

## **ANNEXURE -A**

### **SPECIFICATION OF CRYOGENIC TANKER**

#### **1. SCOPE OF WORK**

Design, detail engineering, sourcing of raw materials and bought-out flow components & instruments, fabrication, testing, coordination for inspection (including third party inspection), mounting on suitable semi trailer, temporary registration of trailer, transportation and delivery of super insulated road tanker for Liquid Methane (LCH<sub>4</sub>) service to IPRC, Mahendragiri.

#### **2. DESIGN DATA**

- |     |  |  |
|-----|--|--|
| 2.1 | Service fluid  | : Liquid Methane (LCH <sub>4</sub> )               |
| 2.2 | Gross (geometrical) volume/ Nominal Water capacity (WC)                    | : $\approx$ 46 Cu.m (46000 litres)                 |
| 2.3 | Usable volume (Gross volume – Ullage volume)                               | : 41.4 Cu.m  |
| 2.4 | Expected Operating Pressure(MEOP) of Inner Vessel                          | : 0.7 MPa (a) max. and at vacuum                   |
| 2.5 | Maximum Allowable Working Pressure (MAWP)/ Design pressure of Inner Vessel | : 0.8 MPa (a)                                      |
| 2.6 | Working temperature of inner vessel at design pressure                     | : 75 – 350 K                                       |
| 2.7 | Working temperature of outer vessel  | : 290 to 350 K                                     |
| 2.8 | Permissible evaporation loss rate  | : Less than 0.1% per day with 90% filled condition |

Note:

To be specified by the results of calculations during Detail engineering review and demonstrated during performance test at IPRC

- 2.9 Liquid Expulsion flow rate from tanker during usage. : 5 kg/s of LCH4
- 2.10 Expected service life : 20 years
- 2.11 Type of thermal insulation : **Super insulation**  
[Double-walled construction with vacuum and multi-layer super insulation in the annular jacket]
- 2.12 Vacuum pressure in the jacket (at atmospheric temperature) :  $1 \times 10^{-3}$  mbar
- 2.13 Expected periodicity of re-evacuation : Once in 5 years (to be confirmed during Detail Engineering Review)
- 2.14 Design code : Inner vessel: Section VIII, Division 1 of Boiler & Pressure Vessel (BPV) code by American Society of Mechanical Engineers (ASME).  
**Note:** **Cold stretched/ pressure strengthened material should not be used.**  
Outer vessel: CGA 341:2007 (or) EN 13458-2: 2002.
- 2.15 Wind speed : Wind load shall be calculated as per IS 875 (Part 3 – 1987) with basic wind speed of 39 m/s. Probability factor (risk coefficient) K1 of 1.08, Terrain, height & structure size factor K2 for terrain category 1 of specific to

width & height of structure and Topography factor K3 of 1.36 shall be considered.

- 2.16 Acceleration load : 1.5 g in vertically upward direction  
: 2 g in vertically downward direction  
**Note:** The design consideration regarding dynamic loads shall account for the horizontal mode transportation of tanker. The speed limit for road transportation on trailer shall be defined. : 1.5 g in transverse (horizontal) direction  
: 2 g in longitudinal (horizontal) direction
- 2.17 Allowable internal pressure of outer vessel : 0.15 MPa(a)  
(not more than the set pressure of outer vessel safety devise)
- 2.18 Allowable external pressure of outer vessel (External overpressure) with full vacuum inside : 0.2 MPa(a)
- 2.19 Safety system to prevent vacuum jacket from overpressure. : Bidder shall suitably size the Rupture disc/lift off device and install in the outer vessel.
- 2.20 Safety system to prevent inner vessel from overpressure due to loss of vacuum in jacket and fire engulfed condition: Bidder shall suitably size the safety relief devices as per code and specify during Detail engineering review. The size of nozzle for installing safety relief devices shall also be verified by results of calculations during Detail engineering review.

