



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT/ MATERIALS MANAGEMENT

ENQUIRY

NOTICE INVITING TENDER

Phone: +91 431 257 76 53

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Email : skaruna@bheltry.co.in

Web : www.bhel.com

TWO PART BID

Tender to be submitted in two parts.

Enquiry
Number:

2621100175

Enquiry
Date:

12.11.2011

Due date for submission
of quotation:

12.12.2011

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both **delayed offer and **late offers** will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.**

| Item | Description | Quantity | Delivery (Item required at BHEL on) |
|------|--|---------------|---|
| 10 | 2 x 40 MT LPG Mounted Bullet as per the technical specification, general guidelines instructions & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in) | 01 Set | 31.05.2012 |

Important points to be taken care during submission of offer

1. Checklist to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
2. Subsequent to the hosting of this Enquiry, any corrigendum to the Enquiry that may be hosted in the BHEL Web-site as well as Government Tenders-portal shall be viewed by the vendors regularly to know the details of corrigendum. In case if any vendor without seeing the corrigendum quoted as per original Enquiry and intimate that they have wrongly quoted will not be considered and rejected. However as per the appropriate Policy of BHEL action will be taken on them in this regard.

BHEL's General guidelines / instructions (refer MM/CE/GT/001) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry referred above.

Tenders should reach us before 14:00 hours on the due date
Tenders will be opened at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present

Yours faithfully,
For BHARAT HEAVY ELECTRICALS LIMITED

Manager / MM / Capital Equipment

PART A

| QUALIFYING CRITERIA FOR THE SUPPLY, ERECTION & COMMISSIONING OF 2 X 40 MT MOUNDED TYPE LPG/PROPANE STORAGE FACILITY | | |
|--|---|-------------------|
| <u>SECTION - 1</u> | | |
| <u>Company Profile:</u> The Bidder has to provide the details pertaining to each clause in the table given below and wherever necessary additional sheets may be attached (giving clear reference number) to understand the profile of the BIDDER's COMPANY. | | |
| S.No | BHEL PARTICULARS | BIDDER's RESPONSE |
| 1.00 | Number of Years of Experience of the BIDDER in the field of Supply and Installation & Commissioning of the following, as per the extant Statutory Regulations and CCOE norms : a. LPG/PROPANE Storage Vessels - Mounded Type b. Associated Liquid/Vapour Unloading System from Supply Tanker c. Vapourising System | |
| 2.00 | Details on the Sub-Vendor(s) - if any, from whom the storage vessel, equipment and accessories for the above, are sourced - to include the following : a. Name of the Sub-Vendor(s) with contact address. b. List of Manufacturing Facilities of Sub-vendor(s) capable of producing the above listed equipment c. Quality Plan for Manufacture of the above equipments and accessories d. Copy of the CCOE Approval and License for Design and Manufacture [NOTE : BHEL might visit the works of the sub-vendors for assessment of their design capabilities and production facilities.] | |
| 3.00 | Details on SERVICE-AFTER-SALES Set-up with competent service engineers for the BIDDER, including the Addresses of Agents/Service Centers in the local regions to be furnished. | |

PART A

SECTION - II

Qualifying Criteria

The Bidder has to compulsorily meet the following requirements to get qualified for submitting an offer for the Supply, Installation and Commissioning of LPG/PROPANE Mounded Storage & Pressure Regulation System at BHEL Thirumayam Works : (Additional Sheets shall be attached with the OFFER, to provide requisite details) Otherwise the offer is liable for rejection.

| S.No | BHEL PARTICULARS | BIDDER's RESPONSE |
|-------------|--|--------------------------|
| 4.00 | The BIDDER shall be a CCOE approved INSTALLER for the Scope of Supply and Work including Installation & Commissioning of LPG/PROPANE Mounded Storage Vessel and the Associated Pressure Regulation System. The BIDDER shall have a minimum of THREE YEARS of continuous experience in this filed of activity. | |
| 5.00 | The BIDDER should have carried out the work of supply, erection & commissioning of minimum FIVE Numbers of LPG/PROPANE Storage Vessel with Associated Gas Handling Systems , with a storage capacity of 40 Tons and above. | |
| 6.00 | The BIDDER should have carried out the work of supply, erection & commissioning of minimum THREE number of Mounded Bullet type arrangement with Evaporators and Associated Accessories (including Safely Devices) of Capacity 30 Tons and above. | |
| 7.00 | The BIDDER shall furnish reference list of customers (with complete contact details - for a cross reference by BHEL) who are the end users of the LPG/PROPANE Storage Systems listed under Clause No. 5.0 and 6.0. | |
| 8.00 | The BIDDER shall submit the Performance Certificate in the enclosed FORMAT (for a period not less than one year from the date of commissioning), from minimum TWO CUSTOMERS in their Letter Head stating the satisfactory execution of the contract (pertaining to installation of LPG/PROPANE Mounded Bullets - as per Clause No.6.0) and further prompt service support. | |

PART A

| S.No | BHEL PARTICULARS | BIDDER's RESPONSE |
|-------|--|-------------------|
| 9.00 | The sub-vendor(s) from whom the LPG/PROPANE Bullets, Liquid/Gas Handling Systems, Pressure Regulators, Vapourisers, Safety Devices & Fire Fighting Equipment, etc. are sourced shall have the approval of CCOE and relevant accreditation to undertake the fabrication works as per SMPV Rules - 1981(unfired). Copy of these licenses shall be enclosed with the technical bid. | |
| 10.00 | The BIDDER shall submit the copies of Balance Sheet for the last five financial years with IT Returns and SOLVENCY Certificate from competent authorities. | |

