall be waterproof and tear-resistant and shall be attached with stainless steel wire.

Auxiliary piping connections shall be tagged or marked for identification in the field. Each package shall contain lists of contents; one list inside and one list outside of the package. The package shall have external identification corresponding to the order number. All loose items shipped with the equipment shall be tagged with the order number and item identification. Start up / Commissioning spare parts shall be identified separately. The equipment shall be delivered with one copy of the Installation, operation and maintenance manuals.

11.0 SITE SUPERVISION AND COMMISSIONING REQUIREMENTS

The Vendor shall include the services of competent and experienced field engineer(s) /Supervisor(s) for the erection, installation / modifications, testing and commissioning of the equipment covered by this specification. This shall cover competent engineer(s)/ Supervisor(s) of sub-vendors also.
The package shall be considered fully commissioned only after the supply and acceptance of all related items of the package, documentation including DGMS approval for all electronic/ electrical field instruments and control Panel.

Vendor shall provide a separate break-down quote for Start-Up and Commissioning Services and Operator Training as per bid format.

11.1 Engineer's / Operator Training

The supplier shall have to provide training to OIL personnel as below during Commissioning Test Run and after successful commissioning:

Vendor shall provide training at site i.e. Duliajan during the period of commissioning run. The vendor shall provide 5 (five) days classroom training at Duliajan and 5 (five) days hands on training at site to the engineers & operators.

Training shall cover basic theory equipment, operating procedures, maintenance procedures and control system training as a minimum.

Training Room plus related ancillaries like LCD Projector etc will be provided by OIL at Duliajan. However to & fro charges, accommodation, local conveyance, food etc. for the trainer will be at the vendor's account.

12.0 GUARANTEE

Vendor shall be fully responsible for all equipment supplied by him including bought out items. All the equipment shall be fully guaranteed for a period of twelve months after commissioning and satisfactory site acceptance test by OIL. Vendor shall guarantee all materials against defect, damage or non-conformity / workmanship. If any defect or non-performance occurs during the guarantee period, Vendor shall make all necessary alteration, repair and replacement at no cost to OIL. Vendor shall also provide a performance guarantee for the Compressor packages.

The Vendor shall provide all Certification for the equipment and shall ensure that, dimensional compatibility, shaft system critical speeds, vibration, noise levels and acceptability of pipe loads are within the relevant specification limits.

Vendor shall have the final and total responsibility for the design and performance of all equipment's supplied under this specification.

13.0 DOCUMENTATION

13.1 Documents Required With Bid

Vendor shall provide the following along with the bid:

- A preliminary production schedule of the complete package including design, engineering, fabrication, factory testing, installation, commissioning, start up and site activities with bar chart showing major milestones and hold points.
- Comments / Deviations / Exceptions taken by the Vendor with respect to Codes, Standards and Regulations shall be explained with technical justification for evaluation.
- Functional description.
- Reliability / Availability information and figures.
- Detailed scope of supply
- Completed ISO 13631 datasheet.
- A machinery train general arrangement drawing for the complete package including weights, space required for maintenance.
- Completed data sheets for the compressor,
- Completed auxiliary equipment data sheets (Gas engine, heat exchangers etc.)
- Completed table of compliance (Exception / Deviation)
- Vendor's P&ID for the complete package including all auxiliaries.
- Functional description of the compressor package including start up, IPF and emergency shutdown procedures, capacity control, normal operation, etc.
- Performance curves at different speeds for the proposed compressor with the guaranteed parameters clearly marked.

- Schedule of material of construction
- Full details of the proposed bearings and the lubrication oil system.
- Panhandle diagram (Capacity versus suction pressure characteristics).
- Full details of all the electrical items, electrical block diagrams showing all interfacing and interconnections.
- Electrical load list including all 24V DC loads.
- Full description and specification of all piping and instrumentation incorporated with the package.
- Spares (commissioning, insurance) list
- Project specific Quality plan.
- Typical Inspection and test plan
- Reference list of compressors of similar capacity and design.
- Anticipated ARM - Availability, Reliability and Maintainability characteristics.
- Recommended 2 years operating spares / Insurance spares.
- Recommended start-up and Commissioning spare list.
- List of references.
- List of proposed major Subcontractor/Vendors.
- Utility requirement and Consumption (if any).
- Infrastructure available for carrying out factory acceptance test and String test.
- Vendor assistance, support facilities in India.
- Filled out Checklists

13.2 Special Notes:

a) Documentary evidence like Invoice / performance report / Bill of lading from their customers for satisfactory performance of the units should be furnished along with their bid to demonstrate the experience of the vendor regarding design, packaging, supply, erection and commissioning of gas compressor package with concrete filled skids.

b) Necessary MOU with skid subvendor who have the experience of successfully designing and supplying at least 3(three) reciprocating compressor skids with concrete filled design in last 5 (five) years of above 400 horsepower rating. Documentary evidence like Invoice / performance report / Bill of lading from their customers for satisfactory performance of the units should be furnished along with bid.

c) Necessary agreement between the parent and the subsidiary company or vice-versa and Parent/Subsidiary Guarantee from the parent/ subsidiary company to OIL for fulfilling the obligation under the Agreement, along with the bid.

13.3 Drawings and Documents

The Vendor drawings shall be reviewed and approved by COMPANY, against the Purchase Order. The approval by COMPANY does not signify compliance with the purchase order. It should be noted that review by the COMPANY is for quality assurance purpose only, assuming that Vendor is technically responsible for all technical aspects of design checking. The Vendor is responsible for checking of compliance with

the relevant documents like this specification, applicable codes and COMPANY standards.
Drawing detailing package envelope including installation and maintenance requirement and interface connections shall be supplied by Vendor.

14 .0 TIME SCHEDULE:

Contractor must complete the entire job within 11 (Eleven) months from receipt of formal order. The schedule of completion of compressors shall be as under :-

Activity	9^{th} Month	10^{th} Month	11^{th} Month
Installation & commissioning of LP Booster Compressor unit complete in all respect (including 72 hrs. commissioning run	2	2	2
Installation & commissioning of Gas Lift Compressor unit complete in all respect (including 72 hrs. commissioning run)	2	2	3

Activity wise break up of milestone chart showing start of activities & completion of activities from zero date (i.e. date of LOA) & commissioning schedule shall be submitted along with the offer.

15. Cost of recommended Spare parts for two years operation shall not be considered for bid evaluation. However, the bidder to furnish detailed list of the spare parts and their price for stock provisioning.

16. Supplier to stand guarantee for the availability of all spares at least for 15 years after commissioning of the equipments supplied.

17. Electrical/electronic equipment shall be CIMFR (or equivalent DGMS approved testing lab) certified and DGMS approved. The CIMFR certificate No. and DGMS approval No. shall be affixed or embossed on each piece of equipment.

18. Payment:

Payment shall be released as follows:

a) Compressor package supplied with valid DGMS Approval of components :

i) 80 % value shall be released on supply against proof of despatch/shipment of the package and submission of valid DGMS certificate against each item separately.

ii) Remaining 20 % along with installation & commissioning charges shall be paid after successful commissioning and acceptance by OIL at site.

OIL may consider making 100 % payment of the compressor package value towards supply of the package against proof of dispatch/shipment provided bidders agree to pay interest @ 1% above prevailing Bank Rate (CC rate) of State Bank of India for 20 % of the package value and also submit Bank Guarantee for the equivalent amount plus interest valid till successful commissioning of the package at site. This is in addition to the 10 % of the order value towards Performance Security as per the tender requirement.

b) Compressor package supplied without DGMS approval of components, but with Field Trial Permissions only:

(aa) 50 % value shall be released on supply against proof of despatch/shipment of the package .

(bb) 30% value upon submission of DGMS approval only.

(cc) Balance 20 % along with installation & commissioning charges shall be paid after successful commissioning and acceptance by OIL at site.

Note : (I) In case DGMS approval is not available, the same shall be supplied with DGMS field trial permission certification. Details of obtaining DGMS field trial permission are available at the web site of DGMS. The field trial may be carried out in any E&P Company operating in India or during the commissioning of the project for it is procured.

(II) The price of each electronics/electrical equipment/instrument wherever DGMS approval is required as per technical specifications shall be quoted separately.

(III) A system shall be considered as successfully commissioned only after obtaining valid DGMS approval for all the constituent/instruments of the system.

