

**Technical Procurement Specifications for water  
transport of Liquefied Ammonia Gas  
(LAG) using Ammonia Bullets**

**TPS No. OFF-LAG- AMMB- 003- R5**



<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>INTRODUCTION</b>	<b>SPEC.No. OFF-LAG- AMMB- 003-02</b>	
		<b>Date : 04.02.2021</b>	<b>Sheet 1 of 1 R5</b>

**1. Introduction:**

FACT plans to meet the requirements of LAG (Liquefied Ammonia Gas) at its production unit in Ambalamedu through inland waterways using Barge. For this purpose FACT shall issue 6 numbers of insulated Ammonia bullets owned by FACT to a barge contractor for mounting them in a barge of suitable capacity and design, owned / leased and operated by him for safe transportation of Ammonia.

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
-----------------	-----------------	------------------

<b>FACT –COCHIN DIVISION</b>	<b>TECHNICAL SERVICES</b>
------------------------------	---------------------------

TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS	Facilities by FACT	Spec.No. OFF-LAG- AMMB- 003-03 Sheet 1 of 4	
		Date : 04.02.2021	R5

## 2. Facilities by FACT:

### 2.1 Description of the system:

FACT operates a 900 TPD capacity Ammonia plant at Udyogamandal. Product LAG is stored in two storage tanks of capacity 5000 tons each. The barge jetty at Petrochemical Division has facilities for loading LAG from the storage tanks into the barge and for unloading LAG from Barge to the storage tanks.

The barge jetty at Ambalamedu has facilities for unloading LAG from the Barge and transferring it into a storage tank of capacity 5000 tons.

The ammonia storage installation at Willington Island has a storage tank of 10000 tons capacity for receipt and storage of imported LAG. The barge jetty at Willington Island has facilities for loading LAG into Barge from storage tank.

### 2.2 Ammonia storage and handling system of FACT Petrochemical Division at Udyogamandal:

The ammonia storage, handling and loading / unloading system at FACT Petrochemical Division comprise of the following:

- 1) Two ammonia storage tanks of 5000 tons capacity each with associated refrigeration system.
- 2) Facilities for receiving LAG from the 900 TPD Ammonia Plant to the storage tanks.
- 3) Facilities for loading LAG to the barge at the rate of 40 tons per hour.
- 4) Facilities for unloading LAG from the barge at the rate of 40 tons per hour.
- 5) Facilities for loading LAG to trucks.
- 6) Facilities for unloading LAG from trucks.

The ammonia storages are double walled, double integrity, atmospheric tanks in which LAG will be stored at around 500 mm W.G. and a temperature of  $-33^{\circ}\text{C}$ .

LAG will be loaded into the Barge using the ammonia loading pumps and associated piping. Only one barge can be loaded at a time. While loading the Barge, the vapor ammonia displaced from the barge will be sent back to the ammonia storage tank, without excessive increase of storage tank pressure, through the vapor arm.

PRPD. BY	CHKD. BY	APPRD. BY
----------	----------	-----------

FACT –COCHIN DIVISION

TECHNICAL SERVICES

TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS	Facilities by FACT	Spec.No. OFF-LAG- AMMB- 003-03 Sheet 2 of 4	
		Date : 04.02.2021	R5

The same system can be used for unloading the Barge, by pressurizing Ammonia bullets with compressed ammonia vapor drawn from the refrigeration system and displacing the liquid ammonia to the storage tank. After unloading, the Ammonia bullets will be depressurized by taking the vapors from the barge to the refrigeration system.

Flow meters are provided with facilities to cut the flow to the bullets when the set quantity has passed through it.

### 2.3 Ammonia Storage and Handling System of FACT Cochin Division at Ambalamedu:

The ammonia storage, handling and loading / unloading system at FACT Cochin Division comprise of the following:

- 1) An ammonia storage tank of 5000 tons capacity with associated refrigeration system.
- 2) Facilities for unloading LAG from the Barge at the rate of 40 tons per hour.
- 3) Facilities for unloading LAG from trucks.
- 4) Facilities for unloading LAG from rail wagons.

The ammonia storage is double walled, double integrity, atmospheric tank in which LAG will be stored at around 500 mm W.G. and a temperature of  $-33^{\circ}\text{C}$ .

