



**BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.
BIFPCL**

**2X660 MW MAITREE SUPER THERMAL POWER PROJECT
AT RAMPAL, BANGLADESH**

**TECHNICAL SPECIFICATION
FOR
FIRE TENDER AND AMBULANCE CAR**

SPECIFICATION NO.: PE-TS-421-550-A001



**BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA**

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TECHNICAL SPECIFICATION
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SECTION IA

INTENT OF SPECIFICATION



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA



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1.0 INTENT OF SPECIFICATION

Total lump sum firm price inclusive of all prevailing taxes, duties and other levies for Supply part comprising of design (i.e. preparation and submission of drawing /documents including "As Built" drawings and O&M manuals), engineering, manufacture, fabrication, assembly, inspection / testing at vendor's & sub-vendor's works, painting, maintenance tools & tackles, fill of lubricants & consumables as required, forwarding, proper packing of accessories, shipment and delivery as per NIT and carrying out Performance guarantee / Functional / Demonstration tests at site, training of customer/client O&M staff, temporary registration, permanent registration and required vehicle insurance and handover in flawless condition to the end customer complete with all accessories for the total scope defined including supply of fire safety equipments including extended warranty for vehicles as per BHEL NIT & tender technical specification (PE-TS-421-550-A001) as specified above, amendment & agreements till placement of order.

The bidder's scope shall also include any other services, etc. if called for in the succeeding sections of the specification.

- 1.2 It is not the intent to specify completely all details and construction of the equipment. However, all the equipment shall conform, in all respect, to high standard of engineering, design and workmanship and be capable of performing in continuous commercial operation up to desired period.
- 1.3 BIDDER's guarantee in a manner acceptable to the PURCHASER who will interpret the meaning of drawing and specification and shall have power to reject any work or material which, in his judgement, are not in full accordance with specified specification and technical parameter.
- 1.4 The extent of supply under the contract includes all items shown in the drawings, notwithstanding the fact that such items may have been omitted from the specification or schedules. Similarly, the extent of supply also includes all items mentioned in the specification and /or schedules, notwithstanding the fact that such items may have been omitted in the drawing.
- 1.5 Items though not specifically mentioned but needed to make the system complete as stipulated under these specifications are also to be furnished unless otherwise specifically excluded.
- 1.6 The general terms and conditions, instructions to tenderer and other attachment referred to elsewhere are hereby made part of the tender specifications. The equipment / material and works covered by this specification is subject to compliance to all the attachments referred in the specification. The tenderer shall be responsible for adherence to all requirements stipulated herein.
- 1.7 While all efforts have been made to make the specification requirement complete & unambiguous, it shall be bidders' responsibility to ask for missing information, ensure completeness of specification, to bring out any contradictory / conflicting requirement in different sections of the specification and within a section itself to the notice of BHEL and to seek any clarification on specification requirement in the format enclosed under Section-III of the specification within 10 days of receipt of tender documents. In absence of any such



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clarifications, in case of any contradictory requirement, the more stringent requirement as per interpretation of Purchaser/Customer shall prevail and shall be complied by the bidder without any commercial implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by Purchaser/ Customer as and when brought to their notice either by the bidder or by purchaser/ customer themselves. However, such requirements shall be binding on the successful bidder without any commercial & delivery implication.

- 1.8 No deviation is permitted in normal case. Deviations, if any, should be very clearly brought out clause by clause in the enclosed schedule otherwise, it will be presumed that the vendor's offer is strictly in line with NIT specification.
- 1.9 In case all above requirements are not complied with, the offer may be considered as incomplete and would become liable for rejection.
- 1.10 Unless specified otherwise, all through the specification, the word contractor shall have same meaning as successful bidder/vendor and Customer/Purchaser/Employer will mean BHEL and/or Customer (BIFPCL) as interpreted by BHEL in the relevant context. Please refer GCC/SCC for better clarity.
- 1.11 In the event of conflict between requirements of two clauses of this specification/ documents or requirements of different codes/standard specified, the more stringent requirement as per interpretation of owner shall apply.
- 1.12 The equipment covered under this specification shall not be dispatched unless the same have been finally inspected, accepted and dispatch release issued by BHEL/Customer.
- 1.13 BHEL's Customer's representative shall be given full access to the shop in which the equipment's are being manufactured or tested and all test records shall be made available to him.
- 1.14 Various codes and standards to be used shall be as indicated in various parts of the specification. In case bidder uses any standard other than those indicated in the specification, the onus of establishing equivalence of the same with the specified standards will rest with the bidder and acceptance of the same shall be sole prerogative of customer. The bidder will also arrange for BHEL a copy of the standards in ENGLISH language. The cost of such service will be deemed to have been included by the bidder in the total cost of the package. BHEL will not entertain any additional cost on account of the same.
- 1.15 All text/ numeric in the document / drawings to be generated by the successful bidder will be in English language only.
- 1.16 The bidder's offer shall not carry any sections like clarification, interpretations and /or assumptions.
- 1.17 The inspection and testing of all the equipment shall be as per approved quality Plan/Inspection checklist.