SECTION - III**BID / OFFER FORMATS:**

The BIDDER has to comply with the following, for accepting the Technical Offer for scrutiny by the Purchaser:

| S.No | BHEL PARTICULARS | BIDDER's RESPONSE |
|-------|--|-------------------|
| 11.00 | The BIDDER shall SUBMIT the offer in TWO PARTS - one part containing the Technical (including PART A & PART B portions of the Technical Specifications) & Commercial Terms with Scope of Supply & Installation Work and the second part containing the Price Bid pertaining to the Scope of Supply & Installation Work. | |
| 12.00 | The OFFER Shall contain a comparative statement of Technical Specifications given by BHEL and the offer Details submitted by the Bidder, against each Clause. A just 'YES' or 'CONFIRMED' or 'NO-DEVIATION' or 'ACCEPTED' or similar words in the technical comparative statement may lead to disqualification of the Technical offer. | |
| 13.00 | The Technical offer shall be supported by product Catalogue and Data Sheets In ORIGINAL and complete technical details of 'Bought-out-Items' with copies of Product Catalogue (if applicable) | |

PART A

| S.No | BHEL PARTICULARS | BIDDER's RESPONSE |
|-------------|---|--------------------------|
| 14.00 | The Commercial Offer shall contain the Scope of supply and the Un-Priced Part of the Price - bid, for confirmation of the inclusion of all the accessories, auxiliary parts, safety devices, spares consumables, etc with the main vessel/equipment, to meet the technical specification requirements. | |
| 15.00 | The expected delivery period (including the time for Pre-Dispatch Inspection clearance by BHEL) for the LPG/PROPANE Storage Vessels and Evaporators with Associated Accessories & Safety Devices, is not more than FOUR Months (which includes time for General Arrangement Drawing approval by BHEL also) from the date of issue of BHEL purchase order. The erection & commissioning, including clearance from the local authorities and statutory agencies, shall be complete in a period of Two Months, after the receipt of equipment at site. | |
| 16.00 | BHEL reserves the right to have stage inspection of pressure vessels and other equipment (falling under the scope of supply) during manufacture at the vendors' works. | |
| 17.00 | BHEL reserves the right to verify the information provided by vendor, and In case, it is found to be false/incorrect, the offer shall get rejected. | |