The inner vessel shall be protected against internal overpressure by Safety Relief Valves. Each set comprises a burst disc and safety relief valve. All vents shall be connected and relieved through common vent header.

### 3. **MATERIAL OF CONSTRUCTION**

- 3.1 Inner vessel : ASTM A 240 304L/ 316L
- 3.2 Outer vessel : ASTM A 516 Gr. 70
- 3.3 Pipes & tubes : ASTM A 312 TP 304L/ 316L
- 3.4 Pipe fittings : ASTM A 403 WP 304L/ 316L
- 3.5 Flanges : ASTM A 182 F 304L/ 316L/ 321
- 3.6 Bolts : ASTM A 320 B8
- 3.7 Nuts : ASTM A 194 8

Note:

Cold stretched/ pressure strengthened material should not be used.

### 4. **CONFIGURATION DETAILS**

#### 4.1 Configuration details of tanker:

- 4.1.1 The inner vessel of the tanker shall be designed for MAWP and also for vacuum.
- 4.1.2 The inner & outer tank shall be of cylindrical configuration.
- 4.1.3 The fill/ drain port of the tanker shall be provided with suitable anti-vortex baffles.
- 4.1.4 The pressurization / vent ports of the tanker shall be provided with diffuser.
- 4.1.5 All the nozzles of DN 50 and smaller sizes shall be suitably stiffened with gusset plates.
- 4.1.6 Suitable earthing bosses shall be provided for protection against lightning and static electricity.
- 4.1.7 LCH<sub>4</sub> in the tanker will be expelled by pressurizing with self pressurisation at ambient temperature. Evaporator coil arrangement is required for self pressurization.
- 4.1.8 Bottom withdrawal line shall be DN 65 and top fill line size shall be DN 40.

The following Manual valves shall be envisaged in the flow diagram / P&I

1. Purge valve
2. Upper filling valve
3. Flow diverter valve
3. Pressurisation outlet valve
4. Pressurisation inlet valve
5. Lower filling valve
6. Vapour equalisation valve

Remaining nozzle size shall be provided in the offer with flow diagram /P&I. Flow scheme diagram indicating different nozzles, valves, vents, fluid temperature measurement, level measurement and safety systems to be enclosed with the offer and it will be finalized during Detailed Engineering Review (DER).

Thermal fuse arrangement shall be provided in air line for preventing spread of fire from external sources.

Electro-pneumatic valves shall be provided in the Filling / withdrawal lines, self pressurization line, Gas/ Vapour equalization line and suitable command gas circuit shall be designed.

Other valves, piping & Fittings shall be provided as per standard provision for LCH4 transport tankers.

The following safety features shall be ensured

- a. Inner vessel with two sets of relief valve and rupture disc as per the design code with a flow diverter valve.
- b. Safety disc on the outer vessel.
- c. Thermal safety valves to relieve entrapped liquid in blind/blocked segments.
- d. Over flow circuit.
- e. Road safety relief valve with isolation valve.

#### 4.2 **Configuration details of Trailer:**

- 4.2.1 The semi-trailer shall be suitably designed to accommodate the LCH4 tanker on it.
- 4.2.2 The semi trailer shall have fifth wheel coupling of reputed make to suit with standard prime movers available with IPRC. The details of fifth wheel coupling shall be finalized during DER. The kingpin shall be of 2" in size.
- 4.2.3 During the operation of tanker the prime mover will be detached by engaging leg support. Accordingly the leg support of the tanker shall be designed considering load and moments.
- 4.2.4 The trailer shall be connected to a primer (IPRC Scope) of GVW 55T with double axle configuration.