LAG in barge brought to the jetty, can be unloaded to the storage tank through the metering station and piping by pressurizing the Ammonia bullets with compressed ammonia vapor drawn from the refrigeration system and displacing the liquid ammonia to the storage tank. After unloading, the Ammonia bullets will be depressurized by taking the vapors from the barge to the refrigeration system.

### 2.4 Ammonia storage and handling system of FACT at Willington Island (Cochin Port):

The ammonia storage, handling and loading / unloading system of FACT at Willington Island comprise of the following:

- 1) An ammonia storage tank of 10000 tons capacity with associated refrigeration system.
- 2) Facilities for unloading LAG from ships at a rate of 700 tons per hour.
- 3) Facilities for loading LAG to the Barge (one barge at a time) at the rate of 40 tons per hour.
- 4) Facilities for unloading LAG from the Barge (one barge at a time).
- 5) Facilities for loading LAG to trucks.
- 6) Facilities for loading LAG to rail wagons.

PRPD. BY	CHKD. BY	APPRD. BY
----------	----------	-----------

FACT –COCHIN DIVISION

TECHNICAL SERVICES

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Facilities by FACT</b>	<b>Spec.No. OFF-LAG- AMMB- 003-03</b>	
		<b>Sheet 3 of 4</b>	
		<b>Date : 04.02.2021</b>	<b>R5</b>

The ammonia storage is a double walled, double integrity, atmospheric tank in which LAG will be stored at around 500 mm W.G. and a temperature of –33 C.

LAG will be loaded into the Barge using the ammonia loading pumps and associated piping. Only one barge can be loaded at a time. While loading the Barge, the vapor ammonia displaced from the barge will be sent back to the ammonia storage tank, without excessive increase of storage tank pressure, through the vapor arm.

Flow meters are provided with facilities to cut the flow to the bullets when the set quantity has passed through it.

**2.5 Technical details of the loading and unloading facility at Udyogamandal, Ambalamedu and Willington Island:**

**2.5.1 Liquid Ammonia connection facility:**

No. of Ammonia Bullets	:	Six
Type	:	Quick release coupling
Operating temperature	:	-29 <sup>0</sup> C
Design temperature	:	-35 <sup>0</sup> C
Operating pressure	:	7 kg/cm <sup>2</sup> a
Design pressure	:	21 kg/cm <sup>2</sup> a
Size of quick coupler	:	50 mm

Material of construction:

Coupling & Flange	:	SS 316/321
Flanges size	:	CL 300 ANSI B 16.5 RF

The quick coupler shall be provided with manual locking arrangement.

Additionally an unloading arm of 150 mm size is also available.

**2.5.2 Vapor Ammonia connection facility:**

No. of Ammonia Bullets	:	Six
Type	:	Quick release coupling
Operating temperature	:	-29 <sup>0</sup> C
Design temperature	:	-35 <sup>0</sup> C

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
-----------------	-----------------	------------------

TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS	Facilities by FACT	Spec.No. OFF-LAG- AMMB- 003-03 Sheet 4 of 4	
		Date : 04.02.2021	R5

Operating pressure : 7 kg/cm<sup>2</sup> a  
Design pressure : 21 kg/cm<sup>2</sup> a  
Size of quick coupler : 50 mm

Material of construction:

Coupling & Flange : SS 316/321-  
Flanges size : CL 300 ANSI B 16.5 RF

The quick coupler shall be provided with manual locking arrangement. Additionally an unloading arm of 100 mm size is also available.

PRPD. BY	CHKD. BY	APPRD. BY
----------	----------	-----------

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Technical Requirements for Liquefied Ammonia Gas Barge</b>	<b>Spec.No. OFF-LAG- AMMB- 003-04</b>	
		<b>Sheet 1 of 2</b>	<b>Date : 04.02.2021</b>
		<b>R5</b>	

### 3. Technical Requirements for Liquefied Ammonia Gas Barge:

3.1 The Barge shall be suitably designed for safe navigation through the inland waterways for a minimum of 330 days in a year. Structural design, strength and buoyancy of the Barge shall be suitable to withstand any possible damage on account of grounding or collisions which will affect the capability of Barge to float or expose ammonia tanks to any risk or damage. Speed of the barge shall be in the range of 8 to 15 kilometers per hour. Design, engineering, construction, testing and acceptance trials of the Barge shall comply with all the relevant Code and Rules applicable for Barge deployed for transportation of LAG through inland waterways.