19. The compressors covered under this tender will be used by OIL in the PEL/ML areas issued/renewed after 01/04/99, applicable Customs Duty for import of goods shall be ZERO. Indigenous bidders shall be eligible for

Deemed Export and should quote Deemed Export prices. Excise Duty under Deemed Export exempted.

Annexure-A

Design Data Sheet
Details of the Compressor Packages

Table : A

Item No.	Unit	Qty	Duty of Compressors	Capacity (NM^3/Hr)	Design Pressure (Gauge) (Kg/cm^2)		Design Temp. (Deg C)
					Suction	Discharge	Suction
1.	No.	6	LP Booster Compressor	2700	1.50	25.00	50
2.	No.	7	Gas Lift Compressor	3200	12.00	120.00	50

Note:

The above duty conditions (capacities) are at normal operating speed of 900 rpm (75% of the maximum rated speed recommended by manufacture) and after considering other conditions/factors such as altitude, maximum gas temperature, ambient temperature etc.

The gas pressures (both suction and discharge) for the units are likely to fluctuate by 20% of the figures given in Annexure-A above and the compressor package shall be designed taking the extreme operating conditions. Bidders are required to furnish Capacity availability and other details like HP requirement of the packages at different combinations.

The requirement against each duty of compressor may be increased/ decreased at the time of order placement.

Annexure-B

Design data Sheet

The gas pressures (both suction and discharge) for the units are likely to fluctuate as shown in the table- B below. Bidders are required to furnish Capacity availability and other details like HP requirement of the packages at different combinations and the compressor package shall be designed taking the extreme operating conditions.

Table:B

Item No.	Unit	Qty	Equipment Description	Cont. Operating Pressure (gauge) (KG / CM^2)					
				Suction Range			Discharge Range		
				MIN	NOR	MAX	MIN	NOR	MAX
1.	No.	6	LP Booster Compressor	1.00	1.50	2.50	14.00	20.00	25.00
2.	No	7	GL Compressor	12.00	14.00	15.00	80.00	95.00	120.00

MIN : Minimum, NOR: Normal operating , MAX: Maximum

(i) The gas pressures (both suction and discharge) for the units are likely to fluctuate as shown in the table above. Bidders are required to furnish Capacity availability and other details like HP requirement of the packages at different combinations including extreme operation conditions of suction and discharge pressures.

Annexure-C

COMPOSITION OF FUEL GAS & GAS TO BE COMPRESSED

The composition of gas to be compressed in each case is shown in the following schedule (typical composition). The gas may be fully saturated with water vapour in the suction, at the suction pressure and temperature condition and hence while computing compressor BHP, it is to be taken in to account. Fuel gas is tapped from GL gas system.

Component	GL Compressor % Volume (approx)	Low Pressure Booster Compressor % Volume (approx)
Methane	80.0 – 88.0	75.0 – 85.0
Ethane	7.5 – 5.0	9.0 – 6.3
Propane	6.5 – 3.0	8.0-4.5
Butane	3.5 – 2.0	2.4 – 1.2
Pentane +	1.5 – 1.0	2.0 – 1.2
Co_2, N_2 Water Vapor etc.	1.0 – 1.0	2.0 – 1.0

Annexure-D

Commissioning Spares

Minimum spares as perceived by OIL are listed below should be included in their offer. However, if bidder feels necessary of any more spares or increase in quantity or items, they should include the same for successful commissioning of the units. The list includes spares for each type of compressor i.e. Low Pressure Booster and Gas Lift separately:

Sl. No	Description	OEM		Vendor	Qty. Reqd.	Unit Rate
		Name	Part No			
1	Compressor valves				05 no. each for suction and delivery of each stage	
2	Piston Rings, Compressors				05 sets for each stage	
3	Packing Rings and springs				05 sets for each stage	
4	Oil Scraper Ring and Spring				05 sets for each stage	
5	Bearings, Compressor i) Con-Rod ii) Main Bearing				 i) 2 sets ii) 2 sets	
6	Lube oil filter , compressor				12 sets	
7	Lube oil filter, Engine				24 sets	
8	Spark Plug				02 sets	
9	Ignition coil				02 sets	
10	Engine water pump				02 sets	
11	Aux. water pump sets with V-Belts				04 nos each	
12	Cylinder Head Gasket				16 nos.	
13	Tappet Screw				16 nos.	
14	Push rod/ hydraulic lifter				16 nos.	
15	Exhaust manifold gasket				16 nos.	
16	Carburettor diaphragm				04 nos	
17	Cooler fan bearings per cooler				01 set	
18	Cooler fan blade				06 nos.	
19	Lubricator pump element & quill (NRV)				05 set	
20	Engine Coolant				As per requirement Of initial fill up and make up during commissioning run	

Sl. No	Description	OEM		Vendor	Qty. Reqd.	Unit Rate
		Name	Part No			
					plus 3months operation (approx.800 litres/unit)	
21	Lube Oil for Compressor				As per recommendation of OEM for commissioning run plus for first oil change.(approx. 150 Litres/unit)	
22	Lube oil for Engine				As per OEM's recommendation for commissioning run plus for first oil change (approx. 1000 litres/unit)	
23	Ignition Module				01 set	
24	Field Instruments (each instrument)				01 set	
25	Control panel components relays, I/O cards, switches, fuse etc.)				01 set	
26	Inlet Air Filter with Prefilter for Gas Engine				05 sets	

The above should be considered for each category (Low Pressure Booster and gas Lift compressor) packages as mentioned in Table:A.

Note:

Rates quoted for commissioning spares shall be considered for evaluation of offers.

Annexure-E

Instrument & Control Philosophy:

The instrumentation & control of the unit shall be designed to provide automatic safety shutdown devices and annunciation system with fuel cut-off, vent and grounding of ignition for safe starting and shutdown of the engine and compressor.

2.0 Control Panel:

The control panel shall be designed based on state of the art technology Microprocessor based programmable Logic controller suitable for hazardous environment. The fault functions shall be both visually and audibly indicated on the unit's control panel and shall remain 'ON' until manually reset. It will have sequence starting system to ensure that all functions associated with starting operation are performed in correct sequence. The initiation shall be by means of a switch of push type, on the unit control panel. Provision shall also be incorporated for emergency shutdown of the compressor unit. All the process parameters shall be indicated on the HMI by using dedicated transmitters/transducers. In addition to the indication on the panel, analog indicators for critical parameters (list given in point no. 3.2) are to be provided at one place in the form of a gauge panel. The gauge panel shall be designed to be located adjacent to the control panel.

Note: The successful bidder should supply a well proven control system for Natural Gas Compressor and Engine Control. The bidder shall provide evidence that this particular control system technology are in use worldwide for Natural Gas Compressor Control at least for the last five years from bid closing date.

3.0 Shutdown & Indicating devices:

3.1 The following minimum shutdown devices should be offered for Compressor, Engine & Cooler:

3.1.1 Compressor Shutdown devices:

a) High liquid level in suction scrubbers
b) High Liquid level in inter stage scrubbers
c) Low lube oil pressure
d) Force-feed lubricator failure
e) Low lube oil level
f) High discharge gas pressure for each stage
g) High discharge gas temperature for each stage
h) Low suction gas pressure
i) High cylinder jacket water temperature
j) High vibration (Crankcase & Cylinders separately)

3.1.2 Engine Shutdown devices:

a) Low lube oil pressure
b) High coolant temperature (outlet from engine)
c) Low lube oil level
d) Cooling system low flow
e) Engine over speed
f) Engine overload
g) Excessive exhaust temperature
h) Engine high vibration
i) Low coolant tank level

Note: The gas compressor packager shall ensure that there is no conflict of engine shutdown system with compressor control system. The packager will be responsible for ensuring proper safe operation of the package. The engine control and shutdown system should be packaged in control panel. Vendor's/manufacturer's works are to ensure proper operation, maintenance and safety of the package and to avoid duplicity of instrumentation devices.

3.1.3 Cooler – Shutdown Devices:

a) High vibration (near drive end and near cooling fans)

3.2 Analog gauge panel is to be provided to monitor process parameters of compressor and Engine as given below:

a) Gas suction and discharge pressure for each stage.
b) Gas suction and discharge temperature for each stage
c) Compressor lube oil header pressure
d) Engine oil header pressure
e) Engine exhaust temperature

3.3 The analog gauge board to be placed on the side of the skid nearer to the transmitter panel.

4.0 <u>Programmable Controller</u>:

4.1 Each unit (Engine and Compressor) shall have a sequence starting system to ensure that all functions associated with the starting operation are performed in the correct sequence. Initiation shall be by means of a switch on the unit control panel.