PART - B

| TECHNICAL SPECIFICATIONS FOR DESIGN, FABRICATION, SUPPLY, ERECTION, COMMISSIONING OF 2 X 40 MT PROPANE/LPG MOUNDED STORAGE & SUPPLY FACILITY AT BHEL THIRUMAYAM WORKS | | | |
|--|---|--|--|
| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
| 1 | NAME OF WORK | DESIGN , FABRICATION , SUPPLY , ERECTION & COMMISSIONING OF 2 X 40 MT CAPACITY MOUNDED TYPE BULLETS , VAPOURIZER, UNLOADING FACILITIES , SAFETY AND FIRE FIGHTING SYSTEM , EMERGENCY SHUTDOWN SYSTEM , etc., MEETING MANDATORY REQUIREMENTS, suitable for STORAGE and DISTRIBUTION of PROPANE or LPG . [BHEL will use the facility either for PROPANE Gas or LPG Gas based on the gas availability) . ALL PARTS and SUPPLIES SHALL BE CONFORMING TO THE STANDARDS MENTIONED AS PER STATUTORY AUTHORITIES AGAINST EACH ITEM. | |
| 2 | BRIEF DESCRIPTION OF WORK | M/s. BHEL proposes to set up 2 x 40 MT capacity Propane / LPG storage yard in the premises of BHEL , at THIRUMAYAM to meet the day to day Propane/LPG requirement at a pressure of maximum 1.5 kg/sq.cm at user point through pipelines with pressure regulation valve for a capacity of nearly 50 to 1200 kgs. per hour with 4 x 500 kgs./hr. of vaporizer, 2 x 6000 kgs./hr. unloading compressor/pump with required piping, valves, fittings, gauges, vents, drains and other accessories as per the rules & regulations stipulated by statutory authorities and further for the operational and maintenance convenience. | |
| 3 | PROJECT LOCATION | BHEL / THIRUMAYAM in PUDUKOTTAI DISTRICT of TAMIL NADU STATE | |
| 4 | PROPANE/LPG MOUNDED STORAGE TANK | | |
| 4.1 | Storage Capacity / Tank Capacity | 2 x 40 MT | |
| 4.2 | Service | PROPANE/LPG (Design, Construction & Commissioning shall be suitable for PROPANE as well as LPG) | |
| 4.3 | Water Capacity of Tank | Around 90 Cubic Metres | |
| 4.4 | Design Code | SMVP (U) Rules 1981/PD 5500 (Latest Edition) and OISD 150 | |
| 4.5 | Working Temperature | Ambient | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|---------------|---|---|--|
| 4.6 | Design Pressure | Bidder to Specify the Design Pressure taken for the Propane Gas as per the Design Codes adopted. | |
| 4.7 | Design Temperature | (minus) 42 DEG. C to (plus) 55 DEG. C | |
| 4.8 | Hydro Test Pressure | Bidder to Specify the Hydro Test Pressure taking into consideration the basic design is for the Propane Gas | |
| 4.9 | Manhole with cover on Shell | As per the Standards/Codes (not less than 600 mm) | |
| 4.10 | Corrosion Allowance | 1.5 mm | |
| 4.11 | Radiography | 100 % to be done | |
| 4.12 | Heat Treatment | Complete Vessel Stress Relieving to be carried out | |
| 4.13 | Joint Efficiency | One | |
| 4.14 | Inspection Agencies | List of CCOE Approved Third Party Inspection Agencies, proposed to be engaged by the BIDDER, has to be listed with license details. | |
| 5.0 | MOUNTINGS/ATTACHMENTS FITTED ONTO THE BULLETS - as per Schedule 80 [BHEL Desirable Details are given below, BIDDERS to give reasons for a better choice] | | |
| 5.1 | MANHOLE | 2 X 600 mm , # 300 Rating | |
| 5.2 | Ladder Inside Vessel | Bidder to give details / Ergonomic & Safety Factors to be taken into consideration in the design | |
| 5.3 | LIQUID INLET | 2" - 1 No, ANSI B 16.5 @ 300 psi rating | |
| 5.4 | LIQUID OUTLET | 2" - 1 No, ANSI B 16.5 @ 300 psi rating | |
| 5.5 | VAPOUR OUTLET | 2" - 1 No, ANSI B 16.5 @ 300 psi rating | |
| 5.6 | VAPOUR BALANCING | 1.5" - 1 No, ANSI B 16.5 @ 300 psi rating | |
| 5.7 | PRESSURE GAUGE | 3/4 " - 2 Nos., ANSI B 16.5 @ 300 psi rating | |
| 5.8 | TEMPERATURE GAUGE | 3/4 " - 2 Nos., ANSI B 16.5 @ 300 psi rating | |
| 5.9 | SAFETY RELIEF VALVE | 2" - 3 Nos., ANSI B 16.5 @ 300 psi rating | |
| 5.10 | DRAIN | 1" - 1 No, ANSI B 16.5 @ 300 psi rating | |
| 5.11 | LOW LEVEL GAUGE | 65 NB - 2 Nos., ANSI B 16.5 @ 300 psi rating | |
| 5.12 | HIGH LEVEL GAUGE | 100 NB - 2 Nos., ANSI B 16.5 @ 300 psi rating | |
| 6.0 | MATERIALS of CONSTRUCTION for PROPANE BULLET | | |
| 6.1 | Shell for the Bullet | SA 537 CL - 1 | |
| 6.2 | Dished Ends / Pad | SA 537 CL - 1 | |
| 6.3 | Flanges / Couplings | SA 350 LF-2 | |
| 6.4 | Pipes attached to Bullet | SA 106 Gr B - SCH 80 | |
| 6.5 | Studs & Nuts | SA 193 Gr B7/SA194 Gr 2H | |
| 6.6 | Gaskets | SS Spiral Wound | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|--|---|---|
| 6.7 | Pipes Lines for Liquid & Vapour Transfer inside the Fenced Area | SA 106 GR B - SCH 80 | |
| 6.8 | Couplings (if any) inside Fenced Area | SA 350 LF-2 | |
| 7.0 | DIMENSIONS OF MOUNDED BULLET FOR PROPANE GAS [Bidder is expected to submit basic design calculations with the Technical Offer] | | |
| 7.1 | Shell Thickness | Bidder to Specify | |
| 7.2 | Dish Thickness | Bidder to Specify | |
| 7.3 | shell Diameter | Bidder to Specify [BHEL prefers a dimension of 3200 mm] | |
| 7.4 | Overall Length | Bidder to Specify [BHEL prefers a dimension of 13000 mm] | |
| 7.5 | Manhole Size | 600 mm | |
| 8 | VAPOURISER | | |
| 8.0 | Code of Manufacture | ASME Section- VIII ,Div-1 for Coil | |
| 8.1 | Total Quantity | 4 Nos | |
| 8.2 | Capacity for One Vapouriser | 500 kgs./hr. | |
| 8.3 | Type | INDIRECT ELECTRICALLY HEATED WATER BATH VAPOURISER | |
| 8.4 | Operating Pressure | Vessel @ Atmospheric : Coil @ 7.00 kgf./sq. cm. | |
| 8.5 | Design Pressure | Vessel @ Atmospheric : Coil @ 22.00 kgf./sq. cm. | |
| 8.6 | Test Pressure | Coil @ 27.5 kgf./sq. cm. | |
| 8.7 | Design Temperature | Vessel and Coil for 100 Deg C | |
| 8.8 | Operating Temperature | Vessel and coil for 30 to 80 Deg C | |
| 8.9 | Heater Capacity Rating | Bidder to Specify [not less than 72 kW] | |
| 8.10 | Operation Mode | The complete system shall be fully automatic | |
| 8.11 | Quality of Propane/LPG Vapour | Various interlocks to be provided so that the LPG Vapour is produced to meet the demand and no liquid should flow downstream of the Vapouriser. | |
| 8.12 | Safety System | All required control and safety systems are to be elaborated and all electrical components and control panels shall be flameproof, certified by CMRS/Dhanbad and approved by CCOE/Nagpur. | |
| 8.13 | Operating Pressure at User Point | 0.04 to 1.5 kg/cm ² | |
| 8.14 | Inlet / Outlet Pipe Size | Inlet: 40mm NB Outlet: 50mm NB | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|--|---|---|
| 8.15 | CCOE Approval | Bidder to produce the Copy of CCOE Approval Certificate from the Sub-vendor, from whom the Vapouriser will be sourced to be enclosed along with the offer. | |