#### **Instrumentation**

- a. Level gauge for Liquid Methane with isolation and equalizing valves.
- b. Two additional ports shall be provided to mount pressure and level transmitter in road tankers. These transmitters are under the scope of IPRC, Mahendragiri

#### 4.3 **STATUTORY CLERANCES**

- 4.3.1 The supplier shall obtain design / fabrication approval from PESO for the LCH4 transportation tanker before commencing fabrication.
- 4.3.2 Approval from State Transport Authority shall be obtained for semi-trailers.
- 4.3.3 Sales invoice, other relevant documents and e-way bill shall be drawn in favor of "Director, ISRO Propulsion Complex [IPRC], Tirunelveli district 627 133, TamilNadu
- 4.3.4 The supplier shall obtain temporary registration in the name of **Director, IPRC** for the trailer before delivering the tanker.

#### 5. **FABRICATION:**

- 5.1. Forming: All the forming works of the tank shall be carried out by suitable forming process. After forming, the parts shall be suitably stress-relieved.

5.2. Welding: The welding on stainless steel parts of the tank shall be carried out by Gas Tungsten Arc Welding (GTAW) with Gaseous Argon of 99.995 % purity as the purge medium. All the welding on carbon steel parts of the outer vessel of the tanks shall be carried out by Shielded Metal Arc Welding (SMAW). Prior to commencement of welding on the tanks, welding procedure qualification and welder's performance qualification tests shall be carried out in accordance with Section IX of ASME BPV code.

5.3. Surface Treatment: The following procedure shall be employed for surface treatment of the tanks.

5.3.1. Cleaning of stainless steel surfaces: After fabrication, the interior and exterior surfaces of the inner vessel and the interior surfaces of the nozzles, interconnecting pipelines and flow components shall be cleaned, employing the following procedure:

5.3.1.1. Mechanical cleaning: All the metallic surfaces with scales and newly welded surfaces shall be cleaned by scrubbing with stainless steel metallic wire brush. The loose scales and particles obtained from mechanical cleaning shall be removed by blowing with dry air, sucking with vacuum cleaner or washing with water.

5.3.1.2. Degreasing: The surfaces shall be degreased to Oxygen service standard as per CGA G-4.1 (Compressed Gases Association Inc, USA) or MIL-C-52211 or ASTM G-93 or equivalent.

5.3.1.3. Pickling: In order to remove rusts and scales, the surfaces are pickled with a solution containing Hydro-fluoric acid (HF) and Nitric acid (HNO<sub>3</sub>). The composition of pickling solution and duration are to be adjusted after trial test on a sample piece to remove uniformly less than 25 µm thick material. Mostly, the composition is as follows:

HF	: 5 % (by mass)
HNO <sub>3</sub>	: 15 to 20 %
Water	: Remainder

This is followed by rinsing with water.

5.3.1.4. Passivation: In order to form a protective layer, the surfaces are passivated with a solution of the following composition:

HNO <sub>3</sub>	: 25 % (by volume)
Water	: Remainder
Duration	: 2 h (minimum)

This is followed by rinsing with De-Mineralized (DM) water.

- 5.3.1.5. Drying: The surfaces of the tanker shall be dried by purging with dry Air or Gaseous Nitrogen until the moisture content in the medium is brought down to 20 ppm,v. Before transportation, the inner vessel be kept pressurized at 0.15 MPa(a) with Gaseous Nitrogen.
- 5.3.1.6. Buffing: The exterior surface of inner vessel shall be finished by buffing.
- 5.3.2. Cleaning of carbon steel surfaces
  - 5.3.2.1. The interior and exterior surfaces of the outer vessel shall be sand-blasted and mechanically cleaned.
  - 5.3.2.2. Painting: The exterior surfaces of the outer tank shall be painted with 2 coats of primer (Zinc or Red oxide) and 2 coats of white color Poly Urethane (PU) or Epoxy paint. A suitable color band of 200 mm width shall be painted circumferentially at the middle of the tank as per standard practice. Exact color coding shall be furnished along with the quotation.
6. Valves and instruments are to be located in a cabin & panel respectively at the rear end of the tanker. The panel shall have suitable doors and locking mechanism. The valves and instruments shall be accessible for operation, maintenance and calibration.
7. All the flow components shall be procured from reputed manufacturers. All the valves shall be of extended stem bellow sealed type to prevent entry of air in to the vessel during sub cooling. The instrument valves shall be of needle type. The instrument isolation valves are bellow sealed needle type valves.
8. Make of flow components is subject to approval by Purchaser during DER.
9. All the flow components and instruments shall be provided with permanent, easy-to-read tag number plates.