4.2 The control panel shall include a programmable controller with the following features to cater the operational need of the compressor.

a) The processor shall be dual redundant and configured in hot standby mode
b) Indication of status of digital inputs and outputs for easy debugging
c) Expandable digital & analog inputs/outputs
d) Program memory held in EPROM

e) Communication port for connection to PC or laptop computer
f) Provision for Ethernet/MODBUS communication for remote monitoring in future at Operator room.
g) Battery operated program loader/Laptop computer (One No. for the entire lot)
h) Designed to work in engine and compressor environment
i) Arrangement for retaining memory in case of power failure
j) The controller should have capability to calculate flow as per latest AGA standard.
k) The controller should be capable of controlling PID Loops.
l) The Programmable Controller should have RS-232/RS485/Ethernet communication port.
m) DC Power supply for the control panel shall be dual redundant.

4.3 Human Machine Interface (HMI): A HMI terminal of with keypad and display is to be provided in the Control panel for monitoring of all parameters connected to Controller as input/output.

4.4 The control panel shall have an entry for easy access and shall be suitable for use in hazardous area. The panel shall employ the sequence start system and alarm/monitoring functions together with the start switch and shutdown button. Provision shall also be incorporated for remote emergency shutdown of the compressor unit.

4.5 An UPS (Uninterrupted Power Supply) of minimum one hour battery back-up is to be provided for each gas compressor-engine control panel. The above UPS with battery should be of portable type & should be placed in the control panel. The UPS should handle unwanted extra high voltage surge for about few seconds & have protection facility to cut-off power to the panel.

4.6 The control panel to be placed on ground with a base level of compressor-engine skid. The supplier shall provide drawing /sketch showing position of the control panel for O.I.L's approval. Mounting of the control panel shall be designed using anti-vibration pads so that no vibration is transferred to the panel.

4.7 The Control Panel including all field instruments, all power supply points should be duly approved by DGMS (Director General of Mines Safety, India) for use in Zone-1 & Zone-2 and Gas groups IIA & IIB hazardous areas of Oil Mines in India.

4.8 STATUTARY APPROVAL REQUIREMENT:

a) Bidders must categorically confirm in their bids that they would submit the following approvals along with the goods, failing which the offer will be summarily rejected. This is required as per Oil India's regulatory standards and specifications for Oil & Gas field services.

b) Certification from CIMFR of India or equivalent country of origin for Control Panel and all electrical / electronic field instruments used in hazardous area i.e. transmitters, switches, solenoid valves, I/P & P/I converters, power supply point etc.

c) Valid DGMS approval for Control Panel and all electrical / electronic field instruments used in hazardous area i.e. transmitters, switches, solenoid valves, I/P & P/I converters, power supply point etc.

d) In case of non availability of DGMS approval for some or all of the above, the bidder must confirm categorically that the control panel/ electrical/electronic field instruments shall be supplied with CIMFR/ERTL (India) laboratory test certificates along with Field Trial Permission from DGMS, India. Flameproof enclosure, electrical/electronic instruments which are manufactured outside India & certified by accredited international authorities shall also have valid approval of DGMS, India or Field Trial Permission from DGMS, India for that particular instruments/enclosure. Supply of Control panel, electrical/electronic instruments without DGMS approval shall be complete only when DGMS field trial permission certificate is submitted and the payment will be released as per the applicable payment terms specified in the relevant payment clause of this tender document.

e) For DGMS certification procedure, please visit: www.dgmsindia.in

5.0 Additional Points:

5.1 All sensors for the various parameters should be designed to be compatible with the I/O card of the programmable controller to have their exact value of the parameters in the control system. For analog inputs transducers with 4-20 mA output is preferable.

5.2 Engine RPM shall be preferably measured using a proximity sensor. Engine speed indicator with Frequency to current Converter (F/I) for Programmable Controller input and auto-manual selection switch with both auto-manual speed control in the panel to be provided. Engine RPM/speed display should be available in the Control panel.

5.3 Pre-Alarm System: The panel will have an additional feature to indicate an audible alarm in the panel in the event of certain parameters deviating from its operating value. The setting of such pre alarm will be slightly below or above the setting value of shutdown alarm such that initiation of these pre alarms will not bring about the shutdown of the unit. Audible alarm shall be loud enough (Min. 80 dB) to draw attention of the shift operator.

5.4 The control system shall be designed in such a way that failure of any portion of the system shall bring the machine to a fail-safe shutdown state.

5.5 Capacity control of the compressor shall be incorporated in the Programmable controller. The control loop shall be complete with pneumatic control valve with positioner and I/P converter.

Capacity control philosophy for Low Pressure Booster:

i) The Low Pressure Booster Compressor should be able to maintain the required suction pressure by taking gas from the discharge line (max 30%of flow) through the control valve. The control valve shall be Normally Closed type.

ii) The Gas Lift Compressor discharge pressure shall be maintained by the control valve below the maximum discharge pressure and the gas shall be by passed to the suction side. The control valve shall be Normally Closed type.

5.6 Flow Measurements to be incorporated in the control system:

a) The engine shall be provided with on-line flow meter for fuel gas volume. This flow measurement should be conforming to latest AGA standard. On-line Flow Meter to be hooked up with the Programmable Controller and Totalizer indication should be available in the Control Panel Display.

5.7 The complete job of impulse tube fitting and cable laying, cable trenching and cable termination in the junction boxes, control panel shall be in the scope of the supplier. All the fittings shall be SS and double compression fittings and the tubing shall be fully annealed seamless type.

5.8 The complete installation & Commissioning of the control system shall be in the scope of supplier.

5.9 Physical tagging of field instruments as per P&ID shall be in the scope of the supplier.

6.0 Documentation & Approvals:

6.1 During detailed engineering & design stage, the approvals of the following are to be obtained from O.I.L. Minimum 3 (three) sets of hard copy and soft copy for each of the following documents are required.

a) P& I Diagram
b) General Layout diagram
c) All drawings and instrument datasheets
d) Panel Details & Panel wiring diagram
e) Loop Diagram & Loop details
f) Programmable Controller Hardware & Software
g) Programming Terminal(Laptop) specification
h) Logic details of start-up, sequence, interlock, safety shutdown, alarm, control & monitoring.
i) Programs development for start-up, sequence, interlock, safety shutdown, alarm, control & monitoring.
j) Emergency & Shutdown logic.
k) All field & Panel Instruments.
l) Tag data base for the entire unit

Note: The supplier must submit drawing/data sheets etc within 02(Two) months from the date of placement of order on them, for OIL's scrutiny and approval.

6.2 Three sets of all electrical drawings are to be supplied in A3 size, laminated. Three sets of operation and maintenance manuals of field instruments are to be supplied for every compressor along with goods.

6.3 A permanent block/flow diagram of the operating process and list of start-up and shutdown procedure is to be riveted in a suitable place on the control panel.

6.4 Detailed technical specifications, approved vendors list and check List for Control and Instrumentation system as per Annexure-F, G & H respectively.

1.0 **Control Panel**:

a)	Type	: Enclosed self supporting, lockable type
b)	Material	: Heavy gauge CRCA sheet stainless steel, reinforced to provide self standing and rigid assembly
e)	Enclosure class	: IP-65 or better
f)	Ambient Temperature	: Maximum 50 deg C
g)	Cable connection	: Double compression FLP Cable gland
h)	Cable entry	: Bottom
i)	Terminal type	: 1.5 mm^2 spring loaded (Double-decker terminals are not acceptable)
j)	I/O Card mounting rack	: As per manufacturer's standard
k)	Input connections	: All analog & digital inputs are to be routed through suitable I.S. barriers
l)	Wiring Insulation grade	: 1100 V or above
m)	Spare Terminals	: 20% after complete wiring
n)	Panel Illumination	: Panel illumination to be provided as per standard. It is to be operated through door switch.
o)	Audio-Visual Alarm	: Suitable audio-visual alarm system should be provided in the control panel.