| 8.16 | Vapouriser Attachments & Instruments [Reputed Make only] | Bidder to list down the Specification/Rating and Make of all types of Valves viz., Solenoid Valves, Pressure Control Valve, Pressure Relief Valve, Safety Valves; Gas Filter Assembly, Flow meters, etc. forming part of the Total Vapouriser System. | |
| 8.17 | MATERIALS of CONSTRUCTION for VAPOURISER | | |
| 8.17.1 | Cylindrical Tank | IS 2062 | |
| 8.17.2 | Coil | SA 312 Type SS 304 | |
| 8.17.3 | Flanges | SA 105 / ANSI B 16.5 / CLASS #300 | |
| 8.17.4 | Dish Ends | Bidder to Specify | |
| 8.17.5 | Water Bath | IS 226 | |
| 8.17.6 | Heaters | Ni. Cr. | |
| 8.17.7 | Piping | SA 312 Type SS 304 | |
| 9.0 | PROPANE/LPG UNLOADING PUMP / RECOVERY COMPRESSOR [skid mounted] | | |
| 9.1 | Quantity | 2 Nos. [1 Working + 1 Standby] | |
| 9.2 | Capacity | 200 lpm | |
| 9.3 | Type | Non lubricating | |
| 9.4 | Make & Model No. | Corken & Model 291 <i>or</i> BLACKMER USA-MODEL LB 161-LU | |
| 9.5 | Discharge Pressure | Around 24 kgf/sq.cm. (maximum) | |
| 9.6 | Accessories | Bidder to list down (with ratings/specifications) the accessories provided, consisting of Knock-out Drum, Pressure Gauges, Temperature Gauges, Ball Valves, Needle Valve, POP Action Valve, 4 Way Valve, Base Plate for Compressor & Motor, etc. | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|---------------------------|---|---|
| 9.7 | Motor Details | Type : Flame-proof, Weather-proof, TEFC Squirrel Cage, Induction Motor IS Standard : IS 2148/1969 (suitable for Gas Group II A & B) Motor Rating : 10 HP (minimum) Motor Speed : 1440 rpm Construction : Mounting Horizontal, Roof-mounted Insulation : "B" Class Duty : Continuous Duty Protection : IP 55 Starter : DOL FLP Push Button : Flame-proof, ON/OFF Make : Crompton/Siemens/ABB/Kirloskar | |
| 10.0 | DECANTING PUMP | | |
| 10.1 | Make & Model No. | Make : Corken USA/BLACKMER USA Type : Positive Displacement Vane Type Model : Z 2000/ LGL D2E Capacity : 12 cubic metre/hr. Pump Speed : 600 rpm Head : 120 psi Suction/Delivery Sizes : 50 x 50 NB Quantity : 2 Nos. (1 Working + 1 Standby) | |
| 10.2 | MATERIALS of CONSTRUCTION | Bidder to specify materials for Case, Heads, Rotor, Cam For other to follow the below given directions : Side Plate : A 536 Ductile Iron Bearing Cap : Gray Iron Seal Rotor : Carbon Shaft : Steel Vanes : Plastic Relief Valves : Steel Bearing : Cylindrical Roller Seals : Mechanical | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|--|--|---|
| 10.3 | MOTOR | Type : Flame-proof, Weather-proof, TEFC Squirrel Cage, Induction Motor IS Standard : IS 2148/1969 (suitable for Gas Group II A & B) Motor Rating : 7.5 HP (minimum) Motor Speed : 1440 rpm Construction : Mounting Horizontal, Roof-mounted Insulation : "B" Class Duty : Continuous Duty | |
| 10.4 | ACCESSORIES | Bidder to list down (with ratings/specifications) the accessories provided, consisting of Pressure Gauges, Ball Valves, Needle Valve, By-Pass Valve, Strainer 'Y' Type, Liquid Flow-meter, Non-Return Valve, etc. | |
| 11.0 | SAFETY FITTINGS / VALVES for PROPANE - LPG BULLETS / PIPELINE | | |
| 11.1 | Supply Scope | Valves like Safety Relief Valve on Bullet, Excess Flow Check Valves for Liquid and Vapour, Vapour Balance, Drain and Pressure Gauge etc., Pressure Gauge with Isolation Valve, Temperature Gauge with Thermocouple, Pop Action Valves, Fixed Level Gauges, Remote Operated Valves (ROV's) and other valves required to meet the CCOE approval, to be listed with Specifications and Make for each type of Valve proposed. [The following clauses give the minimum number in each type, to be deployed] | |
| 11.2 | Safety Relief Valves | Size : 2" ; 3 Numbers for Each Bullet ; Bidder to give details | |
| 11.3 | Excess Flow Check Valve for Liquid Inlet, Outlet, Vapour Outlet. | Size : 2" ; 3 Numbers for Each Bullet ; Bidder to give details | |
| 11.4 | Excess Flow Check Valve for Vapour Balance. | Size : 2" ; 1 Number for Each Bullet ; Bidder to give details | |
| 11.5 | Excess Flow Check Valve for Drain | Size : 1" ; 1 Number for Each Bullet ; Bidder to give details | |
| 11.6 | Excess Flow Check Valve for Pressure Gauge | Size : 3/4" ; 1 Number for Each Bullet ; Bidder to give details | |
| 11.7 | Pressure Gauge with Isolation Valve | Size : 1/2" ; 2 Numbers for Each Bullet ; Bidder to give details | |
| 11.8 | Temperature Gauge with Thermocouple | Size : 3/4" ; 2 Numbers for Each Bullet ; Bidder to give details | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|---------------|------------------------------------|--|--|
| 11.9 | Pop Action Valve | Size : 1/4" ; 4 Numbers between Flanges | |
| 11.10 | Level Gauges | One number for each type of level gauge like Fixed Level Gauge/Rochester Gauge, Simple Magnetic Level Gauge (for low and high levels) to be provided . Bidder to give technical details viz., number of gauges deployed, gauge specification, make and material of construction, etc. | |
| 11.11 | Remote Operated Valves (ROV) | a. In addition to one number for each bullet, one number each at the vapour inlet and one number at the liquid inlet (forming part of the Propane/LPG storage yard pipeline network) are to be provided. b. Spring return type pneumatic operated valve of make Audco / Microfinish / Flowjet / Hawa / Fouress to be provided. c. The ROVs have to operate on compressed air supplied at a pressure of 4.5 bar . d. Bidder to give specification, quantity in each type, make, and material of construction . | |
| 11.12 | Type of Alarms | Suitable Alarms for High & Low Levels and High Pressure Alarms are to be compulsorily provided. Bidder to give specification, quantity in each type, make, and material of construction, etc. | |
| 11.13 | Gas Leak Detecting Sensors/Systems | Suitable Gas Leak Detectors are to be deployed in the station in sufficient numbers with a minimum of TWO numbers at the Vapouriser Unit, TWO numbers at the Gas/Liquid Unloading Pump & Compressor Units, TWO numbers in each Bullet where ROVs installed, ONE number at the Fill Point and ONE number at PRS (Pressure Regulating System). The BHEL preferred makes are COSMOS or RESPRO or HONEYWELL or LESLIE DRAEGER Bidder to give technical details viz., number of detectors deployed, technical specification, make and supply source, etc. are to be provided. | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|---|--|---|
| 11.14 | Cathodic Protection | <p>a. The Bullets shall be provided with the Impressed current type cathodic protection, in addition to the standard surface coating.</p> <p>b. The sacrificial anode shall be of either Zinc or Magnesium</p> <p>c. The life of the sacrificial anode shall be a minimum of 25 years.</p> <p>d. A facility shall be provided to check the potential of the anode and the consumption of the anode</p> | |