3.2 FACT shall issue 6 numbers of insulated Ammonia bullets owned by FACT for the purpose of containment of LAG by mounting them in the barge of suitable capacity and design explained vide para 3.1 and owned/acquired by the contractor. The ammonia bullets shall be fixed inside the barge with proper structurals. The existing base frames of the wagons can be used. The system shall be compatible with unloading/Loading facilities of FACT.

#### 3.3 Technical Details of the Ammonia bullets:

Size	:	16.375m L x 2.246m O.D ( + 50mm thick insulation)
Liquid handled	:	Liquid Anhydrous Ammonia
Specific gravity	:	0.6814
Design Temperature	:	55 <sup>0</sup> C
Operating Temperature	:	-33 <sup>0</sup> C
Design Pressure	:	22.15 Kg/cm <sup>2</sup>
Operating Pressure	:	1 Kg/cm <sup>2</sup>
Empty weight	:	26,500 kg
Capacity	:	60- 66 m <sup>3</sup> (32MT)
MOC of bullets	:	BS 1501-224-32A L50
Code	:	'A 'class pressure vessel
Insulation	:	as per BS 1500 ; 1958 Poly Urethane Foam Insulation

**PRPD. BY**

**CHKD. BY**

**APPRD. BY**

**FACT –COCHIN DIVISION**

**TECHNICAL SERVICES**



<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Technical Requirements for Liquefied Ammonia Gas Barge</b>	<b>Spec.No. OFF-LAG- AMMB- 003-04 Sheet 2 of 2</b>	
		<b>Date : 04.02.2021</b>	<b>R5</b>
<p>3.4 Necessary facilities shall be provided for loading and unloading of LAG to and from the storage tanks and also for indication and monitoring of the system including the temperature, pressure and liquid level in the storage tanks. Each bullet will be having a vapour line as well as a liquid line and unloading of the bullets will be carried out through the respective couplings.</p> <p>3.5 Gas cutting/welding of lifting legs, clamps, nozzles, additional saddles etc. is not permitted, as the bullets have been post weld heat-treated.</p> <p>3.6 The barge shall be classified for the bulk transport of LAG through Inland Waterways and shall meet all the requirements of Kerala Inland Vessel (KIV) rules 2010. The contractor shall be responsible for obtaining certification and maintaining the validity of certificates for the total Contract period from Classification Societies like IRS or any other member of the International Association of Classification Societies (IACS) for design &amp; constructional aspects of the Barge, for obtaining clearances from Statutory Authorities for operation of the barge and to meet the requirements noted vide para 3.1 to 3.4 &amp; 5.0.</p> <p><b>3.7 The necessary clearance and permits from statutory authorities including Directorate of Ports Kerala, Cochin Port Trust, Inland Waterways Authority of India, Southern Naval Command, Ministry of Environment and Forest, GOI, KSPCB, and local bodies wherever required as per existing rules or as per amendment in the existing rules from time to time during the period of the contract, for navigation of the Barge and movement of LAG by inland water ways through specified routes shall be obtained by the contractor.</b></p>			
<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>	
<b>FACT –COCHIN DIVISION</b>		<b>TECHNICAL SERVICES</b>	

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Safety Requirements for Liquefied Ammonia Gas Barge</b>	<b>Spec.No. OFF-LAG- AMMB- 003-05</b> <b>Sheet 1 of 2</b>	
		<b>Date : 04.02.2021</b>	<b>R5</b>