Note:



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Bidder to note that BHEL reserves the right for drawing/document submission through web based Document. Management System. Bidder would be provided access to the DMS for drawing/document approval and adequate training for the same. Detailed methodology would be finalized during the kick-off meeting. Bidder to ensure following at their end.

- Internet explorer version – Minimum Internet Explorer 7.
- Internet speed – 2 mbps (Minimum preferred).
- Pop ups from our external DMS IP (124.124.36.198) should not be blocked.
- Vendor's internal proxy setting should not block DMS application's link (<http://dmsserver.bhelpem.com/Wrench%20Web%20Access/Login.aspx>).

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SECTION IB

PROJECT INFORMATION



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA



**PROJECT: 2x 660 MW BIFPCL MAITREE
KHULNA STPP (BANGLADESH)**

PROJECT INFORMATION

OWNER	BANGLADESH INDIA FREINDSHIP POWER COMPANY LIMITED (PVT)
CONSULTANT	FICHTNER
NAME OF PROJECT	2x 660 MW BIFPCL MAITREE KHULNA STPP (BANGLADESH)
Site Location	RAMPAL UPAZILA,BAGHEERAT DISTRICT,RAJNAGAR UNION (14 KM NORTHEAST OF MONGLA PORT & 14 KM NORTHWEST OF SUNDARBANS) LATITUDE: 22 DEG. 37 MIN. 00 SEC. N TO 22 DEG. 34 MIN. 30 SEC N LONGITUDE: 89 DEG. 32 MIN. 00 SEC E TO 89 DEG. 34 MIN. 05 SEC. E
Climatic Conditions:	
Temperature :	
Highest Temp Recorded	36.9 ° C
Lowest Temp Recorded	12.2 ° C
Relative Humidity	Varies between 20% and 90%
Tidal Range	1.2 m to 3.1 m
Maximum surface rainfall	349mm per day
Rain fall Intensity for design of Storm Water Drains	As per Bangladesh Standards by considering the maximum rainfall intensity of 95 mm/hr for a one hour rainfall with 50 year return period
Wind Load	a) Calculations for wind effect shall be in accordance with as per Bangladesh National Building Code -2012, Part 6, Chapter 2.4. And Basic Wind Speed is 73m/sec
Seismic Data	a) Zone- I as determined by Bangladesh National Building code (BNBC-2012).However, design shall be by Site specific seismic data which shall be furnished by Customer.

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SECTION IC

SCOPE OF SUPPLY



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
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1.0.0 SCOPE

1.1.0 SCOPE OF SUPPLY (SHALL INCLUDE BUT NOT LIMITED TO)

1.1.1 FOAM CUM WATER TENDER

- i) Two (2) number Foam cum water tender including minimum 25 ton vehicle chassis, pump capacity (3000 LPM minimum discharge capacity @ 10.5 kg/cm²), Water tank of 6000 liter minimum capacity, Foam tank of 2000 Liter minimum capacity, Foam pump (1000 LPM minimum discharge capacity @ 14.0 kg/cm²) and conforming to NFPA 1901, complete with all accessories and equipment's as specified herein.

1.1.2 AMBULANCE CAR

- i) One number Road Ambulance complying the requirement of BS-EN 1789 (Medical vehicle and their equipment – Road ambulance) complete with all accessories and equipment as specified & including those specified in **Annexure-II** of this section.

1.1.3 FIRE FIGHTING AND RESCUE EQUIPMENT

Firefighting and rescue equipment as mentioned in Annexure III of this section

1.1.4 MAINTENANCE TOOLS AND TACKLES

Maintenance tools and tackles as mentioned in Annexure IV of this section.

1.2.0 SCOPE OF SERVICES (SHALL INCLUDE BUT NOT LIMITED TO)

- i) Performance demonstration of foam cum water tender, ambulance car and safety equipment at site and training of owner's personnel.
- ii) Warranty upto Provision Acceptance Certificate (scheduled on 24.08.2021) from dispatch of Fire tenders and ambulances and Extended Warranty for Fire Tender and Ambulance Car upto (24 months from PAC/COD) i.e. 23.08.2023 shall be in bidder's scope of work..
- iii) Vendor shall arrange necessary temporary registration, permit required (if any), and insurance as applicable and further permanent registration, permit (if any), and required vehicle insurance of all the above listed vehicles shall be in bidder's scope.
- iv) Responsibility for the apparatus and equipment shall remain with the contractor until they are accepted by the purchaser.
- v) On initial delivery of the fire apparatus, the contractor shall depute a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the purchaser regarding the operation, care, and maintenance of the apparatus and equipment supplied.

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- vi) O&M manuals shall be submitted in English and Bangla language in hard copies (seven copies) and in electronic format both (4 copies)

2.0.0 CODES AND STANDARDS

The design, material of construction, workmanship & finish, performance and testing, accessories and equipment of foam cum water tenders and Ambulance car specified herein shall comply with the requirements of codes/standard as follows:

NFPA: 1901 (Latest) – Standard for Automotive fire apparatus.

BS-EN 1789 - Medical vehicle and their equipment – Road ambulance.

In case of any contradiction with the aforesaid standards and the stipulations as per this Technical Specification, the stipulations of the standard shall prevail.