| 11.15 | Additional Attachments | Bidder has to specify the details of any other additional attachments like Instruments, Valves, Gauges, etc. used (which are not listed in the above clauses) in the total station - required to meet the Rules/Regulations/Stipulations laid out by the Statutory Bodies like CCOE and Local Government Authorities. | |
| 12.0 | PIPELINE INSIDE PROPANE / LPG YARD | | |
| 12.1 | Material of Pipe | All the pipe-line material shall be of ASTM A 106 Gr.B and of Seamless Pipe for Liquid Line / Vapour line | |
| 12.2 | Pipe-line Sizes | Bidder to give details viz., pipe-line lay-out diagram, material specification, approximate length of pipelines involved, make and supply source, etc. in addition to the pipe sizes and wall thickness. | |
| 13.0 | STRUCTURAL WORKS | | |
| 13.1 | Structural Materials | <p>The required quantity of structural steels of industry standards , comprising of Angles, Channels, I-Beams, Plates, Sheets, Fasteners (like Bolts & Nuts, Hooks, Washers), Roof Sheets, etc. including Painting / Protective Coating Materials, are to be arranged by the Bidder/Vendor and the scope of supply includes the fabrication also.</p> <p>The structures have to cover the essential installations and boundary lines also, as per the standards taking into consideration the local area requirements.</p> <p>Bidder is expected to give lay-out drawings for these structures and other peripherals with Bill of Materials.</p> | |
| 13.2 | Bulk Head Cover | Bidder has to furnish construction details, considering the impact due to the movement of gas filled tankers | |
| 13.3 | Crash Post Guards | Bidder to provide details of the structure, to protect the unloading area from accidental damages by Gas Tankers . | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|-------------|------------------------------------|--|---|
| 14.0 | PRESSURE REGULATING STATION | | |
| 14.1 | Pressure Regulating Valve | A minimum of TWO numbers of size 3 " | |
| 14.2 | Make | Kromshroder / Invensys / Honeywell / Sensus make only | |
| 14.3 | Inlet Pressure | 0 to 17 kg/sq.cm. | |
| 14.4 | Outlet Pressure | 0 to 4 kg/sq.cm | |
| 14.5 | Flow Rate | 0 to 1500 kg/hr., Quantity : 2 (1 Working and 1 Stand-by) | |
| 15.0 | Flow Meters | | |
| 15.1 | Quantity | 2 Numbers | |
| 15.2 | Capacity per Flow-Meter | 1000 kg/hr. | |
| 15.3 | Function of Flow-Meter | To measure & indicate flow in cubic metres/hr. and kg/hr. and also with the totaliser measurement | |
| 15.4 | Make | Kromshroder / Invensys / Honeywell / Asco / Endress & Houser / Emerson make only. | |
| 16.0 | FILTERS | | |
| 16.1 | Type & Rating | Bidder to specify the type (Coaleser/sludge separator type) and capacity of the FILTERS proposed with the number of units. | |
| 16.2 | Make | Kromshroder / Honeywell / Asco / Madas /OGPE only | |
| 16.3 | End connection | End Connection FE 300#. | |
| 17.0 | EMERGENCY SHUT OFF VALVE | | |
| 17.1 | Type & Specification | Bidder to specify the type & specification of the EMERGENCY SLAM SHUT-OFF VALVE proposed with the number of units. | |
| 17.2 | Make | Kromshroder / Invensys /Honeywell /Vanaz /Nirmal /Fischer | |
| 17.3 | End connection | FE 300# | |
| 18.0 | DECANTING HOSES | | |
| 18.1 | Hoses with Fittings | Smart hose with excess flow check valve . Hose 2" X 4 mtr long- 2 nos, ends should be flanged connection. | Both |
| 18.2 | Make | Markwell or Gates and smart only | |
| 18.3 | Design Standard | BS-4089-1981 TYPE – 1 /IS 9573/1980 | |
| 18.4 | Working Pressure | 355 psi (g) | |
| 18.5 | Burst Pressure | 1200 psi (g) | |
| 18.6 | End Fittings | 300 Class (Flanged type) | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|---------------------------------|--|---|
| 19.0 | PIPING FITTINGS | Bidder to list down the Fittings proposed to be used in the Pipe Lines like SORF Flanges [ANSI B16.5 CLASS 300 & CLASS#150 - Forged], Bends, Tees, Reducers [Seamless & Sch 80], CAF Gaskets of various sizes, Nuts & Bolts, etc., with quantity and makes | |
| 20.0 | PRESSURE GAUGES | Various pressure gauges required including sizes & pressure range to be mentioned by the Bidder | |
| 20.1 | Type & Rating | Bidder to specify the type & specification of the Pressure Gauges (of various sizes and ranges) proposed with the number of units. | |
| 20.2 | Make | Wika/H Guru/Liebig/Honeywell only | |
| 21.0 | EARTHING STRIPS | Bidder to furnish details on the type and number of earthing strips proposed for the Bullets , Unloading Pump, Vapouriser, Compressor and Copper Jumpers for all Flanges , etc., to meet the stipulations of CCOE and rules/regulations of statutory bodies. | |
| 22.0 | INSTRUMENT CONTROL PANEL | | |
| 22.1 | Type | Weather Proof and Flame Proof | |
| 22.2 | Make | L&T, Siemens or Equivalent acceptable to BHEL | |
| 22.3 | Contactors | L& T/ Siemens | |
| 22.4 | Cables | All cables connecting Control Panel and Instruments / Equipment installed in the PROPANE/LPG Yard shall be of Copper and provided with armoured & fire retardant protection. | |
| 22.5 | Approvals | CMRI | |
| 22.6 | Location | Outside LPG Yard | |
| 22.7 | Function | <ul style="list-style-type: none"> a. To house the instruments required for the DOL Starters for Pump and Compressor, High Level Tripping of Motors, High Temperature Indicators for Automatic Operation of Water Sprinklers, Overload Relays, Remote Operated Valves, Flow Controls, Emergency Hooters, etc. b. An altogether Separate Panel for housing the Leak Detection System with Low Level /Medium Level / High Level Indicators. c. The Control panel shall also consist of the outgoing distribution feeders with separate On/Off switch for the critical instruments and lockey water pump | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|-------------------------------|---|---|
| 22.8 | UPS | <p>a. The scope of supply shall include an UPS of suitable capacity with a Battery Back-up of 30 minutes (min.) at full load, for the uninterrupted power requirements of the Instruments, ROV and Jockey Pump.</p> <p>b. The UPS shall provide 230V ± 10%, 50 Hz ± 3 AC Supply to all field instruments.</p> <p>c. Supply Scope includes providing the necessary battery bank, control panel having rectifiers, inverters & all other accessories.</p> | |
| 23.0 | FIRE MANAGEMENT SYSTEM | | |