- 4.1 Safety Requirements for Liquefied Ammonia Gas Barge**
- 4.2 The total responsibility for safe transportation of LAG, without causing any environmental hazards or pollution, rests with the contractor. All safety facilities and accessories required shall be provided to protect personnel in the barge and the population in the areas surrounding the water ways, during eventualities like ammonia leakage, fire grounding of the barge or collision with other vessels.
- 4.3 The barge organized by the contractor shall confirm to all requirements of safety needed for water transport and handling of LAG at high pressure due to temperature rise on account of any delay in unloading. The contractor shall observe all applicable rules and procedures in respect of design, manufacture, up-keep and operation of the equipment.
- 4.4 The barge shall be provided with appropriate safety appliances for personnel safety and facilities for safe escape of the crew in the event of any unexpected and uncontrollable situation. The safety requirements/facilities shall essentially consist of, but not limited to the following:
- 4.3.1 Safety gadgets such as:
- Minimum SIX numbers of single piece encapsulating full body chemical suit on board and minimum SIX nos. of SCBA set and goggles. Provide sufficient number of tarpaulins made of either polypropylene or polyethylene on board of the barge.
- 4.3.2 One inline inductor with five number of foam concentrate (20 litre can) shall be maintained on board the barge.
- 4.3.3 Sprinkler system to be provided throughout the periphery of the Barge. Provision for water curtain shall be available in the barge surrounding each bullet dome
- 4.3.4 Tower lighting with portable back up power supply shall be available to meet any emergency on board the barge.
- 4.3.5 Portable pump with basket strainers shall be maintained in addition to the in built float pump.
- 4.3.6 Provide two approach ladder at opposite sides of the barge for responder to move on board in the event of emergency.

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
<b>FACT –COCHIN DIVISION</b>	<b>TECHNICAL SERVICES</b>	

TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS	Safety Requirements for Liquefied Ammonia Gas Barge	Spec.No. OFF-LAG- AMMB- 003-05 Sheet 2 of 2	
		Date : 04.02.2021	R5
<p>4.3.7 One number of air inflated boat shall be maintained on board of the barge to provide connectivity from land to barge.</p> <p>4.3.8 Provide and maintain 6 nos. of 15 meter delivery hose with two number of zero torque branch for spraying water with sufficient number of hose boxes on board the barge.</p> <p>4.3.9 Provide and maintain 3 numbers of CO2 extinguishers ( 4.5 kg).</p> <p>4.3.10 Additional diesel engine driven fire hydrant pump shall be available and connected to the sprinkler system.</p> <p>4.3.11 Cabin of the barge shall be airtight and shall be in accordance with the Classification Society rule requirement</p> <p>4.3.12 All the light fittings/power sockets in the barge shall be flame proof and shall be in accordance with the classification Society rule requirement.</p> <p>4.3.13 First aid box shall be provided and MSDS / TREM cards to be exhibited properly.</p> <p>4.3.14 Provide and maintain Communication facilities, public address system along with emergency siren on board.</p> <p>4.4.0 The instructions of FACT Management through its staff/employees shall be obliged by the Contractor regarding operation and safety of barge movement from time to time.</p> <p>4.5.0 The operating staff/ crew engaged by the contractor shall be properly and adequately instructed in writing in a language understood by them, on the material handled by them, its properties, its storage conditions, consequence of any exposure to it in the event of leakage and procedure to be followed in the event of any unexpected disaster situation. The Crew members shall be imparted with training in safe handling of hazardous chemical including Ammonia , wearing of SCBA, full body chemical suit, trap and control procedures, arresting ammonia leak using leak sealing belts and pads, first aid emergency procedures and other response procedures and a register should be maintained</p> <p>4.6.0 In the event of contractors barge not having been appropriately certified by the concerned authorities or due to other unsatisfactory conditions, FACT reserves the right to reject any barge brought by contractor due to its unsound condition or being not worthy of water transport or found unsuitable for the transportation of LAG.</p> <p>4.7.0 The barge shall have a Supervisor on board with single point responsibility.</p>			
PRPD. BY	CHKD. BY	APPRD. BY	
FACT –COCHIN DIVISION		TECHNICAL SERVICES	

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Broad technical specifications - Inland waterway barge for carriage of ammonia bullet tanks</b>	<b>Spec.No. OFF-LAG- AMMB- 003-06</b>	
		<b>Sheet 1 of 3</b>	<b>Date : 04.02.2021</b>
		<b>R5</b>	

**5.0 Broad technical specifications - Inland waterway barge for carriage of ammonia bullet tanks:**

The broad technical specification listed below may not be complete and exhaustive enough to meet all the Rules, Regulations and Statutory requirements. Any mandatory requirement over and above what is listed in this document should additionally be complied with. The Company reserves the right to modify any technical parameters and specifications at any time at their discretion.