## 10. **FLOW COMPONENTS**

### 10.1 **VACUUM COMPONENTS**

The outer vessel of the tank shall be fitted with a vacuum safety disc, a vacuum pump-out port cum seal-off valve. The vacuum safety disc shall be set to relieve at an internal pressure of 0.13 MPa (a) to 0.15 MPa(a). However, during normal period, the vacuum safety disc shall withstand an external pressure of 0.1 MPa(a) with full vacuum inside. Vacuum measurement instrument shall be provided.

## 11. **TESTS**

The following tests are to be performed as per the standards mentioned therein.

Material certificates: The material test certificates shall be provided for all the principal and pressure-bearing parts of the tanks (including plates, nozzles, interconnecting pipes, flow components, etc) to ascertain the physical and chemical properties. This shall include chemical composition and impact strength

Ultrasonic test: All the plates used for the fabrication of inner vessel & outer vessel and the pipes used for the nozzles and interconnection shall be subject to 100% ultrasonic test.

Radiographic test: All the (100 % of the) stainless steel butt weld joints on the inner vessel as well the nozzles, interconnecting pipelines, etc. and 10 % of the butt weld joints on the outer vessel shall be subject to radiographic test with X-rays to 2T sensitivity.

Inner vessel pressure test: The inner vessel shall be pneumatic pressure tested with Gaseous Nitrogen or dry Air. The pneumatic test pressure shall be as per design code. Alternatively, hydraulic pressure test at a pressure as specified by the design code may be conducted. In such case, the water with pH at 6.5 to 7.5 and chloride content < 30 ppm shall be used. After draining water, the vessel shall be dried down to a residual moisture content less than 20 ppm(v).

Outer vessel pressure test: The outer vessel (in assembled form) shall be pneumatic pressure tested with Gaseous Nitrogen or dry Air. The pneumatic test pressure shall be as per design code.

Leak test: The leak tightness across the inner vessel as well as the outer vessel shall be tested with Gaseous Helium Mass Spectrometer Leak Detector (MSLD) as per Article 10, Section V of ASME BPV code

by **hood technique**. While leak-testing the inner vessel, the internal volume shall be charged with a mixture of 75 % Gaseous Nitrogen + 25 % Gaseous Helium and the annular volume between the inner vessel and the outer vessel be evacuated and connected to MSLD. While leak-testing the outer vessel, the exterior surface of the outer vessel shall be shrouded by synthetic bag with a mixture of 75 % Gaseous Nitrogen + 25 % Gaseous Helium and the annular volume between the inner vessel and the outer vessel be evacuated and connected to MSLD. The **global leakage rate thus measured and extrapolated for 100% Helium shall be finer than  $1E-7 \text{ Pa.m}^3/\text{s}$** .

Vacuum retention test: The annular space between inner and outer vessel (vacuum jacket) to be evacuated & sealed and the vacuum pressure in the jacket (at atmospheric temperature) shall be  $1 \times 10^{-3}$  mbar. Subsequently the vacuum level shall be periodically monitored and recorded for a minimum period of 120 hrs and there should not be deterioration in the vacuum level. The vacuum pressure should stabilize at  $1 \times 10^{-3}$  mbar (at atmospheric temperature). Vacuum measuring instrument shall be supplied along with the tanker.