(A) DESCRIPTION ON FOAM CUM WATER TENDER

The suitable chassis with cab for the foam tender shall be procured by the vendor. The vendor shall be responsible for supplying all equipment accessories and properly fixing them on the chassis as described in this specification. Other details and requirements which are not covered under this specification, but may be necessary to complete the foam cum water tender and or to fulfill the operation/ performance requirement shall be provided by the vendor, who will be responsible for the design and construction of the complete appliance to the full satisfaction of the owner. The chassis offered by vendor shall meet the NFPA requirements.

3.0.0 VEHICLE CHASSIS

- 3.1.0 The chassis for carrying out fabrication work of water cum foam tender shall be of VOLVO/ BENZ/ MAN/ TATA/ ASHOK LEYLAND/ equivalent make. The chassis shall be 6 x4 wheel drive and shall be capable to take minimum gross vehicle weight of 25 T. The chassis shall be equipped with power assisted steering. The chassis shall be able to meet the requirements of Chapter 12 of NFPA 1901.
- 3.2.0 Engine shall be capable of developing a minimum power required for simultaneous operation of pumps and other accessories installed on the tender.
- 3.3.0 Engine system shall meet latest EURO norms prevailing at Bangladesh (Minimum Euro-IV).
- 3.4.0 Drag hook or eye of adequate strength and design shall be provided at the rear & front of the chassis.
- 3.5.0 All wiring shall be properly fixed in position and should be protected against heat, oil and physical damage. Wherever possible wiring shall pass through PVC sleeves.
- 3.6.0 All-important electrical circuit shall have separate fuses suitably indicated and grouped in a common switch box located in an easily accessible location. Provision shall be made for a minimum four (4) spare fuses in the fuse box.
- 3.7.0 The diesel engine shall be with manual transmission synchromesh forward and reverse speed gear box. Engine shall be equipped with a complete starting system of 24 V type. An alternator and rectifier capable of delivering a minimum of 50 A at 24 V shall be provided.
- 3.8.0 Radio suppression of the electrical system, which is sufficient to ensure positive operation of radio equipment without interference, shall be provided.



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- 3.9.0 The batteries shall be of high cycle type. With the engine off the battery system shall be able to provide the minimum continuous electric load for 10 minutes without discharging more than 50% of the reserved capacity and then to restart the engine. Master isolation switch shall be provided in dashboard panel. Low voltage electrical system and warning devices shall exceed the requirements mentioned in Chapter 13 of NFPA 1901.
- 3.10.0 The chassis shall be supplied with standard tool kit & spare wheel assembly.
- 3.11.0 The diesel chassis shall be complete with standard features & accessories provided by the manufacturer.

4.0.0 GENERAL REQUIREMENTS

- 4.1.0 The water cum foam tender including all accessories shall be designed, manufactured & tested as per the requirements / guidelines of NFPA 1901 along with codes, standards and details specified therein.
- 4.2.0 All the equipment and accessories shall be fixed on the appliance in a compact and neat manner and shall be so placed that each part is easily and readily accessible for use and maintenance.
- 4.3.0 The controls on control panel are to be so arranged that one man can operate all the controls.
- 4.4.0 **Vehicle data Recorder.**
- 4.4.1 Tender shall be equipped with on board vehicle data recorder (VDR).
- 4.4.3 The VDR shall be capable of recording the data as mentioned below in that order at least once per second.
- Vehicle speed.
 - Acceleration (from speedometer)
 - Deceleration (from speedometer).
 - Engine speed.
 - Engine throttle position (% of full throttle).
 - Anti-lock braking system event (on / off).
 - Seat occupied status (Occupied: Yes / No by position).
 - Seat belt status (Buckled: Yes / No by position).
 - Master optical warning device switch (On / off).
 - Time (24-hour clock)
 - Date (Year / month / day).
- 4.4.4 Data shall be stored at the sampling rate in a 48-hour loop.
- 4.4.5 Memory shall be sufficient to record 100 engine hours' worth of minute-by-minute summary showing the data in table below

Data	Unit of Measure
Maximum Vehicle speed.	Mph.
Maximum Acceleration (from speedometer)	Mph/sec
Maximum deceleration (from speedometer)	Mph/sec
Maximum Engine speed.	Rpm
Maximum Engine throttle position	(% of full throttle)
Anti-lock braking system	On / off

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event	
Seat occupied with seat belt unbuckled.	Yes / no by position at 30sec into minute
Master optical warning device switch.	On / off at 30 sec into minute.
Time	24-hour clock
Date	Year / month / day

4.4.6 When the memory capacity is reached, the system shall erase the oldest data first.

4.4.7 All the data stored in the VDR shall be compatible for uploading into a computer and importable into a data management software package. Software shall be delivered with the tender that will run on both windows and apple operating system and produce the following formatted reports from the uploaded data:

- Raw second-by-second data over a specified data / time range.
- Daily log for the time the engine is running for a given date (minute-by-minute output of all value).
- Weekly summary (maximum values each hour for each day of the week).
- Monthly summary (maximum value each day for each day of the month).