The broad technical specifications of the vessel are as follows:

- 5.1.0 Each of the bullet tanks along with its insulations would have an extreme dimension of about 16.5m length and 2.4m diameter. The loaded weight of each bullet tank would be about 60 tonnes. The contractor shall accommodate the 6 bullets in one barge or more than one barge. The quantity transported shall not be less than 192 tons per day as per clause 8.8. The bidder shall submit a detailed scheme / drawing of the proposed arrangement for mounting the bullets on the barge and the detailed plan for accomplishing movement of minimum 192 tons per day as per his proposed arrangement. / scheme. Integrated Tug Barge (ITB) is also acceptable
- 5.2.0 The vessel carrying the bullet tanks should be made of ship building steel.
- 5.3.0 The vessel is expected to operate between FACT's Ammonia Handling Installation at Cochin Port and FACT (CD), Ambalamedu / FACT(PD), Udyogamandal and FACT(CD), Ambalamedu taking a route through the Champakkara canal (National Waterway No. 3). This route has several shallow patches. The actual dimensions of the vessel should be such that it will permit safe operation through this route at all possible loading condition and tide and also taking into consideration the several bridges in the waterway from Cochin port and FACT Installations. Ballasting the vessel to achieve the air draught restriction is permitted.
- 5.4.0 The bidder shall specify the dimensions and other particulars of the proposed barge in the offer.
- 5.5.0 The scantlings of the vessel, the equipment on board for safe operation, lifesaving, firefighting, navigation, crew accommodation standards and the overall configuration with Ammonia in bullet tanks should have the approval of a Classification Society who is also a member of IACS (International Association of Classification Societies). In addition, it should also conform to the special rules of the said Classification Society for carriage of Liquefied Anhydrous Ammonia

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
-----------------	-----------------	------------------

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Broad technical specifications - Inland waterway barge for carriage of ammonia bullet tanks</b>	<b>Spec.No. OFF-LAG- AMMB- 003-06</b>	
		<b>Sheet 2 of 3</b>	
		<b>Date : 04.02.2021</b>	<b>R5</b>
<p>5.6.0 Sufficient accommodation spaces should be provided in accordance with the norms for crew safety and comfort. The crew strength should be in accordance with the Regulation for a vessel engaged in the transportation of cargo in the Inland waterways.</p> <p><b>5.7.0 Stability:</b></p> <p>5.7.1 The cargo (Ammonia) being a dangerous liquefied gas, the following norms of intact stability will have to be satisfied:</p> <ul style="list-style-type: none"> <li>a) Proof of sufficient intact stability shall be furnished for all stages of loading and unloading and for the final loading condition.</li> <li>b) Stability (intact): <ul style="list-style-type: none"> <li>(i) Stability is to be assessed according to the requirements of GZ curve area, minimum righting lever and initial metacentric height</li> <li>(ii) The requirements for intact stability resulting from the damaged stability calculations shall be fully complied with.</li> </ul> </li> </ul> <p>5.8.0 The main machinery shall be in the aft of the vessel..</p> <p>5.9.0 The Ammonia bullets have to be located below deck in the cargo area.</p> <p>5.10.0 No source of ignition is to be present in the cargo space.</p> <p>5.11.0 The cargo space is to be segregated from the other spaces by gas-tight bulkheads.</p> <p>5.12.0 The bullet tanks should be supported by the hull such as to prevent bodily movement of the tank under static and dynamic loads while allowing contraction and expansion of the tanks under temperature variations and hull deflections without undue stressing of the tanks and the hull.</p>			
<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>	
<b>FACT –COCHIN DIVISION</b>		<b>TECHNICAL SERVICES</b>	

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Broad technical specifications - Inland waterway barge for carriage of ammonia bullet tanks</b>	<b>Spec.No. OFF-LAG- AMMB- 003-06</b>	
		<b>Sheet 3 of 3</b>	<b>Date : 10.01.2017</b>
<b>R4</b>			
<p>5.13.0 Anti-floatation arrangements are to be provided for the bullet tanks. Such arrangements are to be suitable to withstand an upward force caused by an empty tank in a hold space flooded to the maximum full load draught of the ship, without exceeding the yield stress in the material of all involved structures.</p> <p>5.14.0 Accommodation area, Engine room, Bilge system, water spraying system, fuel oil tanks, electrical system and Ballast system shall have the approval of Classification Society who is also a member of IACS (International Association of Classification Societies). In addition, it should also conform to the special rules of the said Classification Society for carriage of Liquefied Anhydrous Ammonia.</p> <p><b>5.15.0 Proposed General Arrangement:</b></p> <p>A typical GA drawing of 6 bullets in a barge showing piping, instruments etc. is attached as Annexure 1 for reference purposes. The GA drawing is indicative only and changes may be carried out in the piping for safety of operations as per the P&amp;ID provided by FACT. The bidder shall submit a detailed GA drawing of the proposed arrangement of bullets in the barge.</p>			
<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>	

