



कोलकाता पत्तन न्यास/ KOLKATA PORT TRUST

यांत्रिक व विद्युत अभियंत्रण विभाग /Mechanical & Electrical Engineering Department
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No. Mech/SP-II/3612

Dated, the 11th December, 2019

1. M/s. Bureau Veritus (I) Pvt. Ltd.,
Eco Center, EM-04, 16th Floor,
Unit-1601 & 1602, Sector-5,
Kolkata – 700 091
2. M/s. IR Class Systems & Solutions Pvt. Ltd.,
205, Centre Point,
21, Hemanta Basu Sarani, Kolkata – 700 001
3. ABS Industrial Verification (India) Pvt. Ltd.,
204/205, Mayuresh Chambers, CBD Belapur,
Navi Mumbai- 400 614
4. DNV GI India, Kolkata,
163, S.P. Mukherjee Marg,
Thapar House, 6th Floor,
Kolkata – 700 026
5. Lloyds Inspection Agency Pvt. Ltd.,
Golden Metro, Office No. 2A, 2nd Floor,
Pettah Bridge, Kochi.

Dear Sirs,

Sub: Quotation for the work of approval of design calculations, drawings and stage inspections of 1 no. Fog Cannon (Airborne Dust Suppressant Unit).

Kolkata Port Trust has placed an order on M/s. EXCEL Combine, 71/1A, Excel House, Ground Floor, D.V. Cooperative Housing Society, Agalli, Fatorda, Margao Goa, Goa-403602 for supply, delivery, installation, testing and commissioning of 1 no. Truck Mounted High Pressure Water Fog Cannon (Airborne Dust Suppressant Unit). The specification of the Fog Cannon is attached herewith. Kolkata Port Trust intends to engage a Third Party for approval of design calculations, drawings and stage inspections of the said Fog Cannon (Airborne Dust Suppressant Unit). The Scope of Work of the Third Party is given below:

A. Approval of design and drawing.

- (i). General Arrangement (GA) drawing showing all the assemblies/sub-assemblies of the Fog Cannon complete unit,
- (ii). Design calculation showing suitability of the sub-assemblies viz. Chassis, D G Set, Pump-Motor set etc. in respect of specified parameters,
- (iii). Load calculation of the Fog Cannon Complete Unit showing load distribution on Axles,
- (iv) Drawing of Water Tank showing holdings with the Chassis for approval of KoPT.

B. Approval of QAP

C. Inspection.

- (i). Inspection of Chassis at contractor's workshop,
- (ii). Inspection after fabrication and mounting of Water Tank and DG Set on Truck Chassis at contractor's workshop and
- (iii). Inspection before despatch of the Fog Cannon complete in all respect at contractor's workshop.

D. Performance Guarantee Test as site before acceptance.

2. Payment would be made in full after completion of Scope of Work in totality. Cost of transportation of Third Party Inspecting Engineer/Inspector shall be borne by the Third Party. M/s. EXCEL Combine, the contractor shall arrange all facilities to carry out inspection and testing.

3. You are now requested to submit your firm quotation ***in sealed cover*** for the above said Scope of Work as per format given below, within 18.12.2019 positively.

PRICE OFFER

Fees including all charges excluding GST for the work of approval of design calculations, drawings and stage inspections of 1 no. Fog Cannon (Airborne Dust Suppressant Unit) ordered on M/s. EXCEL Combine, Goa as per terms of the Scope of Work of this enquiry letter. GST as applicable would be paid extra at actual.	Rs.....
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(S. Roy)
Superintending Engineer
For Chief Mechanical Engineer

TECHNICAL SPECIFICATION OF FOG CANNON

The Truck-mounted Fog Cannon Mist Machine should be capable of suppressing air-borne dust, generated from different types of materials, including fine and micro fine dust, in open areas / Yards / Railway Sidings / Berths / Sheds, etc. It should be capable of suppressing air-borne dust without the use of any surfactants or chemicals. Necessary lighting / illumination arrangement shall be provided on the Truck for operation during night hours. The Fog Cannon shall have the following parameters:

- (i). Water Tank capacity : 8000 litres,
- (ii). Horizontal throw range of water mist : 50 metres under no wind conditions.
- (iii). Vertical peak : 12 metres.
- (iv). Minimum number of Nozzles : 50 (SS316 L Grade),
- (v). Minimum flow through nozzle : 1.2 LPM,
- (vi). Rotation and tilting of Fog Cannon : Automatic arrangement for (280 degrees rotation, -5 degree to 40 degree up and down tilting). Manual arrangement for said operations shall also be provided.
- (vii). Capacity of Generator Set : Minimum 30 KVA.