4.5.0 **Vehicle stability**

4.5.1 The tender shall not exceed the chassis manufacturer's maximum allowable vertical centre of gravity for a completed vehicle, if specified and meet the criteria defined in either of the following:

- The tender remains stable to 26.5 degree in both directions when tested on tilted tables in accordance with SAE J2180.
- The calculated or measured centre of gravity is no higher than 80% of the rear axle track width.

4.6.0 **Load distribution**

4.6.1 The fire tender, when loaded to its estimated in-service weight, shall have a side to side tyre load variation of no more than 7% of the total tyre load of that axle.

4.6.2 Each tyre shall be equipped with a visual indicator or monitoring system that indicates tyre pressure.

4.7.0 **Performance**

4.7.1 The tender shall meet the requirements of this NFPA 1901 at elevations of 2000 ft (610 m) above sea level.

4.7.2 The apparatus shall meet all the requirements of NFPA 1901 while stationary on any grade of up to and including 6 percent in any direction.

4.7.3 The apparatus, when fully equipped and loaded to its in-service weight, shall be capable of the following performance while on dry, paved roads that are in good condition:

- From a standing start, the tender shall be able to attain a speed of 35 mph (55 kmph) within 25 seconds on a level road.
- The tender shall be able to attain a minimum top speed of 50 mph (80 kmph) on a level road.
- The tender shall be able to maintain a speed of at least 20 mph (30 kmph) on any grade up to and including 6 percent.

4.8.0 The chassis shall totally comply with the Bangladesh Road Transport Authority Rules.

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4.9.0. The Fire cum water Tender shall be designed as per Latest NFPA 1901, however details have to be coordinated by bidder with local fire brigade authorities. The responsibility of local fire brigade requirements as per Bangladesh norms lies with the successful bidder. Bidders are advised to get them acquainted with Local fire brigade requirements w.r.t. Fire tender and ambulance car by visiting/acquiring information through reliable channels before submitting their bid.

5.0.0 DESIGN AND CONSTRUCTION

The tender is to function as foam cum fire tender, it shall meet the requirements of chapter 11 of NFPA 1901.

5.1.0 FIRE WATER PUMP

5.1.1 The apparatus shall be equipped with a single stage, centrifugal type fire pump that has a minimum rated capacity of 3000 LPM and meet the requirement of chapter 16 of NFPA 1901.

5.1.2 The pump shall be capable of taking suction from:

- a) Water tank mounted on chassis. (In normal condition).
- b) Under-ground reservoir through flexible suction hose up to suction lift of 7.5 m with the help of automatic water ring type primer.

5.1.3 The pumping system shall be capable of delivering the following:

- a) 100% of rated capacity at 150 PSI net pump pressure.
- b) 70% of rated capacity at 200 PSI net pump pressure.
- c) 50% of rated capacity at 250 PSI net pump pressure.

5.1.4 The pump manufacturer shall certify that the fire pump is capable of pumping 100 percent of rated capacity at 150 psi net pump pressure from draft, through 20 ft (6 m) of suction hose with a strainer attached under the following conditions:

- (a) An altitude of 2000 ft (600 m) above sea level;
- (b) Atmospheric pressure of 29.9 in. Hg (101.2 kPa) (corrected to sea level);
- (c) Water temperature of 60°F (15.6°C);
- (d) 01 number suction hose of 110 Nb size and lift of 10 ft (3 m);
- (e) Friction and entrance loss in suction hose, including strainer as per table 16.2.4.1 (b) or table 16.2.4.1 (c) of NFPA 1901.

The shut of head of the pump should not exceed 140% of the rated head for the pump.

5.1.5 The pump shall be rear mounted and shall be accessible and readily removable for repair and maintenance. It shall be driven by the chassis diesel engine through a power take off unit and propeller shaft.

5.1.6 Pump Casing shall be made of gun metal. Impeller shall be closed type and shall be made of bronze. The impeller and casing wear rings shall be renewable type. The pump shaft shall be made of stainless steel (SS-41 0) and shall be fitted with antifriction bearings. The pump shall have self-adjusting type mechanical seal, which shall be capable of running dry for minimum one minute. Pump shall be self-venting type and shall facility to drain water/ sludge from the casing.

5.1.7 The primer shall be capable of lifting water up to at least 6.0m depth (Suction lift) within 30 seconds.

5.1.8 The auto primer should work satisfactorily even if it is left dry for a long period.

5.1.9 The pump inlet suction lines shall be so sized and oriented to facilitate rated suction as per NFPA 1901.

5.1.10 The pump discharge shall be routed to:

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- 6 nos. outlets (on rear side of vehicle along with control panel) each fitted with Stainless steel approved make ball valves and ending in 63mm (04 nos) and 38mm (02 nos), Stainless Steel female coupling fitted with stainless steel end caps.
- Foam-cum-water monitor fitted on top of vehicle.
- Hose reel.

5.1.11 The pump shall have a suitable box type suction strainer made of Stainless steel. The strainer should be easily removable for maintenance.