Performance test: The performance test with Liquid Nitrogen shall be conducted by supplier at their premises. The tank shall be properly chilled and then filled with Liquid Nitrogen and the evaporation loss rate to be measured using a gas flow meter, pressure & temperature in the vent line. The measured evaporation loss rate with Liquid Nitrogen shall be extrapolated to that with the working fluid (Liquid Methane) by theoretical computation. The evaporation loss rate thus measured and extrapolated to the working fluid (Liquid Methane) shall be less than the value specified. The test procedure shall be finalized during DER. Performance test shall also be conducted at IPRC. LN2 shall be provided at free of cost by IPRC for conducting performance test.

- a) On the day of performance test the vacuum level in the vacuum jacket shall be measured and recorded before start of chill down.
- b) After completion of performance test and draining LN2 & warm up, the vacuum level in the jacket shall be measured and ensure that the vacuum level is not deteriorated.

### **13. INSPECTION**

The in-process (stage) and pre-delivery inspection of the tanks shall be carried out by one of the following Third Party Inspection (TPI) agencies:

- Lloyds Register Industrial Services Pvt Ltd (LRIS)

- Det-Norske Veritas (DNV)
- Technischer Überwachungs Verein (TUV-NORD)
- Technischer Überwachungs Verein (TUV-SUD)

It shall be the responsibility of the Supplier to arrange for and coordinate with the TPI agency. The scope of inspection shall be as follows.

- 13.1 Review and approval of the design calculations, fabrication drawings and QAP.
- 13.2 Identification of raw materials and review of the material test certificates for compliance with the relevant requirements.
- 13.3 Review of test and calibration certificates for compliance with the specification and visual examination of the bought-out flow components and instruments.
- 13.4 Witnessing and certification of welding procedure qualification and welder's performance qualification tests. If the welders already possess the performance certificate, the TPI agency shall review and authorize the same.
- 13.5 Review of X-ray films of radiographic tests for possible defects in the weld joints.
- 13.6 Witnessing of formed head solution annealing and simulation test coupon results.
- 13.7 Inspection at any stage of fabrication to ensure that the methodology employed for fabrication is in compliance with the requirements of standard codes and practices and the approved documents.
- 13.8 Witnessing of inner vessel final volume measurement test.
- 13.9 Witnessing of pressure test.
- 13.10 Witnessing of leak test.
- 13.11 Review of vacuum retention test.
- 13.12 Witnessing of performance test.
- 13.13 Issuance of Pre-Delivery Inspection (PDI) certificate and stamping on the tanks.

Note:

Apart from inspection by the TPI agency, the Purchaser's representative(s) shall also witness any test as may be deemed necessary at their discretion.

## **Annexure-B**

### **1. PRE-QUALIFICATION CRITERION**

The Bidder's capability shall be evaluated based on the following Pre-Qualification (PQ) criteria. The Bidders shall suitably fill-up the information solicited in "Item specification" and submit as part of the Techno-Commercial Bid (TCB). Those Bidders who comply with the PQ criteria only will be screened-in for opening and evaluation of Price Bid. The information to be submitted in the TCB shall be complete in all respects substantiated by attached documents and there shall not be any further opportunity for the Bidders to submit any information or document unless the Purchaser solicits so at their own discretion. Any lack of information or incomplete/ambiguous information or false information or information non-compliant with the PQ criteria shall be treated as sufficient cause to reject such Bids.

- 1.1. The bidder shall be a regular Supplier of vacuum jacketed (VJ) cryogenic road tanker. The bidder should have manufactured & supplied at least 3 VJ cryogenic tankers of at least 10m<sup>3</sup> (10000 liters) volume and 1.0 MPa (10 bar) pressure. during last three years. The claim shall be substantiated by purchase order(s) and inspection release note(s)/ acceptance certificate(s) by third-party inspection agency or client dated between 01/04/2017 and 31/03/2024.
- 1.2. Financial turn over for the last year shall be at least Rs.90 Lakhs
- 1.3. Balance sheet with profit or loss statement shall be submitted for the last three years for evaluation

## **Annexure-C**

### **General terms & conditions:**

#### **1 DOCUMENTATION**

The following documents (in English) in 2 hard prints/ copies as well as in electronic/ soft copy shall be furnished at different stages specified thereupon.