| 23.1 | FIRE WATER STORAGE FACILITY | <p>BHEL will supply required water (optimum quantity) at one location which will be next to the fire fighting pump room with POSITIVE SUCTION.</p> <p>Bidder shall supply and install one number of Diesel Engine driven with pump, one Electric driven motor with pump and one Jockey Pump with motor complete piping and hardware including valves, strainers, etc.</p> <p>Bidder to indicate the total requirement of water per hour with detailed calculation for various needs to be submitted along with offer.</p> | |
| 23.2 | FIRE FIGHTING SYSTEM | <p>Bidder to furnish complete details on the type & number of Fire Extinguisher (with DCP and metal cap as per IS2191), Fire Buckets, etc. proposed for the station.</p> <p>The makes and sizes shall conform to CCOE approval / certification patterns.</p> | |
| 23.3 | SPRINKLER SYSTEM | <p>Bidder has to include in the scope of supply a suitable sprinkler system covering vapouriser shed, pump and compressor shed, Bullet SRV's, tanker unloading platform, with adequate number of spray nozzles including pressure regulating station. (covering the tanker tyres also).</p> <p>Bidder to furnish complete details on the scope of supply.</p> | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|---|---|---|
| 23.4 | Fire Hydrant System & Fire Monitoring System | Design : to be in line with CCOE Norms and details to be furnished by the Bidder. Quantity : to meet the requirements and the details to be provided by the Bidder. Monitors : two numbers to fit at diagonal corners Hydrant : two numbers of Hydrants, Hydrant Hoses, Hose Nozzles, etc. are to be part of the supply. Make : Allied or Bombay Fire Stop or Any Reputed Make acceptable to BHEL. | |
| 23.5 | FIRE WATER PUMPS | Bidder to include in the scope of supply the complete automation and the fire fighting pumps along with dedicated fire fighting panel. The first fill of Lubricant, Diesel, etc. shall be by the Bidder | |
| 23.6 | DIESEL ENGINE DRIVEN WATER SUPPLY PUMP [as per OISD 150 Norms] | Service : Hydrant & Sprinkler Water Supply Liquid : Water Capacity : To be specified by the Bidder Head available : Tank height 30 metres Diesel Engine : Details to be provided by the Bidder Engine Make : Kirloskar / Reputed Make for BHEL Motor (HP) : To be specified by the Bidder Speed : To be specified by the Bidder Cooling : Air Cooled Pump Make : Mather & Platt/KSB/Sulzer/BE Pumps Pump Model : To be specified by the Bidder Suction/Delivery : To be specified by the Bidder Type : Centrifugal Pump Body : Casing Cast Iron Impeller Material : Bronze Shaft Material : EN-8 Accessories : MS Fabricated base plate with coupling and coupling guard Fuel Tank : Capacity to be specified by the Bidder Battery Starter : Details to be specified by the Bidder | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|---|--|---|
| 23.7 | ELECTRICALLY OPERATED WATER SUPPLY PUMP | Service : Hydrant & Sprinkler Water supply Liquid : Water Capacity : To be specified by the Bidder Head available : Tank height 30 metres Motor (HP) : To be specified by the Bidder Make of Motor : Crompton / Bharat Bijlee / Siemens / Kirloskar / ABB Make of Pump : Mather & Platt / KSB / Sulzer/ Kirloskar / BE Pumps Pump Model : To be specified by the Bidder Suction/Delivery : To be specified by the Bidder Type : Centrifugal Pump Speed : To be specified by the Bidder Pump Body : Casing Cast Iron Impeller Material : Bronze Shaft Material : EN-8 Accessories : MS Fabricated base plate with coupling and coupling guard Electric Starter : Details to be specified by the Bidder | |
| 23.8 | JOCKEY PUMP [as per OISD 150 Norms] | Service : Hydrant & Sprinkler Water Supply Liquid : Water Capacity : To be specified by the Bidder Head : Minimum 70 Mtrs. Motor : Motor shall be Energy Efficient /EFF1 Motor HP : To be specified by the Bidder Make of Motor : Crompton /Bharat Bijlee / Siemens / Kirloskar/ABB Type : TEFC Speed : 2900 rpm Starter : Delta Starter Suction/Delivery : 50 mm & 32 mm Type : Horizontal Centrifugal Pump Body : Casing Cast Iron Impeller : Bronze Shaft Material : EN -8 Accessories : Base Plate, Lovejoy Coupling, Coupling Guard, Foundation Bolts, etc. to form part of the supply | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|---------------|--------------------------------|---|--|
| 23.9 | PIPELINE AND FITTINGS | <p>a. The Water Pumps shall be located within 50 metres from the PROPANE/LPG Storage Yard Fencing.</p> <p>b. Bidder to list down the pipes and fittings proposed to be used in the Pipe Line Network like Bends, Tees, Reducers, Gaskets, Clamps & Supports, Bolts & Nuts, etc., with quantity and makes.</p> <p>[Note : Civil Works will be carried out by BHEL, at site].</p> | |
| 24.0 | SPECIFIC INSTRUCTION | <p>The intention of this broad specifications is to call for the services for executing the project, of installation of PROPANE/LPG Storage & Supply Yard, according to the most modern and proven techniques and codes.</p> <p>The omission of specific reference to any method and equipment or materials necessary for the proper and efficient services towards installation shall not relieve the successful BIDDER/VENDOR/CONTRACTOR of the responsibility of providing such services / facilities to complete the work or portion of work awarded to the successful BIDDER / VENDOR / CONTRACTOR .</p> <p>The quoted rate shall deem to be inclusive of all such requirements and contingencies.</p> | |
| 25.0 | CLEANING & PAINTING | <p>The BIDDER has to list down the activities (including the specification of surface coating / protective coating consumables used) pertaining to the surface cleaning and application of primer coatings / protective coating, prior to finish painting - covering the complete factory fabricated vessels and sub-assemblies, including pipe lines, fittings, attachments, fire fighting system, structural supports & fabricated items required at the Project Site, etc. Painting to be done by the vendor with. Poly Urethane painting upto 800 microns after surface preparation by shot blasting for bullets at vendors works and 450 microns with coal tar for under ground water lines wherever applicable(gates and tanker entry and exit)</p> | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|---------------------|--|---|