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Maintenance of Equipment</b>	<b>Spec.No. OFF-LAG- AMMB- 003-07</b>	
		<b>Sheet 1 of 1</b>	
		<b>Date : 04.02.2021</b>	<b>R5</b>
<p>6.1 <b>Maintenance of Equipment:</b></p> <p>6.2 The contractor is expected to maintain the equipment scheduled for the work in good condition. To enable this, the contractor will be normally allowed to withdraw the barge from service for a maximum period of thirty days per calendar year to meet the needs of docking, repairs and maintenance.</p> <p>6.3 The program of laying up the barge for the above purpose including the requirement if any of longer periods of lay up in some years to meet the needs of special survey etc. shall be discussed with FACT well in advance so that FACT's operations are not affected on this account.</p> <p>6.4 The scope of maintenance for the contractor includes the barge and all equipment associated except the bullets. The routine overhauling of the bullets shall be carried out by FACT in the frequency fixed by FACT during the contract period. Competent personnel of FACT shall handle the inspection, testing and maintenance of the bullets. However, damage to the bullets/bullet insulation shall be avoided during normal operations and care shall be taken to maintain the bullets in the best possible manner.</p>			
<b>PRPD. BY</b>		<b>CHKD. BY</b>	<b>APPRD. BY</b>
<b>FACT –COCHIN DIVISION</b>		<b>TECHNICAL SERVICES</b>	

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Scope of work</b>	<b>Spec.No.OFF-LAG- AMMB- 003-08</b>	
		<b>Sheet 1 of 1</b>	<b>Date : 10.01.2017</b>
		<b>R4</b>	

**7.0 Scope of work:**

**7.1** Water transport of Liquefied Ammonia Gas (LAG) at -33Degree Centigrade by Barge from FACT Petrochemical Division (PD) at Udyogamandal / FACT Ammonia Storage at Willington Island, Cochin Port to FACT(CD), Ambalamedu and FACT Ammonia Storage Tank at Willington Island, Cochin Port to FACT (PD), Udyogamandal as per the following routes:

- a) From the barge jetty at FACT's Petrochemical Division at Udyogamandal to the Barge jetty at FACT's Cochin Division at Ambalamedu.
- b) From the barge jetty at FACT's Ammonia Storage Installation at Willington Island, Cochin port to the Barge jetty at FACT's Cochin Division at Ambalamedu.
- c) From the barge jetty at FACT's Ammonia Storage Installation at Willington Island, Cochin port to the Barge jetty at FACT's Petrochemical Division at Udyogamandal.

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
-----------------	-----------------	------------------

**FACT –COCHIN DIVISION**

**TECHNICAL SERVICES**



<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Scope of Contractor</b>	<b>Spec.No. OFF-LAG- AMMB- 003-09</b>	
		<b>Sheet 1 of 2</b>	<b>Date : 04.02.2021</b>
		<b>R5</b>	

**8.0 Scope of Contractor:**

8.1 Transporting the dismantled ammonia bullets to Jetty / barge lying site and fixing the bullets on the barge, without damage to vessel and insulation. Rigging arrangements for lifting of the bullets may be suitably devised in the absence of lifting legs. Any damage to the PUF insulation, cladding due to rigging operation/ transportation of the bullets etc. shall be made good by the Contractor at his own cost before commissioning of the bullets.

8.2 Labour involved in transporting and fixing the bullets

8.3 Lifting tackles, machinery and carriages needed for the above work.

8.4 Piping, walkways, supports work etc inside the barge including all materials required for fabrication, testing of the installation, maintenance and statutory testing of installation on board except the bullets.

8.5 PUF insulation of liquid and vapour lines inside the barge from bullets to isolation valves (Ball valves).

8.6 All piping materials/valves etc. (LTCS) & PUF Insulation of piping shall be as per specification provided by FACT.

8.7 Coupling & Decoupling of Quick release couplings for loading / unloading activities shall be carried out by the contractor under the supervision of FACT's representative.