2.0 **Microprocessor based Programmable Controller**:

The specification given below is the minimum requirement but not restricted to the following:

Model : Latest model of Programmable Logic Controller

Hardware & Software:

a) Processor: Processor should be capable of handling all the parameters and all control loops, indications, annunciations etc. It should have sufficient memory capacity with minimum of 20% extra memory as spare. Also its memory should have the facility for future up-gradation.

b) Rack: As per MFR's standard.

c) I/O Card : Should have following Input-Output cards
   i. Analog Input
   ii. Analog Output
   iii. Digital Input
   iv. Digital Output
   v. Power supply card

d) Incoming Power supply at site: 230 V AC +/- 10%, 50 Hz, single phase

e) Software: Latest Windows based application software for developing logic diagram etc & Graphics building on operating system Windows

f) Communication Port: RS-232/RS485/Ethernet (Provision for Ethernet/MODBUS communication for remote monitoring in future at Operator room)

3.0 **Programmable Controller Inputs/Outputs (Tentative):**

Inputs – Digital	**Inputs – Analogue**
1. Start 2. Stop 3. Accept 4. Reset 5. Emergency stop 6. 1st Stage Suction Scrubber High Level 7. 2nd Stage Suction Scrubber High Level 8. Fuel Gas manifold Pressure Very High 9. Jacket C. W outlet Pressure Very Low 10. Suction Separator Liquid level High 11. Discharge Separator Liquid level High 12. Low Oil level Compressor 13. Low oil Level engine 14. Remote Shutdown(via relay/switch) 15. Cooler Vibration 16. Compressor Vibration 17. Engine Vibration 18. Cylinder Lubricator Pressure	1. Compressor Oil Pressure 2. Engine Oil Pressure 3. Suction Pressure 1st stage 4. Suction Pressure 2nd stage 5. Suction Pressure 3rd stage 6. Discharge Pressure 1st stage 7. Discharge Pressure 2nd stage 8. Engine RPM 9. Comp. Air Pressure very Low 10. Engine flow meter for fuel gas 11. Engine Jacket water temperature 12. Engine Oil temperature 13. Suction Temperature 1st stage 14. Discharge Temperature 1st stage 15. Suction Temperature 2nd stage 16. Discharge Temperature 2nd stage 17. Engine Manifold Temperature 18. Compressor Frame Oil Temp 19. Engine C.W. Outlet Header Temp. 20. Engine Exhaust Temperature 21. Individual Engine Cylinder Temp.
Outputs – Digital	**Outputs – Analogue: 4-20 mA**
1. Engine Crank Solenoid 2. Fuel Gas Valve Solenoid 3. Start-up Bypass Valve Solenoid 4. Air Start valve for Engine L.O.P 5. Air Start valve for Compressor L.O.P 6. Ignition grounding	1. Engine speed Control I/P Converter 2. Auto Bypass valve Control I/P converter

Specification for Laptop Computer for PLC configuration/ Programming:

5 nos. laptop Computer with the following specification shall be supplied by the vendor.

a) Operating System: Windows® 7 Professional, (Licensed software CD's are to be provided)

b) Application Software: Preloaded with Programmable Controller software, (Licensed software CD's are to be provided)

c) Hardware (minimum configuration):
   - Processor : Latest Intel® Core™ processor, Hard disk : 320 GB or more
   - High speed DVD Combo Drive ;Minimum 2 GB RAM
   - One RS-232 Ports ;Two USB port
   - Ethernet port with integrated network card
   - 15" LCD Monitor

d) The specification mentioned above is minimum for the Laptop. Supplier should include all features & accessories as necessary for programming and configuration application.

e) Amongst others, laptop should be virus protected with latest semantic antivirus software; licensed Antivirus CD is to be supplied separately.

Annexure – G

CHECK LIST FOR INSTRUMENTATION & CONTROL SYSTEM

A. Programmable Control Panel:

Sl. No.	Description	Remarks	
		YES	NO
1	Latest Model of Programmable Controller is provided		
2	Communication for remote monitoring provided		
3	Audio-Visual Alarm facility with safety shutdown devices provided		
4	The suitable position of the panel is provided as per the layout diagram		
5	Suitable engine speed indicator and auto-manual selection with both auto-manual speed control is provided		
6	All panel parameters are displayed through HMI in Control panel		
7	Redundant DC Power supply unit Provided		
9	I.S. Zener Barriers are provided for all inputs		
10	Starting sequence, Interlock, Startup & Safety shutdown is executed using Programmable Controller		
11	Confirm to supply control 3 sets of panel engineering details, technical documents of control panel instrumentation system along with the material		
12	Scrubber level control is achieved using control valve and level control action from Programmable Controller		
13	Compressor capacity control is provided		
14	UPS(Uninterrupted Power Supply) back up is of one hour duration		
15	Provision for interface to OIL's SCADA system is available in the panel		
16	Gauge panel is placed as per the layout diagram		

Field Instruments

Sl. No.	Description	Remarks	
		YES	NO
1	All field instruments i.e. transmitters, switches, solenoid valves, I/P & P/I converters etc. approved by DGMS		
2	All field instruments are compatible to 24 V DC power supply		
3	Technical literature/catalogue for all field instruments provided		

Annexure-H

VENDORS LIST

Sr No	Item / equipment	Name of Vendor
a)	Gas Engine	Caterpillar GE Dresser Waukesha
b)	Aerial Cooler	Harsco Air-X-Limited, USA/UK AXH air-coolers, Tulsa, Oklahoma,USA Air Cooled Exchangers, Tulsa,USA
c)	Coupling	Rexnord ,CMR type
d)	Divider Block Lubrication	CPI,Stafford, Texas, USA CC technology , Midland, Texas, USA Lincoln
e)	Control Panel	AMOT Controls, UK FWMurphy, UK Altronic, LLC,Girard, Ohio, USA
f)	Pressure/Temperature gauges	ODIN WIKA Murphy McDaniel
g)	Pressure/Temperature Switches	Switzer Danfoss Indfoss
h)	Level Switches	Norriseal Murphy Fisher Rosemount Invalco Magnetrol
i)	Level gauges	Levcon Chemtrols Norriseal
j)	RTD/Thermocouple	Nagman GIC ALTOP Waaree
k)	Solenoid Valve	ASCO Rotex
l)	Control valves & Valve Positioners	Emerson MIL Samson
m)	Junction Box & cable Gland	Baliga, Chennai Flexpro

Sr No	Item / equipment	Name of Vendor
		Sterling
n)	I.S. Zener Barrier	MTL India P&F Electronics
o)	Vibration Switches	Murphy(UK) AMOT Controls(UK) Metrix (USA)
p)	Flow Meters	Emerson Rockwin Cameron
q)	Pressure regulators	Emerson Shavo Norgren ABB Fisher
r)	PLC	Allen Bradley Siemens Altronics Amot Murphy
s)	Pressure/DP Transmitter/Temp. Transmitter	Emerson ABB Honeywell Yokogawa
t)	I/P Converter	Fisher ABB Honeywell Yokogawa
u)	SS Tubing	Sandvik, Sweden
v)	SS Tubing fittings	Swagelok , Hylok
u)	Acoustical simulation and mechanical response studies & Pulsation studies	Beta machinery Analysis Tech Transfer Inc. SWRI, USA Engineering Dynamics Inc.Houston SVT Engg Consultants, Perth , Australia

Note:

The vendor list is for reference purpose. The supplier/ packager to avail approval of each instrument with detail datasheet, make etc. after placement of order.