5.1.12 Two Nos. suction inlets of 100 mm each with collecting heads with required no. of instantaneous male coupling of gun metal shall be provided. The collecting head shall be suitably designed to provide sufficient flow to pump, to discharge rated capacity of the pump. The spring, stem, nut of the loaded coupling should be of suitable material. Water pump shall be installed in such a manner that it will have sufficient clearance from the tank for easy maintenance of the pump and have proper approach.

5.2.0 WATER TANK

The water tank shall meet the requirements and guidelines of Chapter 18 of NFPA 1901 and details mentioned below.

(a) Minimum net capacity of water tank shall be 6000 liters. In addition, 2% expansion space shall be provided in the water tank over & above the water capacity. A calibrated dip tape shall be provided on the tank to measure the tank level.

(b) The water tank shall be fabricated out of minimum 5mm thick SS 316 plates at bottom & minimum 4 mm thick SS 316 plates on sides & top.

(c) The tank shall be of welded construction and shall be suitably stiffened with SS(stainless Steel) angles & flats so as to avoid buckling and distortion.

(d) Baffle plates of 3 mm thickness made of SS plates shall be provided inside the tank so as to avoid surging due to movement of the vehicle. Baffle plates shall be bolted type (with SS nuts & bolts), which can be removed easily for maintenance of the tank from inside.

(e) Water tank shall have convex shape for bottom and top plates for lowest center of gravity and shall have slope towards drain point.

(f) Tank shall be provided with anti-vortex device at the nozzle for pump suction.

(g) The tank shall be tilted with a sludge trap. The bottom of the tank shall have a slight slope towards sludge trap.

(h) The tank shall also have a cleaning manhole of 250mm diameter and one no. drain point of 100 mm dia. to be provided with approved make ball valve at the bottom of the tank. Valve shall be provided with threaded blind cap.

(i) Water tank shall be removable type with hooks at tank top for removal from the chassis.

(j) Inspection manhole of 750 mm dia. with hinged/ bolted covers with suitable gasket to be provided. Cover and neck shall be of 5 mm thickness. Manhole cover shall have an SS name plate marked WATER of letter size 100 mm.

(k) Tank level tube, 6"-8" size over flow pipe to avoid over pressurizing of the water tank during tilting of tank from hydrant system shall be provided for the water tank. The size of the pipe should be designed to avoid bulging or damage of tank at hydrant inlet pressure 7kg/cm² and drain pipe to be routed suitable to avoid fall of water on any equipment.

(l) Level tube and dipstick with marking in litre shall be provided for the water tank. Isolation valve to be provided for level gauge near the tank, a drain nipple at bottom of level gauge to be provided for draining and flushing.

(m) A draining connection with valve for water to be provided at the bottom of the tank

(n) Two no. independent water filling lines each of minimum 8 " size. One on each side of the vehicle shall be provided. Each water filling line shall be provided with Strainer, NRV

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(Non Return Valve), minimum 4 no male instantaneous coupling made of gunmetal and lever operated ball valves. The distance between the valves shall be maintained for easy operation.

(o) All the outlets and inlets from the tank shall be taken by installing nozzles of suitable length and shall have suitable reinforcement pads. Nozzle shall have flange with suitable thickness.

(p) Tank supporting structure on the chassis shall be made of SS 316.

(q) Reinforcement pads at tank supporting structure shall be of same thickness and material as that of the water tank.

(r) Provision shall be made on either side of the body for visual inspection / maintenance of the water tank.

(s) Suitable eyes should be provided on the shell of the tank to enable it to be lifted off the vehicle for repairs / replacement as necessary.

(t) The tank should be connected to the pump through a pipeline fitted with inverted stainless steel strainer and lever operated ball valves.

(u) All piping, fittings, internals, bolts and nuts of the tanks shall be SS 316. All the pipes shall be tested with hydrostatic pressure of 18 kg/cm² for a minimum period of 30 minutes. Water tank should be tested for leakage period of 24 hours.

(v) The tank shall be provided with a breather valve / vent.

(w) The water tank shall be constructed of non-corrosive material or other materials that are protected against corrosion or deterioration.

5.3.0 FOAM TANK

The foam tank shall meet the requirements and guidelines of clause no 20.6 of NFPA 1901 and details mentioned below.

(a) The foam compound tank of 2000 liters net capacity shall be constructed of non-corrosive material or other materials that are protected against corrosion or deterioration and that will not be adversely affected by the foam concentrate to be stored in the tank. In addition, 2% of expansion space shall be made in the tank, over and above foam compound capacity.

(b) The tank shall be suitably stiffened with suitable angles & flats so as to avoid buckling and distortion.

(c) The tank shall be provided with swash partitions arranged such that the maximum dimension perpendicular to the plane of any partition shall not exceed 900mm. Base plates will be connected to the tank with SS nuts and bolts. The threads of bolts shall be tac welded beyond the nut to prevent them falling inside the tank due to vibration.

(d) Suitable lifting lugs/arrangement shall be provided on the tank shell to enable it to be lifted off the vehicle for repairs / replacement as necessary.

(e) Foam tank shall have convex shape for bottom and top plates for lowest center of gravity.

The tank shall be fitted with a sludge trap and shall have slope towards sludge trap.