1. MIST CANNON:

- (i). The Fog Cannon shall be fitted with Nozzles (SS316 L Grade), Gun, High Speed Fan, rotating mechanism, Pump set and internal connections, other components suitable to operate in Port working conditions to get maximum dispersal of fog for effective dust suppression.
- (ii). The system shall be fitted with 1 Multi-stage Centrifugal Pump set, developing suitable pressure, for collection of water from fabricated Water Tank of capacity 8000 litres, suitable for horizontal throw range of Water Mist to 50 metres and vertical peak up to 12 metres. The Pump set shall be capable of working with inlet water pressure of minimum gravity pressure.
- (iii). Finest fog of direct pressure nozzle shall produce high percentage of droplets in the range of 25 - 200 microns. The Contractor shall provide the validation certificate in this regard. Spray pattern shall be cone shaped.
- (iv). The system shall have suitable automatic Pump protection, to ensure that in the event of stoppage of water supply to Pump, the Pump will get stopped completely, thereby preventing the Pump from getting damaged.
- (v). The system shall be provided with suitable Electrical Motor to rotate high speed specially designed Fan for throwing the mist to 50 metre distance under no wind conditions.
- (vi). The system shall have the facility in manual mode and in automatic mode to set for Barrel tilting from angle -5° to +40°.
- (vii). The system shall have the facility to rotate 280 degrees for spraying with maximum coverage. The rotation of the system shall have facility to be set manually and in automatic mode.
- (viii). The system shall have the facility to operate the Fog Cannon both by internal DG Set and external power sources. Suitable size of electrical cable of length minimum 30 metres, with proper termination/plug/socket for connecting to the external power source, shall be provided.
- (ix). The system shall be provided additionally with Water Hoses, of suitable size and length of minimum 30 metres, with quick fix coupling arrangements, for easy connection and dismantling for manual operations of water jetting in case of any emergency.

2. **CAB CHASSIS:**

(i). Broad Technical Specifications of Chassis are as follows:

Wheel Base: 4200 mm (minimum)

Power: 125 HP (minimum)

Steering: Power / Power-assisted Hydraulic

No. of Wheel: Minimum 6 (six) nos., with built-up Driver's Cabin.

Gross Vehicle Weight (GVW): To the tune of 16 MT.

Cabin: Factory fitted Cabin for Driver + 1.

(ii). The Contractor shall have to select the Chassis in such a way that the complete Fog Cannon Machine unit is installed on the Chassis, without any hindrance. Necessary documents (viz. Temporary Registration/Permit, Insurance, PUC etc.), for movement of the Chassis from the Chassis supplier's location to the Contractor's works, shall be arranged by the Contractor. Final Registration of the vehicle in Kolkata, West Bengal, in the name of KDS, KoPT, shall have to be arranged by the Contractor, after the completed vehicle (i.e., Truck-mounted Fog Cannon Machine) is delivered to KDS, KoPT.

(iii). All Axles should be loaded within the maximum permissible pay load specified by the Chassis manufacturer. Any restriction on performance of Chassis, observed during/after execution of order shall have to be rectified by Contractor, in consultation with KDS, KoPT and the chassis manufacturer. Such corrections shall be at no extra cost to KDS, KoPT.

(iv). The spare Wheel assembly (supplied along with the Chassis) shall be fitted at a suitable place. Drag Hook or Eye Hook, with adequate strength and design, shall be provided at the rear of the Chassis.

(v). All wiring shall be properly fixed in position and should be protected against heat, oil and physical damage. Wherever possible, wiring should pass through PVC Sleeves.

(vi). All important Electrical Circuits shall have separate Fuses suitably indicated and grouped in a common Fuse Box located in an easily accessible position. Provision should be made for minimum 4 (four) nos. spare Fuse in the Fuse Box. Fuse Box should have visual marking to identify individual Fuse details.