The bidder should ensure that the supplied electrical/electronic instrumentation items from any of the above vendor are approved by Directorate General of Mines Safety, Dhanbad, India, authorities. The responsibility of providing necessary approval from the DGMS authorities in on the package

ANNEXURE-I

BRC (Technical) Check List

Sl. no.	Description	Vendor's Comment
1.	The Compressor Unit shall conform to API 11 P of 1989/ISO 13631	
2.	Data sheet as per API11P/ISO13631 submitted	
3.	The gas compressor package skid shall be concrete filled type.	
4.	Quoted for full quantity of same make and model of Compressors and other ancillaries/accessories against each duty of compressors	
5	Documentary evidence for fulfilling BRC Clause no. 4.0 (i) submitted	
6	Documentary evidence for fulfilling BRC Clause no. 4.0 (ii) submitted, if required	
7	Confirmation regarding BRC clause nos. 5 to 7 submitted	

Technical Check List
Packaged Compressor Information Sheet

Sl. No.	Description	Vendor's Comments
A	Documents Attached	
1	Documents submitted against Special Notes 13.2 (a)	
2	Documents submitted against Special Notes 13.2 (b)	
3	Documents submitted against Special Notes 13.2 (c)	
B	Frame/Piston rod/valve etc	
1	Maximum BHP per throw and number of throws	
2	Maximum/minimum allowable speed (rpm)	
3	Maximum gas rod-load at rated disch. pressure and relief valve set pressure	
4	Max. inertia load	
5	Max. (Gas + Inertia) load at rated disch. pressure and relief valve set pressure	
6	Piston speed	
7	Main journal bearing size (dia x length) and quantity	
8	Crank pin journal bearing size (dia x length) any quantity	
9	Con rod bushing (X-head end) size (dia x length) any quantity	
10	Cross-head type	
11	Cross head size (dia)	

Sl. No.	Description	Vendor's Comments
12	Cross-head pin size (dia x length) quantity	
13	Cross head pin bushing size (dia x length) and quantity	
14	Cross head shoe size (width x length)	
15	Piston-rod dia	
16	Con rod bolt dia	
17	Type of threads on piston-rod on (Requirement is for rolled-threads) X-head side Piston side	
18	Type of threads on con-rod bolts	
19	Frame lubrication pump capacity	
20	Crank-case oil sump capacity	
21	Difference in reciprocating weights on opposite crank	
22	Valve speed at operating speed and valve ratings (lbs)	
23	Material of construction of the following:	
	Crank-shaft	
	Con-rod	
	Piston rod	
	Con-rod bolts	
	Cross-head	
	Cross-head pin	
	Main bearing	
	Crank-pin bearing	
	Thrust bearing	
	Pistons	
	Piston rings	
	Packing rings	
	Oil Scrapper rings	
	Valves plates/springs	
	Valve stop/seat	
24	General Information (Compressor)	
25	Whether the design of LP Booster has taken into consideration the expected fluctuations of suction/discharge pressure.	
26	Whether the cylinders are linered	
27	Whether the compressors are provided with explosion relief devices.	
28	Whether ½" indicator taps are provided at the end, of the cylinders	
29	Whether reinforced conical type suction start-up screens are provided	
30	Make and type of coupling	

Sl. No.	Description	Vendor's Comments
31	Whether pre/post lube oil pumps (for gas engine driven units) are driven by pneumatic motors and both the systems are automatic and controlled by Control Panel	
32	The type of suction scrubber provided .Whether the mist extractor provided with the suction/inter stages scrubbers is adequate to remover 99% of all droplets of 10 microns or larger. Is there any arrangement in the suction scrubbers to handle light slugging	
33	Interchangeability of parts of the offered compressors	
34	Grades of lube oil for compressor and its Indian equivalent	
35	Make of the forced-feed lubrication system, Divider Block	
36	Type of rod packing cooling	
37	Power required driving auxiliaries (cooler and compressor auxiliary water pumps).	
38	Whether safety valve is provided after each stage of compression and at first stage suction.	
39	Whether compressor valves are of plate-type or ring type	
40	Whether compressor valves are non-metallic	
41	Whether air bleed valve is provided at both stage cylinders. (In case of water cooled compressors)	
42	Whether the bidder has quoted with concrete filled skid along with details and credentials thereof	
43	Whether after cooler by-pass valve/ system has been provided for Gas Lift compressors	
44	Whether approx. dimensions and weight of each skidded units are included.	
45	Whether commissioning spares and other consumable spares provided	
C	PRIME MOVER (ENGINE):	
1	Whether continuous ratings (HP) of the engine indicated are after appropriate deductions for altitude, temperature and fuel-gas composition mentioned in specifications	
2	Whether pyrometer is provided to indicate individual cylinder temperature of the engine.	
3	What is the continuous rating (HP) of the engine at operating speed at site condition ?	
4	Whether bhp developed by the prime mover at design speed meets the 20% margin required over (total BHP required to drive compressor when fully loaded + total	

Sl. No.	Description	Vendor's Comments
	BHP required to drive the auxiliaries).	
5	Whether the prime mover design speed is 80% of the maximum speed of the machine as shown in published literature and operated satisfactorily	
6	Whether engine crank-case is provided with explosion proof devices	
7	Whether starting air pressure at 8.5 kg/cm2 metre is sufficient for starting the engine.	
8	Whether the fuel filter is provided with pressure gauges, drain block valve and piping to the edge of skid.	
9	Details of the fuel filter provided	
10	Whether engine governor is Wood-ward hydraulic type/Electronic Type	
11	Whether the air cleaner is dry-type with pre-filter.	
12	Whether the silencer is hospital type with spark & flame arrestor	
13	Whether suitable provision has been made to check the performance of individual spark plug by spark detector without opening the spark plug or the cable.	
D.	COOLER	
1	Whether the engine jacket water cooler has been designed for 20% excess reserve cooling capacity over maximum possible lHP of the engine (i.e. HP developed at maximum rated speed of the engine).	
2	Whether the auxiliary cooler section for gas and compressor jacket water has been designed for an excess 15% & 20% capacity respectively over the design requirement.	
3	Whether the heat transfer calculation have been provided with respect to adequacy of the engine jacket water cooler.	
4	Mesh size of the bug-screen and hail Guard	
5	Inter-stage and after cooler gas temperature.	
6	Whether the cooling water circuits for the engine and compressors are separate with separate cooling sections in the cooler	
7	Whether cooler fin guard (folding type) provided on top of cooler section.	
8	Whether air bleed valve is provided for water section(s) at the topmost position.	
9	Coolant Capacity	
10	Coolant Make, Specification	
E.	GENERAL	
1	Whether the string test will be carried out as per the specifications	

Sl. No.	Description	Vendor's Comments
2	What is the maximum expected noise level in decibels of the packaged unit from a distance of 1m from the unit	
3	Whether spare parts list for 2 years operations indicating price of the individual item is provided.	
4	It is to be confirmed that spares for the engines, compressors and other accessories shall be available at least for a period of 15 years after the date of commissioning of the units at site as mentioned in OIL's specifications	
5	Whether the delivery schedule is as per the specifications	

ANNEXURE - BB

BID REJECTION CRITERIA (BRC) / BID EVALUTION CRITERIA (BEC)
(PROCUREMENT OF GAS COMPRESSORS)

(I) BID REJECTION CRITERIA:

The bids shall conform generally to the specifications and terms and conditions given in the tender. Bids shall be rejected in case the goods offered do not conform to the required minimum / maximum parameters stipulated in the technical specifications and to the respective International / National Standards wherever stipulated. Notwithstanding the general conformity of the bids to the stipulated specifications and terms and conditions, the following requirements shall have to be considered as non-responsive and rejected.

(A) TECHNICAL :

1.0 The Compressor Unit shall conform to API 11 P of 1989/ISO 13631. The bidder shall furnish the technical information in API packaged data sheet of API Standard 11 P/ISO13631.

2.0 The gas compressor package skid shall be concrete filled type suitable for installation on relatively soft gravel packed area without concrete foundation.

3.0 Bidders must quote for full quantity of same make and model of Compressors and other ancillaries/accessories against each duty of compressors i.e. LPB (Low Pressure Booster) & GL (Gas Lift).

4.0 **TECHNICAL EXPERIENCE / PERFORMANCE OF VENDOR**:

i)The bidder should have relevant experience in engineering, packaging, supply, installation & commissioning of Reciprocating Gas Compressor Units of minimum duty of 400 HP with ***concrete filled skids.*** At least 3 (three) such units should have operated 8000 hours individually in last 10 years from the date of Bid Closing Date (B.C.D.).

. Bidder to provide documentary evidence regarding the experience of engineering, packaging, supply, installation and commissioning of gas compressor units with concrete filled skid design with the bid. The documentary evidence shall be valid purchase order and as proof of execution of order , copy of invoice or inspection report from client or bill of lading.

Or

The bidder having relevant experience in engineering, packaging, supply, installation & commissioning of Reciprocating Gas Compressor Units but not having the experience of ***concrete filled skid*** may take support from a party who have the proven capability of design of concrete filled skids for reciprocating gas compressor packages of minimum duty of 400 HP.

In this case bidder to provide documentary evidence regarding the experience of engineering, packaging, supply, installation and commissioning of at least 3 (three) gas compressor units of minimum 400 HP duty which have operated 8000 hours individually in last 10 years from the date of bid closing. The documentary

evidence shall be valid purchase order and as proof of execution of order , copy of invoice or inspection report from client or bill of lading.