- 1.1 Detail engineering review: Within 2 months from placement/ award of the Purchase order, the Purchaser shall conduct the **Detail Engineering Review (DER)**. The following documents duly reviewed and approved by the TPI agency for compliance with the requirements of the relevant design codes as specified in the Purchase order and statutory regulations, shall be submitted to the Purchaser during the DER. These documents are subject to review by the Purchaser and only upon approval of the same by the Purchaser, the Supplier shall proceed with fabrication. However, the Purchaser's approval shall not absolve the Supplier of their responsibility to comply with the specifications of the Purchase order.
- a. An overall dimensioned General Arrangement (GA) drawing of the tanker, showing the assembled view along with all accessories shall be provided. The details of the interconnecting pipelines and their location with respect to the tanker shall also be shown in the GA drawing. The interface details for both fluid connections and instrument connections, including the relative positioning among the interfaces, their location with respect to the tanker and the end connection/ preparation details for each interface shall also be shown in the GA drawing.
  - b. The detailed design **calculations for the tanker (thermal & structural) and trailer** shall be provided.
  - c. A detailed Quality Assurance Plan (QAP) shall be provided in compliance with IPRC requirements given.
  - d. A schedule chart detailing the various activities involved in fabrication and the time required for completing the same, so as to comply with the specified overall delivery period, shall be furnished.
  - e. The make, model number and specifications of the flow components and instruments along with the relevant catalogues shall be provided.
  - f. Detailed procedure shall be provided for conducting performance test including chilldown procedure and the methodology of computing evaporation loss rate of actual working fluid from the measured evaporation loss rate of LN2.
  - g. Detailed procedure shall be provided for commissioning at

Purchaser's site.

1.2 **On completion of DER:**

1.2.1 The bidder shall obtain PESO approval of drawings / documents within one month from the date of completion of DER.

1.2.2 The bidder shall obtain approval from State transport Authority for semi-trailer.

1.2.3 During the course of fabrication: The details of activities completed by the end of every month shall be sent to the Purchaser. The delay, if any, from the agreed schedule and the reasons, if any, therefore shall be highlighted. The schedule chart shall also be updated in such cases.

1.3 Pre-delivery review: On completion of fabrication and testing, but prior to delivery of the consignment, the Purchaser shall conduct a pre-delivery review. During the review, the following documents, duly approved by the TPI agency, shall be submitted to the Purchaser. The Purchaser shall review the same to ensure compliance with the specification of the Purchase order. On being satisfied, the Purchaser shall issue a "Purchaser's delivery clearance", only upon receipt of which the Supplier shall proceed with delivery of the consignment.

- a. The certificates of all tests and calibration (including those for the bought-out flow components and instruments) shall be provided. Each page of the certificates shall be duly counter-signed and stamped by the TPI agency.
- b. PDI certificate by the TPI agency.
- c. Warranty certificate.
- d. Calibration chart for the level gauge with respect to water column, liquid Nitrogen and liquid Methane.

**Inspection plan for Department**

- a. Approval of P&I diagram and general arrangement drawing with overall dimension
- b. Review of test certificates and visual examination of bought out components
- c. Inspection at critical stages of fabrication as mutually agreed upon to ensure the compliance of fabrication as per QC plan

- d. Witnessing vacuum stabilization / hold tests, pressure tests (ambient & cold condition), leak tests, moisture content in the inner vessel, evaporate rate measurement test etc.

#### **1.4 Along with supply:**

The supplier shall send the following documents along with supply.

- Warranty certificate
- PDI certificate by the TPI agency.
- As-built GA and fabrication drawings – 2 sets
- Design reports / documents mentioned under DER
- Instruction manual for commissioning, operation, trouble-shooting and maintenance.
- Test certificates of tanker.
- Test certificates of flow components used.
- Temporary registration of Trailer.
- PESO approval document.
- State Transport approval document.

