

# **SPECIFICATION & TECHNICAL DETAILS**

## **OF LIQUID OXYGEN**

**Annexure-I**

**1.0 Qualifying criteria** - The tender of only those parties shall be accepted who meet the following qualifying conditions :

- 1.1 Have atleast three years continuous experience in manufacturing and bulk supply of liquid oxygen for industrial use, and the same running successfully at present.
- 1.2 Have sufficient back up facility for gas supply in case of breakdown in manufacturing plant/equipment.

### **2.0 Technical Specification**

- 2.1 Liquid Oxygen after vaporization shall conform to IS:309 with 99.5% (min.) purity.
- 2.2 Quantity : 1250 in one years
- 2.3 Consumption per day : Upto 4000 m3 (5.2 MT) as per requirement with max flow rate of 400 m3/hr in morning hours.
- 2.4 Min. stock to be maintained : 15 kL. (If stock is below this level for two consecutive days then penalty of 0.5% per day (max.10%) of that months' bill will be imposed from 3<sup>rd</sup> day for no. of days the level is low).

### **3.0 Quality & Inspection**

- 3.1 Normally inspection of material will be done at our works however BHEL may inspect material at source also.
- 3.2 The quality test certificate shall be sent with every tanker

### **4.0 Price variation clause**

4.1 The price variation due to change in rates of electricity & diesel shall be allowed as given below (no other factor will be considered) :

(a) Price variation with change in electricity rates -

$$P_n = P_i + \{(E_n - E_i) \times 0.769\}$$

$P_i$  &  $P_n$  = Initial & new price of liquid oxygen (Rs/kg)

$E_i$  &  $E_n$  = Initial & new electricity rate (Rs/unit)

(b) Price variation with change in diesel rates shall be as per below formula -

$$T_n = T_i + \left\{ \frac{(D_n - D_i)}{D_i} \times \frac{T_i}{4} \right\}$$

$T_i$  &  $T_n$  = Initial & new transportation charges (Rs/kg)

$D_i$  &  $D_n$  = Initial & new diesel rate (Rs/lit.)

- 4.2 (a) The PVC shall be applicable and price variation with change in electricity and diesel rates will be allowed as & when the rates are changed.
- (b) The base rates of electricity and diesel must be given in offer.
- (c) The electricity rate means the official electricity tariff, including all applicable fuel surcharges and electricity duty, as published by the relevant State Electricity Board and/or Regulatory Commission. The rate of diesel means price in Rs/lit. as declared by IOCL/HPCL/BPCL.

## **5.0 Transportation**

- 5.1 The transportation of liquid oxygen and its unloading in storage tank at our site shall be in supplier's scope.
- 5.2 Road tanker carrying liquid oxygen should be approved for the purpose and before entry in BHEL, it should be complete with all safety and other necessary fittings as per CCoE and other statutory norms. It must carry TREM card and MSDS.
- 5.3 Supplier shall ensure compliance of the requirements as per Motor Vehicles Act 1988.

## **6.0 Delivery**

- 6.1 Delivery of liquid oxygen shall start immediately with commissioning of the storage system. Further delivery will vary as per actual use (approx 100 MT±30% per month). An advance intimation of 2 days will be given by BHEL for supply.

# **SPECIFICATION & TECHNICAL DETAILS**

## **FOR LIQUID OXYGEN STORAGE SYSTEM**

**Annexure-II**

### **1.0 Qualifying criteria**

The tender of only those parties shall be accepted who have atleast three years experience in supply & installation of liquid oxygen storage system for industrial use and those storage systems running successfully at present.

### **2.0 Technical Specification**

- 2.1 Liquid storage capacity : 30 kL (minimum)
- 2.2 Gas pressure & flow required at vaporiser outlet : (a) 150 bar @100 m<sup>3</sup>/hr for filling our own cylinders through our own lox pump.  
(b) 16 bar @400 m<sup>3</sup>/hr for direct supply through pipeline

### **3.0 Storage system**

- 3.1 The liquid oxygen system should be complete from liquid inlet to gas outlet conforming to all technical and statutory requirements.
- 3.2 Loading, unloading, erection & commissioning of tanks, vaporizers, related equipment and interconnecting pipelines upto vaporisers outlet flange and all other required material & resources are in bidder's scope. Only civil work and water/power supply at one point shall be in BHEL's scope.
- 3.3 Erection & commissioning of complete storage system should be done within 6 weeks of receipt of order/LoI.
- 3.4 The system should be in well maintained condition and approved for intended use by concerned authorities. The documents showing relevant approvals, year of manufacture and other details should be furnished before installation.
- 3.5 The supplier has to submit necessary technical/civil drawings and schematic drawing of all equipment with offer, clearly showing the required area and layout.
- 3.6 Obtaining necessary approval, license and subsequent renewals from statutory bodies (CCoE, etc) and co-ordinating with them with respect to compliance of statutory requirements is in the scope of supplier for which no charges will be paid by BHEL.
- 3.7 The maintenance of storage system shall be in supplier's scope. In case of any problem in storage system, it shall be attended immediately on intimation by us.

#### **4.0 Transportation**

The transportation of complete storage system from suppliers' works to our site and back after contract expiry shall be in bidder's scope and no extra charges will be paid.

#### **5.0 Price variation clause**

The price variation shall not be allowed in rental charges.