| 26.0 | CIVIL WORK | <p>All civil work will be carried out by BHEL for the entire Project subject to the timely submission of the site construction drawings with details.</p> <p>For an offer evaluation and work assessment purpose, the BIDDER has to furnish the tentative quantum of civil work to be done by BHEL, supported by proposal drawings along with the Technical Offer.</p> <p>The successful BIDDER has to submit the 'good for construction' civil drawings with the dynamic & static loading and foundation details for the Bullets, within four weeks from the date of issue of LOI/PO.</p> | |
| 27.0 | QUALITY PLAN | <p>The Bidder shall submit (with the TECHNICAL OFFER) a QUALITY ASSURANCE PLAN covering the operations / activities of sourcing & testing of raw materials, bought-out items, semi-finished components, factory fabrication work, non-destructive testing and heat treatment operations, air / hydro testing of vessels and assemblies, surface cleaning and protective coating operations with consumables, inter-stage inspection by third party or statutory agencies, approval / certification by agencies like CCOE, etc. pertaining to manufacture at the BIDDER'S / SUB-VENDOR'S Works.</p> | |
| | | <p>The Bidder shall submit (with the TECHNICAL OFFER) a QUALITY ASSURANCE PLAN covering the operations / activities to be carried out at the Project Site from receipt of materials, storage, handling, erection & commissioning with nature of intermediary tests / checks carried out, site fabrication work, non-destructive testing, air / hydro testing of vessels and assemblies, cleaning & finish painting, stage & final inspection by third party or statutory agencies, approval / certification by agencies like CCOE, etc.</p> | |
| | | <p>The Bidder shall submit (with the TECHNICAL OFFER) a QUALITY ASSURANCE PLAN covering the periodic testing / activities to be carried out at BHEL Works after the handing over of the PROPANE/LPG Station to BHEL but during the warranty/guarantee period of TWELVE Months from the date of acceptance by BHEL - pertaining to the satisfactory functioning of the complete PROPANE/LPG Station.</p> | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|--|---|---|
| 28.0 | ERECTION & COMMISSIONING | <p>The complete erection, total commissioning and handing over of the PROPANE/LPG Station with all the auxiliaries is under the scope of successful Bidder.</p> <p>The successful Bidder shall deploy only skilled & competent technicians for the installation & commissioning of all the sub-systems like LPG/PROPANE STORAGE & VAPOURIZATION SYSTEM, FIRE MANAGEMENT SYSTEM, GAS SUPPLY PIPE LINE LINKAGE to BHEL Piping Net Work under the DIRECT SUPERVISION of qualified Filed Supervisors and Site Engineers. [Only Engineering Graduates and/or Diploma holders in relevant engineering stream shall be employed for the work execution and supervision].</p> | |
| | | <p>The successful Bidder shall execute the total work in a professional manner adopting all safe working practices. All Statutory Regulations and Rules as promulgated from time to time shall be strictly adhered to.</p> | |
| | | <p>The site operations, from the date of receipt of materials to the date of handing over to BHEL , shall be conforming to the labour laws of the land without defaulting or accruing dues against PF</p> | |
| | | <p>The Bidder may visit the BHEL Site at Thirumayam / Trichy for LPG/Propane installation and storage, piping distribution, for assessing the quantum of work involved, before quoting. The acquaintance of the site condition is very much essential before quoting for the system.</p> | |
| 29.0 | SAFE CUSTODY & PRESERVATION OF COMPONENTS | <p>The safe custody of Storage Vessel , Evaporator, Pressure Regulation System, Fire Fighting Equipment, Control Panels, Instruments & Fittings, etc. till commissioned and handed over to BHEL , will also be under the scope of the successful BIDDER, though BHEL Campus is well protected and guarded</p> | |
| | | <p>Preservation of all equipment and sub-assemblies by suitable surface protection/padding/covering at all stages of handling, transporting to site of work or Pre-Assy Yard , Pre-Assembly Erection, Testing, Commissioning , and till the unit is handed</p> | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|---------------|--|--|--|
| 30.0 | SCOPE OF SUPPLY BY THE BIDDER [The Price Bid Shall Cover All The Supply & Service - listed below - by the Bidder] | | |
| 30.1 | | Design, Manufacture/Sourcing, Supply, Installation and Commissioning of the COMPLETE PROPANE/LPG Storage & Supply Station in accordance with BHEL Technical Specifications and conforming to norms stipulated by CCOE / Statutory Authorities | |
| 30.2 | | Building of PROPANE/LPG Yard including Fire Fighting System with Fenced Area and Fire Water Management System outside the fenced area. | |
| 30.3 | | Supplying and Laying of Cables (Flame Proof) inside PROPANE/LPG Yard as per the details provided and for the Fire Water Management System outside the fenced area. [BHEL will carryout the excavation of earth for laying of cables from switch board to the motor with end termination at the MP switch board and will form the required earth pits and lighting system for inside and outside of PROPANE/LPG Yard.] | |
| 30.4 | | Providing all the technical inputs, direction, guidance & assistance required for the proper installation of the PROPANE/LPG Yard. | |
| 30.5 | | Providing all related engineering drawings for P & I (Process & Instrumentation) and installation layout, civil works execution, etc. for the successful completion of the project, in time. | |
| 30.6 | | Adequate number of spares for all the operating systems and gadgets, instruments, equipments like pumps & compressors, etc. are to be compulsorily offered for a trouble free operation for two years on three shifts a day basis. | |
| 30.7 | | Required consumables like cutting gases, welding electrodes for installation purposes . | |
| 30.8 | | BHEL will provide the electrical supply of adequate rating at one single point only (through a Panel Board) and the BIDDER has to plan for the complete internal and external wiring connecting various systems (like Pumps , Compressors , Vapourisers , Fire Water Pumps, etc.) of the PROPANE/LPG Yard . | |
| 30.9 | | Bidder shall arrange for the deploying of complete set of Tools & Plant for the Erection, Testing, Commissioning and Handing over of the PROPANE/LPG Storage & Supply Station. | |
| 30.10 | | The crane facility required for unloading & installation of equipment / sub-assemblies pertaining to the supply at the site SHALL BE ARRANGED BY THE BIDDER ONLY. | |
| 30.11 | | Training of BHEL Staff in the Operation & Maintenance of PROPANE/LPG Station, covering a period of not less than TEN Working Days. | |