## **2 COMMISSIONING**

After receipt of the tanker at the Purchaser's site at IPRC, Mahendragiri, the tanker shall be commissioned by the Purchaser based on the documents to be provided by the Supplier for the same. The commissioning shall comprise pressure test up to the MEOP with Liquid nitrogen and functional check of the flow components and instruments. Though **commissioning is NOT included under the Supplier's scope of responsibility**, in case any discrepancy or ill-performance is observed during commissioning, it shall be the Supplier's responsibility to rectify/ replace the defective/ ill-performing subsystems or the entire tanker. The Supplier may, at their discretion, depute their representative(s) to witness the commissioning, but at their own expense. In case the defective/ ill-performing sub-systems or the entire tanker require rectification/ rework to be carried out at

the Supplier's works, it shall be Supplier's responsibility to transport the same to the Supplier's works and item back to the Purchaser's site.

### **3 DELIVERY TERM:**

The tanker shall be delivered in totally integrated and ready-to-use form on FOR Mahendragiri basis. The supplier shall make their own arrangement to deliver the road tanker at IPRC, Mahendragiri.

i) Sale invoice and other relevant documents shall be drawn in favor of "Director, ISRO Propulsion Complex [IPRC]", Tirunelveli district 627 133, TamilNadu

ii) The supplier before starting transportation shall obtain e-way bill in favor of Director, ISRO Propulsion Complex [IPRC], Tirunelveli district 627 133, TamilNadu

The supplier shall arrange for temporary registration and transit insurance.

**4 DELIVERY PERIOD:** The delivery period shall not exceed 10 months from the date of Purchase Order. The delivery period of 10 months include the period for DER, obtaining PESO and State Transport Authority approvals and the work shall be deemed to have been executed after the tanker is received at IPRC, Mahendragiri. In case the delivery stretches beyond the stipulated period, the Purchaser shall recover from the Supplier, as Liquidated Damage (LD).

Wherever Purchaser's approval is required on the documents submitted by the Supplier, the Purchaser will dispatch/ transmit their approval or comments within 10 calendar days from the date of receipt of such documents at the Purchaser's end. Wherever Purchaser's representatives are required (for Detail Engineering Review, Pre-Delivery Inspection, etc.) at the Supplier's premise, the Purchaser will depute their representative within 15 calendar days from the date of readiness of documents for review or hardware for inspection and receipt of intimation from Supplier.

**5 Warranty:** The tank shall be warranted for satisfactory performance over a period of 24 months from the date of receipt of the tanks at the port of entry in the Purchaser's country in case of import or Mahendragiri in case of indigenous supply. The Supplier shall furnish a Performance Bank Guarantee (PBG) for 10 % of the value of the



Purchase Order for the Warranty period.

## **6 Payment Terms:**

The payment shall be made within 30 days after receipt and acceptance of LOX tanker at IPRC, Mahendragiri. The Department does not normally entertain advance payment. However, in case the Bidder proposes for advance payment, the Department may consider it, subject to the following conditions.

- a. Bank Guarantee for equivalent sum from a nationalized/scheduled bank approved by RBI valid till final acceptance of tanker with additional claim period of 2 months is to be submitted.
- b. In case of different advance payment terms proposed by the Bidders, Department will load simple interest on the advance payment over the execution period at the rate of marginal cost of funds-based lending rate [MCLR] as notified by State Bank of India [SBI] applicable on the due date for submission of bid for comparison of the price bids.

Moreover, in case of delay in execution of the Purchase Order by the supplier beyond the stipulated period due to reasons not attributable to the Department, the Department will recover interest on the advance payment after at the at the rate of MCLR as notified by SBI on the scheduled date of completion.

## **7 DOCUMENTATION ALONG WITH THE QUOTATION**

. Along with the quotation, the following documents shall be furnished in English. Any lack of the following details in the quotation will be treated as sufficient cause for rejection of the bidder.