(vii). The Contractor shall be responsible for design, engineering and construction of the complete appliance to the full satisfaction of KDS, KoPT.

(viii). At the end of complete fabrication/manufacture of Fog Canon Machine, the vehicle with fully laden conditions shall be checked and certified by the Contractor for correct load distribution on individual Axle. The actual individual load on Axle shall not exceed the allowable limit specified by the Chassis manufacturer or regulating authority, whichever is lower.

3. **WATER TANK:** The Water Tank shall be of minimum 8000 Litres capacity, fabricated with IS 2062 (considering latest amendment) Gr. "B" Steel and fitted with the chassis. Minimum 6 mm plate to be used for the tank excepting top which may be of 4 mm thickness. The tank should be rectangular shaped with round edges. EPOXY prime and paint shall be given to inside and outside of water tank after surface preparation. Water Tank shall be firmly installed on chassis with all required assemblies without making any whole. Two nos. manhole cover fitted with removable covers, ladder, catwalk shall be provided. The tank shall be connected to the pump. Suitable plumbing between pump and water tank shall be made to have a clear and unobstructed waterway throughout without any obstructions. LIFTING EYES shall be provided on the shell of the

Tank to enable the Tank to be lifted off the vehicle for repairs/replacement as necessary. A tube type water level indicator for the water tank shall be fitted on and near the pump control side panels.

4. DIESEL GENERATOR (DG) SET:

(i). Minimum 30KVA DG Set with Alternator and all other arrangements (to take the load of Fog Cannon and Pump Sets) in acoustic enclosure, as per the relevant Indian Standards, shall be fitted with residential type silencer. The complete assembly must be fitted firmly on the Chassis unit.

(ii). The Alternator shall be self-excited, self-regulated, 3 (three) Phase, 415 Volts, 50 Hz, 1500 RPM and shall conform to the relevant Indian Standard(s), with latest amendment(s). The Alternator shall be screen protected drip proof with IP-23 degree of protection as per IS: 4691/85. The Class of insulation of Alternator shall be F/H.

(iii). Diesel Engine shall be air/water/liquid cooled and rated for continuous duty as specified. Electric start developing required BHP at 1500 RPM, with governing, to deliver specified continuous KVA output at 0.8 lagging PF at NTP conditions. The Diesel Engine should be capable of providing 10% overload for 1 hour for every 11 hours of continuous running at full load. The Diesel Engine shall be complete with following accessories.

(iv). Fuel Tank capacity: Minimum 50 Litres.

(v). Engine Instrument Panel consisting of Starting Switch with Key, Low Lubrication Oil Pressure and High Water Temperature Indicators, RPM Indicator, Fuel Gauge and Hour Meter.

(vi). The required Safety Controls to shut down the Engine in the event of low Lubrication Oil Pressure, High Water Temperature and Engine Over Speed and High Cylinder Head Temperature, as required for the Engine, as stated above.

(vii). All required safeties as per standards. 12 V Starting System, complete with Starter Motor Charging Alternator and Cut Out. Sealed Maintenance-free Battery, of suitable rating, with connecting Cables. The Batteries shall be supplied in fully charged condition and shall conform to the relevant IS specifications (considering latest amendment). The systems should charge the Batteries automatically, while the Generator is in running condition.

(viii). Make of Engine: Kirloskar / Cummins / Greaves Cotton / Mahindra / Ashok Leyland / Caterpillar. Make of Alternator: Kirloskar / Stamford / Leroy Sommer / Caterpillar / Crompton Greaves.

5. ELECTRICAL SYSTEM:

The Electrical system shall consist of minimum 2 (two) nos. Batteries of 100 Ampere Hour. Alternator of adequate capacity, to charge the above Batteries in the shortest possible time, and allied regulating equipment shall be provided. A suitable Battery Charger shall be provided separately. All important Electrical Circuits shall have separate Fuses, suitably indicated, and shall be grouped into a common Fuse Box located in an accessible position in the Driver's Cabin and fitted with means for carrying spare Fuses. The wiring shall be single pole and shall not be exposed to the atmosphere. Conduits shall be used wherever necessary.