However the bidder shall have to provide undertaking to carryout design of the concrete filled skid through outsourcing through experienced sub-vendor.

Also the bidder to provide documentary evidence of experience of the sub vendor in regards to design, supply of concrete filled skids for reciprocating gas compressor packages of minimum duty of 400 HP. The documentary evidence shall be valid purchase order and as proof of execution of order , copy of invoice or inspection report from client or bill of lading.

ii) Offers of those Bidders who themselves do not meet the technical experience criteria as stipulated in the clause no. 4.0 (i) above shall also be eligible provided the Bidder is a subsidiary company of the parent company in which the parent company has 100% stake or parent company can also be considered on the strength of its 100% subsidiary. However, the parent/ subsidiary company of the Bidder should on its own meet the technical experience as stipulated in the clause no. 4.0 (i) above and must not rely for meeting the technical experience criteria on its sister subsidiary/ co-subsidiary company or through any other arrangement like Technical Collaboration agreement. In that case as the subsidiary company is dependent upon the technical experience of the parent company or vice-versa with a view to ensure commitment and involvement of the parent/ subsidiary company for successful execution of the contract, the participating bidder should enclose an Agreement (as per format enclosed at Attachment – I) between the parent and the subsidiary company or vice-versa and Parent/ Subsidiary Guarantee (as per format enclosed at Attachment – II) from the parent/ subsidiary company to OIL for fulfilling the obligation under the Agreement, along with the techno-commercial bid.

5.0 Bidders shall categorically confirm that installation and commissioning of the compressor packages with all accessories shall be carried out by their competent personnel at OIL's installations in and around Duliajan, Assam (India) and its adjoining fields/ out step locations. The units will be installed as replacement in the existing stations as well as in new installations.

6.0 The bidder shall warrant that in the event of an order, all product(s) supplied shall be new and free from all defects and fault in material, workmanship, & manufacture and shall be in full conformity with the applicable API specification. The clause shall be valid for 12 months from the date of successfully commissioning of the units.

7.0 The bidder shall have single point responsibility for designing, engineering, packaging, supply, installation and commissioning of the complete package.

(B) <u>COMMERCIAL</u>:

1.0 Bids are invited under Single Stage Two Bid System. Bidders shall quote accordingly under Single Stage Two Bid System. Please note that no price details should be furnished in the Technical (i.e. Unpriced) bid. The "Unpriced Bid" shall contain all techno-commercial details except the prices which shall be kept blank. The "Priced Bid" must contain the price schedule and the bidder's commercial terms and conditions. Bidder not complying with above submission procedure will be rejected.

2.0 Bid security of US $ 2,95,000.00 or Rs. 1,32,60,000.00 shall be furnished as a part of the TECHNICAL BID. Any bid not accompanied by a proper bid security in ORIGINAL will be rejected without any further consideration. For exemption for submission of Bid Security, please refer Clause No. 9.8 (Section A) of General Terms and Conditions for Global Tender. The Bid Security shall be valid till 02/09/2015 (dd/mm/yy) .

3.0 Bidders must confirm that Goods, materials or plant(s) to be supplied shall be new of recent make and of the best quality and workmanship and shall be guaranteed for a period of twelve months from the date of commissioning of the complete package at site against any defects arising from faulty materials, workmanship or design. Defective goods/materials or parts rejected by OIL shall be replaced immediately by the supplier at the supplier's expenses at no extra cost to OIL.

4.0 Successful bidder will be required to furnish a Performance Bank Guarantee @10% of the order value. The Performance Bank Guarantee must be valid for one year from the date of successful commissioning of the complete package at site. Bidder must confirm the same in their Technical Bid. Offers not complying with this clause will be rejected.

5.0 The prices offered will have to be firm through delivery and not subject to variation on any account. A bid submitted with an adjustable price will be treated as non-responsive and rejected.

6.0 Validity of the bid shall be minimum 180 days. Bids with lesser validity will be rejected.

7.0 Bids received after the bid closing date and time will be rejected. Similarly, modifications to bids received after the bid closing date & time will not be considered.

8.0 Bidders shall quote directly and not through Agents in India. Offers made by Indian Agents on behalf of their foreign principals will be rejected. Similarly offers from unsolicited bidders will be rejected.

9.0 Bids containing incorrect statement will be rejected.

10.0 Offers received without Integrity Pact duly signed by the authorised signatory of the bidder will be rejected.

11.0 No offers should be sent by Telex, Cable, E-mail or Fax. Such offers will not be accepted. 12.0 Bidders are required to submit the summary of the prices in their commercial bids as per bid format (Summary), given below for each item :

(i) <u>Commercial Bid Format (SUMMARY) for Foreign Bidders for each item</u> :

(A) Total material cost of Compressor(other than Sl. No B below)
(B) Cost of Commissioning spares
(C) Grand Total Material Cost, (A + B)
(D) Packing & FOB Charges
(E) Total FOB Port of Shipment value, (C+ D) above
(F) Ocean Freight Charges upto Kolkata, India
(G) Insurance Charges
(H) Total CIF Kolkata value, (E+ F+ G)
(I) Pre-shipment Inspection charges
(J) Training charges
(K) Installation & Commissioning charges
(L) Total Value, (H + I + J + K) above
(M) Total value in words :
(N) Gross Weight :
(O) Gross Volume :

(iii) <u>Commercial Bid Format (SUMMARY) for Indigenous Bidders for each item</u> :

(A) Total material cost of Compressor(other than Sl. No B below)
(B) Cost of Commissioning spares
(C) Grand Total Material Cost, (A + B)
(D) Packing and Forwarding Charges
(E) Total Ex-works value, (C+ D) above
(F) Excise Duty including Cess, (Please indicate applicable rate of Duty & Cess)
(G) Sales Tax, (Please indicate applicable rate of Tax)
(H) Total FOR Despatching station price, (E+ F + G) above
(I) Road Transportation charges to Duliajan
(J) Insurance Charges
(K) Total FOR Duliajan value, (H + I + J) above
(L) Pre-shipment Inspection charges
(M) Training charges
(N) Installation & Commissioning charges
(O) Total Value, (K + L + M + N) above
(P) Total value in words :
(Q) Gross Weight :
(R) Gross Volume :

<u>NOTES</u> :

1. The Commissioning Spares should be quoted separately indicating the unit price and quantity quoted.

2. The compressors covered under this tender will be used by OIL in the PEL/ML areas issued/renewed after 01/04/99, applicable Customs Duty for import of goods shall be ZERO. Indigenous bidders shall be eligible for Deemed Export and should quote Deemed Export prices. Excise Duty under Deemed Export exempted.

3. Installation/Commissioning charges must be quoted separately on lumpsum basis which shall be considered for evaluation of the offers. These charges should include amongst others to and fro fares, boarding/lodging, local transport at Duliajan and other expenses of supplier's commissioning personnel during their stay at Duliajan, Assam(India). All Income, Service, Corporate Taxes etc. towards the services provided under installation / commissioning/training shall be borne by the supplier and will be deducted at source at the time of releasing the payment. Bidder should also confirm about providing all these services in the Technical Bid.

4. Successful bidder shall offer the compressors for Pre-despatch/shipment Inspection by OIL's team of technical/commercial executives. Pre-despatch/Shipment Inspection and Training charges, if any, must be quoted separately on lumpsum basis which shall be considered for evaluation of the offers. The to and fro fares, boarding/lodging and other enroute expenses of OIL's personnel shall be borne by OIL.

   Bidders must categorically indicate the Installation / Commissioning, Pre-despatch/Shipment Inspection and Training charges in their offers and must confirm about providing the same in their Technical bids.

(II) <u>BID EVALUATION CRITERIA</u> :

The bids conforming to the specifications, terms and conditions stipulated in the tender and considered to be responsive after subjecting to the Bid Rejection Criteria will be considered for further evaluation as per the Bid Evaluation Criteria given below:

A. <u>COMMERCIAL</u>:

1.0 The evaluation of bids will be done as per the Commercial Bid Format (SUMMARY) detailed vide Para 12.0 of BRC.

2.0 If there is any discrepancy between the unit price and the total price, the unit price will prevail and the total price shall be corrected. Similarly, if there is any discrepancy between words and figure, the amounts in words shall prevail and will be adopted for evaluation.