- a. A complete technical description of the tanker offered shall be furnished. Technical deviations, if any, from the tender specification shall be explicitly indicated in the quotation. The following details shall be specifically highlighted:
  1. Overall dimensions (outside diameter & length) of the inner vessel of the tanker.
  2. Overall dimensions (outside diameter & length) of the outer vessel of the tanker.
  3. Overall size of the trailer.
  4. Tentative P&Id
- b. A detailed profile of the bidder, in terms of the design and fabrication shall be provided in the quotation.

- c. The capability to meet Pre Qualification Criteria shall be substantiated with documentary evidences in the form of Purchase order/ Contract and Inspection/ acceptance certificate by TPI agency or Client.
- d. A list of clients (including address, telephone and fax numbers and contact person) to whom tanks of similar specification have been supplied shall be furnished.
- e. Suggested list of vendors for flow components is given below. If the bidder proposes alternate sub vendors other than listed, such details may be submitted in the bid. The decision of the IPRC in regard to acceptance/ rejection of the sub vendor proposed by the bidder shall be the final.
- f Spare valves, Safety relief valves, rupture discs and pressure regulators and essential spares like seat, disc, nozzle, gaskets, O-rings shall be quoted for hassle free operation of the road tanker for a period of two years.

1. Extended stem **EP & Manual** bellow sealed globe valves :

- a. M/s. Herose GmbH, Gurgaon
- b. M/s. Ireland SA, France
- c. M/s.MIL Controls Ltd, Aluva, Kerala
- d. M/s. Samson controls Pvt. Ltd, Pune

2. Manifold valves, Needle valves & bellow sealed needle valves:

- a. M/s. Swagelok
- b. M/s. Parker
- c. M/s. Weka AG Switzerland
- d. M/s. Schneider
- e. M/s. Hoke

3. Safety Relief valves:

- a. M/s. LESSER India, Mumbai
- b. M/s. Herose GmbH, Gurgaon
- c. M/s. Tyco Sanmor, Chennai

4. Burst discs :
  - a. M/s. BS&B Safety systems (India) Ltd, Chennai
  - b. M/s. FIKE India Ltd, Pune
  
5. Pressure gauges  
Make : Samson/Wika/Burton
  
6. Pressure regulators  
Make : Cash valve, USA / Swagelok, England/ RHPS,  
France / Tescom, UK

**Note** : Flow components of make other than specified in the it shall be mentioned in the quotation and approval relevant as and documents to be submitted for approval

7. Quality assurance plan: QAP for the road tanker shall be provided along with the quotation. Tentative QAP of the road tanker is enclosed herewith. Kindly go through it and offer your comments. Kindly include

**Additional requirements**

1. Cattle arrestor
2. Electronic braking system
3. Pneumatic suspension

## **TERMS AND CONDITIONS:**

### **1. SCOPE:**

- Design, fabrication, testing and supply of horizontal, cylindrical, double walled (Vacuum jacketed) tank with super insulation mounted on suitable semi trailer for Liquid Methane service. The tanker shall be designed for Liquid Methane service.
2. The supplier shall submit the bid in two parts in e-procurement portal one part has technical & commercial bid including technical details, drawings, detailed quality assurance & testing/inspection plan, commercial terms and conditions. The other part is the price bid which contains the cost of road tankers, third party inspection charges, etc. If any price details are revealed in the technical bid, the offer will be summarily rejected
3. The design and fabrication of the tanker must be as per the specified standards. Necessary approvals/certification must be obtained by the party.
4. The design and fabrication shall be approved by the reputed third party inspection agency. The name of the inspection agency is to be given in the offer.
5. The supplier must furnish the compliance statement with respect to the technical specification and terms & conditions indicating clearly deviations if any.
6. The supplier shall make arrangement to transport and deliver the tanker at IPRC, Mahendragiri. Transit insurance shall be taken by the supplier and the cost shall be quoted separately.
7. Tankers will be accepted only after carrying out evaporation loss rate test at IPRC, Mahendragiri.