PART - B

| SI.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|--------|---|---|---|
| 30.12 | | Supply of Hard Bound Operation & Maintenance Manuals including Guarantee Certificates and Product Manuals with Spares List for all Bought-Out Items, Data Entry Log Sheets, Lay-Out Drawings, Safety Pre-Cautions, Trouble Shooting Charts, Tank History File, etc. in FOUR SETS. (in addition to soft copies in CDs) . | |
| 31.0 | BHEL SCOPE OF SUPPLY | | |
| 31.1 | | Complete Civil work involved inside PROPANE/LPG Yard which includes Civil Pedestals for Tanks, Pump & Compressor Shed, Vapouriser Shed, Control Room, Unloading Gantry, Fencing, Gates, Instructions and Sign Boards, etc. | |
| 31.2 | | Providing overhead water tank to PROPANE/LPG Yard for Fire Fighting. | |
| 31.3 | | Water Storage Sump for fire fighting system will be provided by BHEL. | |
| 31.4 | | Providing single point Power source (Panel Board) and Single Point Compressed Air Supply for the Erection & Commissioning activities , free of cost. | |
| 31.5 | | BHEL will execute works related to Earth Pits as per IS 3043, Lighting System inside the Control Room and Yard lighting with flame proof fittings and wiring. | |
| 31.6 | | Payment of Explosive Fees towards Drawing Approval and towards Final License Fees for 3 | |
| 31.7 | | Seeking of NOC from District Magistrate/Collectorate after the receipt of Drawings for | |
| 31.8 | | Seeking approval for Initial Drawings from CCOE (Chief Controller of Explosives – Nagpur). | |
| 31.9 | | Third Party Inspection for fabrication & installation of entire PROPANE/LPG Storage & Supply | |
| 31.10 | | Obtaining Final License from CCOE–Nagpur, after the Installation of PROPANE/LPG Yard. | |
| 31.11 | | Endorsement of the CCOE License from Local CCOE Office and getting approval from | |
| 32.0 | PRE-DISPATCH INSPECTION AT SUPPLIERS WORKS | PROPANE/LPG BULLETS, VAPOURISER UNITS with ACCESSORIES, FIRE WATER PUMPS and FIRE FIGHTING SYSTEM, ALL BOUGHT-OUT ITEMS, etc. shall be offered for Pre-Dispatch inspection by BHEL Engineers at the Supplier's Works. | |

PART - B

| Sl.No. | BHEL SPECIFICATIONS | DESCRIPTION / PARTICULARS | BIDDER'S OFFER [with COMPLETE TECHNICAL DETAILS] |
|---------------|---------------------------------|---|--|
| 33.0 | PROVE-OUT AND ACCEPTANCE | PROPANE/LPG BULLETS & AUXILIARIES with CONTROL SYSTEMS establishment including inspection completion, statutory approval and physical demonstration of all systems to the satisfaction of BHEL, as per the technical specifications. The Plant will have to be operated along with auxiliary equipments, such as filling of PROPANE/LPG in the Bullet, lining of PROPANE/LPG through Vapourisers, Testing of Water Sprinkler/Fire Fighting System, etc. as per the normal required parameters to satisfy the design conditions. | |
| 34.0 | WARRANTY | Performance Guarantee for the Entire Station and Warranty for the Bought-Out Items/Sub-Systems against defective materials and workmanship for a period of 12 months from the date of commissioning or 18 months from the date of despatch whichever is earlier. | |