8.8 FACT's required quantity is 192 MT / day for transportation of LAG from:

a) FACT (PD) at Udyogamandal to FACT (CD) at Ambalamedu;

OR

b) FACT Ammonia Storage (Willington Island), Cochin Port to FACT (CD) at Ambalamedu;

OR

c) FACT Ammonia Storage (Willington Island), Cochin Port to FACT (PD) at Udyogamandal.

The bidder may quote the maximum quantity he will be able to transport per day using his barge

8.9 Work site for fixing the Ammonia bullets in the barge and the connected works can either be at FACT(CD) site or at the discretion of the contractor. FACT representatives shall inspect the work at FACT site or other sites as and when the contractor makes available the job for inspection.

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
<b>FACT –COCHIN DIVISION</b>	<b>TECHNICAL SERVICES</b>	

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Scope of Contractor</b>	<b>Spec.No. OFF-LAG- AMMB- 003-09</b>	
		<b>Date : 04.01.2021</b>	<b>R5</b>

- 8.10 The barge Operator shall be ready in all respects for transportation of LAG within 4 months of award of contract or within 4 months of issue of Ammonia bullets by FACT which ever is later.
- 8.11 The bullets have to be returned to FACT-CD with in 30days after completion of the contract period. The contractor shall arrange for dismantling the bullets from the barge and for transportation of the same to designated location in FACT(CD) as per instructions of FACT Representative.

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
<b>FACT –COCHIN DIVISION</b>	<b>TECHNICAL SERVICES</b>	

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Facilities by Contractor</b>	<b>Spec.No. OFF-LAG- AMMB- 003-10</b>	
		<b>Sheet 1 of 2</b>	<b>Date : 04.02.2021</b>
		<b>R5</b>	

**9.0 Facilities by Contractor**

- 9.1 Contractor shall own / acquire the required barge as per para 3 at his own cost and use them for the transportation of the required quantity of LAG. Contractor shall transport sufficient quantity in order to meet the day to day requirement and also to maintain a buffer stock in FACT's storage tanks so that FACT's plants can be operated uninterrupted and smoothly.
- 9.2 The barge provided by contractor shall confirm to operating conditions specified by FACT, applicable design codes, statutory regulations in vogue, good engineering practice and with all Safety precautions. Contractor shall be responsible to obtain approval of the statutory as well as of Certification Agency for the design and drawings of the barge as applicable for carrying the bullets for transportation of Ammonia and shall produce the related documents to FACT. FACT Management or authorized representatives shall also have access to the works of contractor and their sub-contractors for inspection of barge at any stage to ascertain progress of manufacture and/or quality of work and more over shall have the right to inspect the barge at any time during the period of contract.
- 9.3 FACT shall extend all co operation to the contractor to obtain the necessary Navigation certificates licenses, clearances etc. from the authorities concerned. However, contractor shall be solely responsible for timely receipt of required certificates, licenses etc. Contractor shall renew the Licenses, certificates, Clearances etc. from time to time as stipulated by the authorities concerned and keep them valid for the entire duration of the contract. Valid certificates, licenses and clearances etc. shall be made available to FACT as and when required.
- 9.4 Contractor shall ensure that the specification of all valves and fittings inside the Barge/ bullet shall be as per P&ID and shall match with vapor arm and liquid arm couplings issued by FACT. FACT shall within one week from the date of award of contract, furnish to the contractor details and specifications of couplings and pipe/pipe fittings to be fitted in the barge. Contractor shall inform the details of operating staff/crew for the barge operation one week before starting the operation.
- 9.5 If changes are required to be made at a future date on the coupling arrangements provided on the barge / bullet of the contractor, the same shall be undertaken only with the prior approval of FACT.
- 9.6 Contractor should ensure that his equipment and employees have adequate coverage under the statutory obligations including ESI/Workmen's Compensation Act. Payment of Wages Act, Motor vehicles Act, Safety regulations etc. as may be applicable and expenditure for these shall be met by the contractor. No extra payment will be made by FACT on this account and contractor shall indemnify FACT against such expenditure / claims.