(f) The tank shall also have a cleaning manhole of 250mm diameter and 50mm-drain pipe fitted with approved make ball valve and 63mm instantaneous male coupling incorporated in it.

(g) A filling connection (2 inch diameter Male instantaneous coupling with provision of blank cap) with valve for foam compound to be provided at the bottom of foam tank.

(h) Tank shall have foam-filling opening of 200 mm dia. at top and with a removable conical strainer fitted to it. The filling hole shall have a hinged or with bolts cover with suitable gasket.

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- (i) Inspection manhole of 750 mm dia. with hinged or bolted covers with suitable gasket to be provided. Manhole cover shall have name plate marked FOAM of letter size 100 mm. There shall be no obstruction for movement of personnel on deck.
- (j) Breather valve / automatic vent, tank level tube and dipstick with marking in liter shall be provided for the foam tank. Isolation valve to be provided for level gauge near the tank. A drain nipple at bottom of level gauge to be provided for draining and flushing.
- (k) The inlet line in the tank shall have an adequately strong deflector plate, which will avoid the incoming jet of foam from hitting the tank side / roof.
- (l) All the outlets from the tank shall be taken by installing nozzles of suitable length and shall have suitable reinforcement pads. Nozzle shall have flange with suitable thickness.
- (m) A suitable strainer shall be provided at the pump suction inside the foam tank.
- (n) Tank supporting structure on the chassis shall be made of SS 316.
- (o) Reinforcement pads at tank supporting structure shall be of same thickness and material as that of the foam tank.
- (p) Provision shall be made on either side of the body for visual inspection/ maintenance of the foam tank.
- (q) A foam level indicator of the graduated glass tube (suitably protected) shall be provided close to the control panel. Isolation valve shall be provided just after the tap off point near the foam tank for the level indicator.
- (r) Foam tank shall be tested for leakage for a period of 24 hours.

5.4.0 FOAM COMPOUND PROPORTIONER

Around the pump foam proportioning system in line with Chapter 20 of NFPA 1901 and details mentioned below shall be provided

- (a) The Automatic around the pump proportioning system with variable setting selector valve to induce 3 to 6% of foam compound should be provided between the foam compound tank and pump, which can automatically proportion the foam compound to the water according to the pressure of water.
- (b) The proportioner shall be so installed that it shall not be liable to mechanical or other damage. The selector valve shall have four settings beginning with 'On' or 'Off' position. Each upward setting will result into an equal increase in the foam compound flow rate. The linkages for this purpose shall be as simple as possible to avoid distortion due to chassis flexion.
- (c) Auxiliary foam pickup tube arrangement from outside shall also be provided.

5.5.0 FOAM PUMP

The foam pump shall meet the requirements and guidelines of clause no 20.7 of NFPA 1901 and details mentioned below.

- (a) Pump to handle Foam Compound (AFFF / AFFF-AR) shall be rotary gear type.
- (b) The pump shall have minimum discharge capacity of 280 lpm at discharge pressure of 10.0 kg/cm² (g).
- (c) The pump shall be gravity feed & self-priming type and capable to lift foam from foam barrels kept on ground.

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(d) The pump casing, shaft and other parts coming in contact with foam compound shall be made of SS-316. However, gears shall be as per AISI - 410 hardened. Gears shall be double helical and profile grounds. Bearing shall be of GM and Teflon bush type. Shaft sealing shall be by mechanical seals. Alternatively, the material of construction for the foam concentrate pump shall be corrosion resistant and compatible with the type of foam concentrate.

(e) The pump shall be used to:

- Deliver foam compound from foam tank on chassis to around the pump foam proportionating system for each of the 6 outlets.
- Transfer foam compound from foam tank on chassis to other tender. One 50 mm screwed male connection (with cap) on each side of vehicle.
- Transfer foam compound from barrels to foam tank on chassis.
- Deliver foam compound from barrels kept on ground to around the pump foam proportionating system.
- Deliver foam to around the pump foam proportioner system on top of vehicle for foam/water monitor.

(f) The pump shall be driven by the main engine on chassis through a side power take off unit.

(g) The pump shall have a by-pass to route the pump discharge to foam tank on chassis.

(h) The pump shall have a PSV (set at suitable pressure) for protection of pump against over pressure and PSV discharge will be routed to foam tank on chassis. PSV shall have SS-304 body and trim. Isolation valve shall be provided on downstream side of PSV.

5.6.0 POWER TAKE-OFF UNIT

(a) The power take off unit shall be capable of transmitting adequate power to the pump through propeller shaft required for rated performance of the pump.

(b) Power take off (PTO) unit for each pump shall be independent.

(c) The foam pump shall be driven by a side PTO Unit.

(d) Vendor shall submit a sketch showing the arrangement of both PTO Units for taking power from main engine on chassis to water pump and foam pump.

(e) Each PTO Units shall be engaged by a separate push button in the driver's cabin.

(f) Switch for engaging the PTO pneumatically shall be provided in the driver's cabin and PTO shall be mechanical type.

(g) Necessary supports for PTO units, propeller shafts, couplings, universal joints etc. for power input to and power output from PTO unit shall be provided by vendor.