6. CONTROL PANEL:

The Control Panel shall be fabricated from CRCA (Cold Rolled Carbon Annealed) Sheet Steel of minimum 2/2.5 mm thick duly pre-treated/powder coated and aesthetically finished. The Control Panel shall be totally enclosed, dust and vermin proof integral type, with IP 53 degree of

protection as per the relevant Indian Standard(s), with latest amendment(s). The Control Panel shall have the following instruments:

Digital Voltmeter (to show Generator Voltage),
Digital Ammeter (to show load Current),
Digital Frequency Meter,
Digital Energy Meter,
One (1) MCCB/RCCB of suitable rating for DG Set,
Push Button Switches for ON and OFF operation,
Pilot Lamps - 3 (three) Nos. [for Phase, Load On Set & Charging indication), and
Battery Charger (complete with Voltage Regulator, Voltmeter and Ammeter for charging the Batteries).

7. **HIGH PRESSURE PUMP**: Other than the requirement of dust suppression by Cannon Mist, the same may be used for sprinkling of water on roads and other areas for suppression of dust. In line with the above, the equipment will be supplied along with Pump and Hose.

8. **REAR SPRINKLERS**: 2 nos. Rear Sprinkler shall be provided for sprinkling of water on roads. It shall have separate valve to control the flow of water. It shall have the facility to operate the Rear Sprinkler by the Truck Driver from the Driver Cabin itself.

9. **PAINTING AND MARKING**:

(i). Chassis, cabin, bumper, mudguard, bonnet, wheel drum etc. shall be painted by two coats of primer and two coats of Polyurethane finish paint. All other things to be painted with epoxy paint.

(ii). Lockers/Cabins shall be provided with Stainless Steel Name Plates with letters etched on it boldly indicating the content.

(iii). KoPT's emblem in blue colour, together with name KOLKATA PORT TRUST shall be written on both sides of the vehicle.

(iv). In the front of the vehicle, 'FOG CANNON' shall be written in English.

(v). Mud Flappers shall be provided at wheels.

(vi). The appliance shall be clearly having the following marks at the rear side of the vehicle:

Name of manufacturer,
Year of manufacture,
Capacity of Water Tank in liters,
DG Set Capacity,
Pump Capacity etc.

(vii). All instrument control and valves shall be identified with properly etched metallic name plates.

10. **DESIGN AND DRAWING APPROVAL**:

After award of Order Letter, the Contractor shall, within 10 days, submit (i). General Arrangement (GA) drawing showing all the assemblies/sub-assemblies of the Fog Cannon complete unit, (ii). Design calculation showing suitability of the sub-assemblies viz. Chassis, D

G Set, Pump-Motor set etc. in respect of specified parameters, (iii). Load calculation of the Fog Cannon Complete Unit showing load distribution on Axles, (iv) drawing of Water Tank showing holdings with the Chassis for approval of KoPT or Third Party, to be engaged by KoPT. However, such design and Drawing approval shall not relieve and absolve the Contractor of his responsibilities for the quality of material, efficiency and performance of the machine.

11. QUALITY ASSURANCE PLAN (QAP):

The Contractor shall submit detailed QAP for approval by KoPT or a Third party, to be appointed by KoPT. After approval, the same shall be followed for the execution of the contract. The details of the tests, etc., shall be included in the QAP, specifying the relevant Indian Standard(s), etc.

12. INSPECTION AND TESTING:

Prior to despatch of the vehicle from contractor's works, stage-wise inspections and testing shall be carried to the satisfaction of KoPT or the Third Party Inspection Agency, to be appointed by KoPT, without any extra cost to KoPT. The Contractor shall arrange all facilities to carry out inspection and testing and all consumable e.g. HSD, Engine Oil, Lubricating Oil, Water etc. shall have to be arranged by the contractor at his own cost and liability. Final performance tests/inspection for the complete Fog Cannon Unit shall be carried out by KoPT or the Third Party Inspection Agency at KoPT site.

13. ACCEPTANCE TEST:

The contractor at his own cost and liability shall carry out the following tests at KoPT site. The Fog Cannon would be accepted only after declaration as commissioned, after satisfactory performance of the tests.

- (i). The Fog Cannon would be such that it would not affect the Chassis characteristics, as specified by the Chassis manufacturer, such as speed, turning circle, acceleration, etc.
- (ii). The Fog Cannon would be tested for delivering Mist Fog at their rated capacity and horizontal range also as per specifications.