3.0 For conversion of foreign currency into Indian currency, B.C. selling (Market) rate declared by State Bank of India, one day prior to the date of price bid opening shall be considered. However, if the time lag between the opening of the bids and final decision exceed 3(three) months, then B.C. Selling(Market) rate of exchange declared by SBI on the date prior to the date of final decision shall be adopted for conversion and evaluation.

4.0 Offers not complying with the payment terms indicated in the enquiry shall be loaded with one percent above the prevailing Bank rate (CC rate) of State Bank of India for duration of commissioning time indicated in the tender plus transit time (3 months) for evaluation purpose.

5.0 Bids will be evaluated itemwise.

6.0 To ascertain the inter-se-ranking, the comparison of the responsive bids will be made as under, subject to corrections / adjustments given herein.

6.1 **When only foreign bidders are involved :**

Comparison of bids will be done on the basis of " TOTAL VALUE" which is estimated as under for each item :

(A) Total material cost of Compressor(other than Sl. No B below)
(B) Cost of Commissioning spares
(C) Grand Total Material Cost, (A + B)
(D) Packing & FOB Charges
(E) Total FOB Port of Shipment value, (C+D) above
(F) Ocean Freight Charges upto Kolkata, India
(G) Insurance Charges @ 1% of Total FOB Value vide (E) above
(H) Banking Charges @ 0.5% of Total FOB Value vide (E) above in case of payment through Letter of Credit (If confirmed L/C at buyer's account is required, 1.5% of Total FOB Value will be loaded)
(I) Total CIF Kolkata Value, (E+ F + G + H) above
(J) Pre-shipment Inspection charges
(K) Training charges
(L) Installation & Commissioning charges
(M) Total Value, (I + J + K + L) above

NOTE : Banking charge in the country of the foreign bidder shall be borne by the bidder.

6.2 When only domestic bidders are involved or when more than one domestic bidders are in contention in case of mixed response :

Comparison of bids will be done on the basis of " TOTAL VALUE" which is estimated as under for each item :

(A) Total material cost of Compressor(other than Sl. No B below)
(B) Cost of Commissioning spares
(C) Grand Total Material Cost, (A + B)
(D) Packing and Forwarding Charges
(E) Total Ex-works value, (C + D) above
(F) Excise Duty including Cess
(G) Sales Tax
(H) Total FOR Despatching station price, (E + F + G) above
(I) Road Transportation charges to Duliajan
(J) Insurance Charges @0.5% of Total FOR Despatching Station Value (H) above
(K) Assam Entry Tax
(L) Total FOR Duliajan value, (H + I + J + K) above
(M) Pre-shipment Inspection charges
(N) Training charges
(O) Installation & Commissioning charges
(P) Total Value, (L + M + N + O) above

NOTE: **Excise Duty in case of the indigenous bidder is EXEMPTED.**

6.3 **When both foreign and domestic bidders are involved :**

The Total Value of domestic bidder (inclusive of customs duty on imported raw material and components etc, and applicable terminal excise duty on the finished products and Sales Tax) excluding inland transportation to destination and Insurance charges worked out as per Para 6.2 above and Total Value of the foreign bidder worked out as per Para 6.1 above excluding inland transportation to destination will be compared. No price preference will be allowed to indigenous bidders except that for capital goods, the domestic manufacturers would be accorded a price preference to offset CST to the extent of 4 % or actuals, whichever is less subject to 30 % local content norms as stipulated for World Bank Funded project to the satisfaction of OIL. When more than one domestic bidders fall within price preference range, inter-se-ranking will be done on Grand Total Value basis.

Note: If the Government of India revises these evaluation criteria the same as applicable on the bid closing date will be adopted for evaluation of the offers.

7.0 Other terms and conditions of the tender shall be as per General Terms and Conditions for Global Tender. However, if any of the Clauses of the Bid Rejection Criteria / Bid Evaluation Criteria (BEC / BRC) mentioned here contradict the Clauses in the General Terms & Conditions of Global Tender of the tender and/or elsewhere, those mentioned in this BEC / BRC shall prevail.

Attachment – I

FORMAT OF AGREEMENT BETWEEN BIDDER AND THEIR PARENT COMPANY / *100% SUBSIDIARY COMPANY (As the case may be)*

(TO BE EXECUTED ON STAMP PAPER OF REQUISITE VALUE AND NOTORISED)

This agreement made this ___ day of ____ month ____ year by and between M/s. _____ (Fill in the Bidder's full name, constitution and registered office address) hereinafter referred to as bidder on the first part and M/s. _____ (Fill in full name, constitution and registered office address of Parent Company/Subsidiary Company, as the case may be) hereinafter referred to as "Parent Company/ Subsidiary Company (Delete whichever not applicable)" of the other part:

WHEREAS

M/s. Oil India Limited (hereinafter referred to as OIL) has invited offers vide their tender No. _____ for _____ and

M/s. _____(Bidder) intends to bid against the said tender and desires to have technical support of M/s. _____[Parent Company/ Subsidiary Company-(Delete whichever not applicable)] and whereas Parent Company/ Subsidiary Company (Delete whichever not applicable) represents that they have gone through and understood the requirements of subject tender and are capable and committed to provide the services as required by the bidder for successful execution of the contract, if awarded to the bidder.

Now, it is hereby agreed to by and between the parties as follows:

1. M/s._____(Bidder) will submit an offer to OIL for the full scope of work as envisaged in the tender document as a main bidder and liaise with OIL directly for any clarifications etc. in this context.

2. M/s. _____ (Parent Company/ Subsidiary Company (Delete whichever not applicable) undertakes to provide technical support and expertise, expert manpower and procurement assistance and project management to support the bidder to discharge its obligations as per the Scope of work of the tender / Contract for which offer has been made by the Parent Company/Subsidiary Company (Delete whichever not applicable) and accepted by the bidder.

3. This agreement will remain valid till validity of bidder's offer to OIL including extension if any and till satisfactory performance of the contract in the event the contract is awarded by OIL to the bidder.

4. It is further agreed that for the performance of work during contract period bidder and Parent Company/Subsidiary Company (Delete whichever not applicable) shall be jointly and severely responsible to OIL for satisfactory execution of the contract.

5. However, the bidder shall have the overall responsibility of satisfactory execution of the contract awarded by OIL.

In witness whereof the parties hereto have executed this agreement on the date mentioned above.

For and on behalf of	For and on behalf of
(Bidder)	(Parent Company/Subsidiary Company (Delete whichever not applicable)
M/s.	M/s.
Witness:	Witness:
1)	1)
2)	2)

&&&&&&&&&&&&&

Attachment – II

PARENT COMPANY/ SUBSIDIARY COMPANYGUARANTEE *(Delete whichever not applicable)*

(TO BE EXECUTED ON STAMP PAPER OF REQUISITE VALUE AND NOTORISED)

DEED OF GUARANTEE

THIS DEED OF GUARANTEE executed at ……. this …….. day of …….. by M/s …….. (mention complete name) a company duly organized and existing under the laws of …….. (insert jurisdiction/country), having its Registered Office at …….. hereinafter called "the Guarantor" which expression shall, unless excluded by or repugnant to the subject or context thereof, be deemed to include its successors and permitted assigns.

WHEREAS

M/s Oil India Limited, a company duly registered under the Companies Act 1956, having its Registered Office at Duliajan in the State of Assam, India, hereinafter called "OIL" which expression shall unless excluded by or repugnant to the context thereof, be deemed to include its successor and assigns, invited tender number …….. for …….. on ……..

M/s …….. (mention complete name), a company duly organized and existing under the laws of …….. (insert jurisdiction/country), having its Registered Office at …….. (give complete address) hereinafter called "the Company" which expression shall, unless excluded by or repugnant to the subject or context thereof, be deemed to include its successor and permitted assigns, have, in response to the above mentioned tender invited by OIL, submitted their bid number …….. to OIL with one of the condition that the Company shall arrange a guarantee from its parent company guaranteeing due and satisfactory performance of the work covered under the said tender including any change therein as may be deemed appropriate by OIL at any stage.

The Guarantor represents that they have gone through and understood the requirement of the above said tender and are capable of and committed to provide technical and such other supports as may be required by the Company for successful execution of the same.

The Company and the Guarantor have entered into an agreement dated …….. as per which the Guarantor shall be providing technical and such other supports as may be necessary for performance of the work relating to the said tender.