(h) The drive assembly components (shafts, couplings etc.) shall be dynamically balanced and the vibration at any of the rotary parts shall be minimum and in no case to be more than 10 mm/sec.

(i) Necessary modifications to the standard drive system available on the chassis shall have to be done by the vendor so as to adopt the PTO unit in the system. Prior concurrences need to be obtained from chassis manufacturing to carry out modifications on drive system.

5.7.0 WATER CUM FOAM MONITOR

Overhead monitor for water / foam discharge shall be provided. The water cum foam monitor shall be of 1000 gpm (4000 lpm) capacity in line with NFPA 1901 and details mentioned below.

(a) Discharge Capacity: 1000 gpm at 7 kg/cm² (g) (at the base flange of the monitor)

(b) Size: 4" of standard size suitable with discharge capacity

(c) One no. of oil filled pressure gauge near the monitor near to the air inlets to be provided

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(d) Throw at 7 kg/cm² pressure (Monitor inlet pressure): minimum 65 meter throw in still air for foam/water.

(e) Type of Nozzle: Self inducing Non-aspirating aqua fog / foam type with SS 304 ball valve for foam intake control.

(f) Foam expansion: 1:7 to 1:8

(g) Rotation: 135° (+ 90 degrees; -45 degrees)-vertical, 340° horizontal

(h) Material of Construction:

- Body/Elbow/Bend: SS 316

- Nozzle: SS 316

- Handle: SS 304 (self-locking wheel type)

- Water/foam barrel: SS 316

- Drain Valve: SS 304

- Pick up tube: 3m long PVC Hose reinforced with high tensile steel wire helix manufactured as per ASTM D 1785 schedule 80 with dip pipe made of SS 316 or SS304.

(i) Operational control for the monitor shall be provided at the roof top and shall be duplicated at the pump panel. Joy stick operation shall be provided at pump panel & at top of vehicle for horizontal movement, vertical movement & jet / spray pattern of the monitor. Manual override with self-locking arrangement shall be provided at monitor for horizontal movement, vertical movement & jet / spray pattern.

(j) Approval: UL/ FM / Vds approved.

5.8.0 HOSE REEL

Two hose reel drum having 40 m length of minimum of 25 mm size (internal bore) high pressure rubber hose with a jet cum spray nozzle/gun at outlet shall be provided on the top deck of the vehicle. Hose reel tubing shall be of braided rubber.

5.9.0 AUXILLIARY HEAT EXCHANGER (FOR MAIN ENGINE)

An auxiliary heat exchanger shall be provided to maintain the temperature in the engine at or below the engine manufacturer's maximum temperature rating under all conditions for which the apparatus is designed. The body of the heat exchanger shall be made of Stainless steel (SS- 316). Suitable pressure control valve shall be provided to restrict the pressure & flow of water from water pump as per requirement. Piping from the water pump to auxiliary heat exchanger shall be seamless carbon steel A 106 grade B. Pipe up to 2" diameter shall be of Schedule 80 and pipes of more than 2"dia shall be of schedule 40. All the piping in the cooling system and auxiliary heat exchanger shall be hydraulically tested at minimum 25 kg/cm² pressure.

5.10.0 STORAGE

5.10.1 Equipment storage:

A minimum of 40ft³ (1.13m³) of enclosed weather-resistant compartmentation that meets the requirements of Section 15.1 of NFPA 1901 shall be provided for the storage of equipment.

5.10.2 Hose storage:

Hose bed areas, compartments, or reels that comply with the section 15.10 of NFPA 1901 shall be provided to accommodate the following.

- A minimum hose storage area of 30 ft³ (0.1m³) for 65mm or larger fire hose.
- Two areas, each a minimum of 3.5 ft³ (0.1 m³), to accommodate 38mm or larger pre-connected fire hose lines.

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15.11.0 BODY WORK

The body work shall meet the requirements and guidelines of Chapter no 14, 15 of NFPA 1901 and details mentioned below.

15.11.1 Fire Crew Cabin

- (a) A cabin for 5 persons (including driver) shall be provided behind the factory built tilt-able driver's cabin. The cabin shall be air conditioned. The driver's seat should be adjustable. All seats should have comfortable cushion with cover. There shall be four doors in the cabin, sized generously with proper arrangement for embarking and disembarking of crewmembers. The doors shall open outwards and hung forward and shall have levers for unlatching from outside and inside.
- (b) The doors shall be provided with shatterproof safety glasses which can be raised/lowered by Push Button mechanism.
- (c) First aid box made of fiber glass / aluminum suitable for 20 persons shall be provided in the cabin. First aid box shall be suitably mounted in the cabin at easily accessible location.
- (d) Non slip type steps & grab rails shall be provided in the cabin to assist the crew members to get in & out.
- (e) Front side of the cabin shall have glass paneling so that the crew can have an all-round view.
- (f) Provision shall be made in crew cabin to mount two nos. 6 lit. (300bar) capacity Self Contained Breathing Apparatus (SCBA) sets in vertical position with the valve down. It shall be supported with brace or yoke under the cylinder or valve. The holding & clamping device shall not injure, wear, scrape or otherwise affect the SCBA units including damage to paint while the cylinder is being placed in or removed from holder.
- (g) The crew cabin structure shall be so designed so as to avoid any vibration, Rattling / deformation in the intended usage of the vehicle.
- (h) Cabin shall have one roof light & two side lights (one on each side) for proper illumination of cabin.
- (i) The entire floor of the crew cabin shall be provided with vinyl matting of minimum 6mm thickness with anti-skid features.