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
-----------------	-----------------	------------------

<b>FACT –COCHIN DIVISION</b>	<b>TECHNICAL SERVICES</b>
------------------------------	---------------------------

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Facilities by Contractor</b>	<b>Spec.No. OFF-LAG- AMMB- 003-10 Sheet 2 of 2</b>	
		<b>Date : 04.02.2021</b>	<b>R5</b>

- 9.7 Contractor shall ensure that the transportation system is operated safely without causing any environmental hazards or pollution and that no danger is caused to men / materials/marine life or facilities belonging to third parties or Public / FACT.
- 9.8 The barge with the bullets shall be used only for the purpose for which it is intended as per the contract.

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
<b>FACT –COCHIN DIVISION</b>		<b>TECHNICAL SERVICES</b>

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Quality of Work</b>	<b>Spec.No. OFF-LAG- AMMB- 003-11</b>	
		<b>Date : 04.02.2021</b>	<b>Sheet 1 of 1</b> <b>R5</b>

**10.0 Quality of Work:**

- 10.1 Contractor shall execute work diligently and according to appropriate specifications consistent with the requirements explained vide para 3 to 8 hereof. If FACT is not satisfied with the design, specifications or material of construction or workmanship of the barge/ components of the barge other than the Ammonia bullets, contractor shall rectify the defect immediately at his own cost on receipt of notice there of from FACT on design, construction and final inspection stage and also when repairs are carried out during the contract period.
- 10.2 Loading and unloading of LAG will have to be done ensuring all safety procedures and strictly as per the direction of the FACT employee assigned for this purpose.
- 10.3 The contractor shall carry out the transportation efficiently, without causing any hazard or inconvenience or nuisance to Public/FACT. It will be the sole responsibility of the contractor to supervise and direct the work of the contractor's workmen during transportation and all other related operations. Only qualified and experienced personnel shall be employed as operation crew and there shall be a Supervisor with single point responsibility.
- 10.4 The contractor's crew shall carry out necessary actions required for mitigation of any emergency during transportation of LAG.

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
-----------------	-----------------	------------------

**FACT –COCHIN DIVISION**

**TECHNICAL SERVICES**

<b>TECHNICAL PROCUREMENT SPECIFICATION FOR WATER TRANSPORT OF LAG USING AMMONIA BULLETS</b>	<b>Scope of FACT</b>	<b>Spec.No. OFF-LAG- AMMB- 003-12</b>	
		<b>Sheet 1 of 1</b>	<b>Date : 04.02.2021</b>
		<b>R5</b>	

**11.Scope of FACT:**

11.1 Owner ship of the Ammonia bullets and their maintenance.

11.2 Crane service with operator free of charges will be provided for loading the bullets lying at FACT (CD) railway siding for transportation and further for fixing the Ammonia bullets in the barge at FACT (CD) jetty. (Transportation of the bullets from railway siding to the jetty is in Contractor’s scope). Crane service with operator will also be provided free of charges similarly, for loading and unloading at FACT(CD) site during return of the Ammonia bullets to FACT(CD) after completion of the contract period.

11.3 Stripping of PUF insulation and all NDT tests will be carried out by FACT before transportation of bullets to the jetty by the contractor. The new PUF insulation will be done after Inspection & Certification of the bullets by a Third party Inspection Agency in 2 stages, i.e.,

- a) PUF insulation of the bullets will be done near the jetty/railway siding leaving a gap of about 0.8M width circumferentially at 2 locations as specified by the bidder for lifting and placing the bullets in the barge.
- b) PUF insulation of the left out portion will be done after erection inside the barge.
- c) Erection of only 2 bullets can be done at a time due to limitation in space to complete the PUF insulation of the left out portion. On completion of PUF insulation of the first 2 bullets, erection of the next batch can be done. Six days will have to be spared by the contractor for completion of PUF insulation inside the barge.

11.4 Mating loading/ unloading couplings will be provided free of cost.

11.5 Providing specification for piping works, valves, PUF insulation for piping, P& ID and Isometrics.

11.6 Power and water within 100 meters of the work spot for erection in the barge will be provided at one point free of cost (If work is done at FACT premises). Further, distribution if any required to be arranged by the contractor.

11.7 Stage wise inspection of the work at the contractor’s site.

<b>PRPD. BY</b>	<b>CHKD. BY</b>	<b>APPRD. BY</b>
-----------------	-----------------	------------------

**FACT –COCHIN DIVISION**

**TECHNICAL SERVICES**