Accordingly, at the request of the Company and in consideration of and as a requirement for OIL to enter into agreement(s) with the Company, the Guarantor hereby agrees to give this guarantee and undertakes as follows:

1. The Guarantor (Parent Company / ***100% Subsidiary Company (Delete whichever not applicable***) unconditionally agrees that in case of non-performance by the Company of any of its obligations in any respect, the Guarantor shall, immediately on receipt of notice of demand by OIL, take up the job without any demur or objection, in continuation and without loss of time and without any cost to OIL and duly perform the obligations of the Company to the satisfaction of OIL.

2. The Guarantor agrees that the Guarantee herein contained shall remain valid and enforceable till the satisfactory execution and completion of the work (including discharge of the warranty obligations) awarded to the Company.

3. The Guarantor shall be jointly with the Company as also severally responsible for satisfactory performance of the contract entered between the Company and OIL.

4. The liability of the Guarantor, under the Guarantee, is limited to the 50% of the contract price entered between the Company and OIL. This will, however, be in addition to the forfeiture of the Performance Guarantee furnished by the Company.

5. The Guarantor represents that this Guarantee has been issued after due observance of the appropriate laws in force in India. The Guarantor hereby undertakes that the Guarantor shall obtain and maintain in full force and effect all the governmental and other approvals and consents that are necessary and do all other acts and things necessary or desirable in connection therewith or for the due performance of the Guarantor's obligations hereunder.

6. The Guarantor also agrees that this Guarantee shall be governed and construed in accordance with the laws in force in India and subject to the exclusive jurisdiction of the courts of ....., India.

7. The Guarantor hereby declares and represents that this Guarantee has been given without any undue influence or coercion, and that the Guarantor has fully understood the implications of the same.

8. The Guarantor represents and confirms that the Guarantor has the legal capacity, power and authority to issue this Guarantee and that giving of this Guarantee and the performance and observations of the obligations hereunder do not contravene any existing laws.

For & on behalf of (Parent Company/Subsidiary Company (Delete whichever not applicable))

M/s _____

Witness:

1. Signature _____
   Full Name _____
   Address _____

Signature _____
Name _____
Designation _____

Common seal of the
Company_____

Witness:

2. Signature _____
   Full Name _____
   Address _____

INSTRUCTIONS FOR FURNISHING PARENT/SUBSIDIARY COMPANY GUARANTEE

1. Guarantee should be executed on stamp paper of requisite value and notorised.
2. The official(s) executing the guarantee should affix full signature (s) on each page.
3. Resolution passed by Board of Directors of the guarantor company authorizing the signatory(ies) to execute the guarantee, duly certified by the Company Secretary should be furnished alongwith the Guarantee.
4. Following certificate issued by Company Secretary of the guarantor company should also be enclosed alongwith the Guarantee.

   "Obligation contained in the deed of guarantee No._____ furnished against tender No. _____ are enforceable against the guarantor company and the same do not, in any way, contravene any law of the country of which the guarantor company is the subject"

Price Break up

Details of Price Break up for each package (i.e. LP Booster & Gas Lift separately)

Sl.No.	Description	Quantity	Unit Rate	Cost
1	Gas Engine			
2	Gas Compressor			
3	Aerial Cooler			
4	Control Panel			
5	Field Instrumentations			
	i)Pressure Transmitter			
	ii)Pressure Switch			
	iii)Temperature Switch			
	iv)Vibration Switch			
	v)RTD			
	vi)Thermocouple			
	vii)Solenoid Valve			
	viii) Level Switch			
	ix) No Flow Switch			
	x) Level Controller			
	xi) Flow Meter			
	xii) Differential Pressure Switch			
	xiii) Battery Pack & UPS			
	xiv) Any other Instrument not indicated above (please specify)			
6	Special Tools & tackles			
7	Acoustic/ Pulsation Study Charges			
8	Any other item/charge not covered above			
			Total	

Note: Bidder to provide price break up as per the format above for each type of package i.e. Low Pressure Booster and Gas Lift Compressor.

COMMERCIAL CHECK LIST

THE CHECK LIST MUST BE COMPLETED AND SUBMITED WITH YOUR OFFER. PLEASE ENSURE THAT ALL THESE POINTS ARE COVERED IN YOUR OFFER. THESE WILL ENSURE THAT YOUR OFFER IS PROPERLY EVALUATED. PLEASE SELECT "Yes" OR "No" OR INDICATE TO THE FOLLOWING QUESTIONS, IN THE RIGHT HAND COLUMN.

Sl No.	REQUIREMENT	COMPLIANCE
1.0	Whether bid submitted under Single Stage Two Bid System?	Yes / No
2.0	Whether Integrity Pact with digital signature uploaded and all clauses have been accepted as per the format?	Yes / No
3.0	Whether ORIGINAL Bid Bond (not copy of Bid Bond) Sent separately? If Yes, provide details	
	(a) Amount :	
	(b) Name of issuing Bank :	
	(c) Validity of Bid Bond :	
3.1	Whether offered firm prices?	Yes / No
3.2	Whether quoted offer validity of 180 days from the date of closing of tender?	Yes / No
3.3	Whether quoted a firm delivery period?	Yes / No
3.4	Whether agreed to the tender Warranty clause?	Yes / No
3.5	Whether confirmed acceptance of tender Payment Terms ?	Yes / No
3.6	Whether confirmed to submit PBG as asked for in tender?	Yes / No
3.61	Whether agreed to submit PBG within 30 days of placement of order?	Yes / No
3.70	Whether Prices submitted as per Price format ?	Yes / No
3.71	Whether confirmed that all spares will be supplied for a minimum period of 15 years after supply ?	Yes / No
3.72	Whether cost of two years recommended Spares quoted?	Yes / No
3.8	Whether quoted as per tender (without any deviations)?	Yes / No
3.81	Whether quoted any deviation?	Yes / No
3.82	Whether deviation separately highlighted?	Yes / No

3.9	Whether indicated the country of origin for the items quoted?	Yes / No
3.91	Whether technical literature / catalogue enclosed?	Yes / No
3.92	Whether weight & volume of items offered indicated?	Yes / No
4.0	For Foreign Bidders - Whether offered FOB / FCA port of despatch including sea / air worthy packing & forwarding?	Yes / No
4.1	For Foreign Bidders – Whether port of shipment indicated. To specify:	Yes / No
4.2	For Foreign Bidders only - Whether indicated ocean freight up to Kolkata port (Excluding marine insurance) ?	Yes / No
4.3	Whether Indian Agent applicable ?	Yes / No
	If YES, whether following details of Indian Agent provided?	
	(a) Name & address of the agent in India – To indicate	
	(b) Amount of agency commission – To indicate	
	(c) Whether agency commission included in quoted material value?	
5.0	For Indian Bidders – Whether indicated the place from where the goods will be dispatched. To specify :	Yes / No
5.1	For Indian Bidders – Whether road transportation charges up to Duliajan quoted?	Yes / No
5.2	For Indian Bidders only - Whether offered Ex-works price including packing/forwarding charges?	Yes / No
5.3	For Indian Bidders only - Whether indicated import content in the offer?	Yes / No
5.4	For Indian Bidders only - Whether offered Deemed Export prices?	Yes / No
5.5	For Indian Bidders only – Whether all applicable Taxes & Duties have been quoted?	Yes / No
6.0	Whether all BRC/BEC clauses accepted ?	Yes / No
7.0	Whether confirmed to offer the equipment for Pre-despatch/shipment Inspection & testing?	Yes / No
7.1	Whether Pre-despatch/shipment inspection & testing charges applicable?	Yes / No
7.2	If Pre-despatch/shipment inspection & testing charges applicable, whether quoted separately on lumpsum basis?	Yes / No
7.3.	Whether confirmed to carry out Installation & Commissioning of the equipment at Duliajan (Assam) ?	Yes / No
7.4	Whether Installation & Commissioning charge applicable?	Yes / No
7.5	If Installation/ Commissioning and Training charges applicable, whether separately quoted on lumpsum basis?	Yes / No
7.6	Whether to & fro air fares, boarding/lodging of the commissioning personnel at Duliajan , Assam(India) included in the quoted charges ?	Yes / No
7.7	Whether confirmed that all Service, Income, Corporate tax etc. applicable under Installation/	Yes / No

	Commissioning are included in the prices quoted ?	
8.0	Whether prices of DGMS approved items quoted separately ?	Yes/No

Offer reference	
Name of the Bidder	