5.11.2 Structure / Frame Work

- (a) The structure frame work on chassis & crew cabin shall be of welded construction and made from 30 mm x 30 mm x 1.6mm hollow square section (minimum dimensions) of SS-316 and distance between each horizontal and vertical square shall be maximum 400mm.
- (b) Cross supporting members of the paneling shall be made of SS-316 channels of 75mm x 5mm thickness (minimum dimensions).
- (c) The entire roof of the vehicle including the crew cabin top, entire rear, crew cabin floor, locker floor and sides shall be made from minimum 2mm SS-316 sheets and these shall be bolted to the frame for ease in removal of the tank for repairs.
- (d) Proper draining arrangements shall be provided on the entire roof, crew cabin and inside the lockers.
- (e) Area around the monitors operation shall be provided with 16 SWG anodized aluminum checkered plate (in addition to the 2mm SS-316 sheets) and shall be bolted to the frame.
- (f) The roof of the cabins should be rigid enough to take the weight of two persons without deforming the roof sheeting.

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(g) Proper access ladder with Grab rails and non-skid steps shall be provided to give access to the roof for approaching the extension ladder, manholes for tanks and monitor etc.

(h) Access handrails shall be provided at each entrance to a driving or crew compartment and at each position where steps or ladders for climbing are located. Access handrails shall be constructed of, or covered with, a slip-resistant, non-corrosive material. Handrails shall be between 1 inch to 1 3/8 inch in diameter and have a minimum clearance between the handrails and any surface of at least 2 inch (51 mm). All handrails shall be designed and mounted to reduce the possibility of hand slippage and to avoid snagging of hose, equipment, or clothing.

(i) Dual sun- visors and long arm rear view mirrors shall be fitted to drivers' cabin.

5.11.3 Lockers

(a) Size and number of locker shall be decided such that on either side fire hose can be easily accommodated in single layer and equipment may be accommodated in maximum two layers. Sufficient numbers of lockers shall be provided to accommodate all the equipment and accessories in an easily accessible manner.

(b) All lockers shall be provided with Roller type shutter doors.

(c) Roller shutters shall be of hollow rectangular shaped & made from aluminum interchangeable links connected by means of plastic profiles. Sealing of roller shutter shall be watertight when closed.

(d) Roller shutters shall be inward rolling type and shall be provided with guide rails over entire length on both sides to make them torsion free.

(e) When shutters are rolled, unobstructed access should be available to the equipment & hoses. Shutters should open in all positions of the vehicle even in rough terrains.

(f) Roller shutters shall have locking arrangement to prevent accidental opening during movement of the vehicle.

(g) All the lockers shall be fitted with internal lighting, which shall be capable of being automatically switched, 'ON' and 'OFF' by the opening of shutters. A master switch for isolating the locker lighting circuit shall also be fitted in the driver's cabin.

(h) Lockers shall have arrangement for self-draining of any water entering inside.

(i) Sufficient number of lockers shall be provided for storage of all accessories listed in this specification.

(j) Lockers shall be accessible from ground level by a man of average height (1.67m).

(k) All the Lockers shall be provided with 3M or equivalent make, 4mm thick, vulcanized synthetic rubber mat at bottom and up-to 12 inch on three sides.

5.12.0 OTHER WORK

(a) The two piece extension ladder shall be mounted on suitable gallows fitted with toilers and designed to facilitate easy and quick removal of the ladder by one man from the rear of the tender.

(b) No part of the bodywork shall reduce ground clearance of vehicle to less than 36cm & not increase the overall width to more than 2.50m. The highest part of the appliance with the ladder and monitor mounted on it shall not exceed 3.60m from the ground level.

(c) Anti-vibration rubber mats shall be provided while mounting the tanks etc. on the chassis.

(d) Circuits shall be provided with properly rated low-voltage over-current protective devices. Such devices shall be readily accessible and protected against heat in excess of

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the over-current device's design range, mechanical damage and water spray. Circuit protection shall be accomplished by utilizing fuses, circuit breakers, fusible links, or solid state equivalent devices.

(e) All light fixtures shall be placed in recesses or protected by grill covers to avoid damage by movement of material and personnel.

(f) A reflective stripe(s) shall be affixed to the perimeter of the apparatus meeting the requirement of Clause 15.9.3 of NFPA 1901. The stripe or combination of stripes shall be a minimum of 4 inch (100 mm) in total width and shall conform to the minimum requirements of ASTM D 4956, Standard Specification for Retro reflective Sheeting for Traffic Control. Type I. Class I or Class 3. At least 50 percent of the cab and body length on each side at least 50 percent of the width of the rear, and at least 25 percent of the width of the front of the apparatus shall have the reflective material affixed to it.

(g) Arrangement shall be made on Dashboard opposite to the fire officers' seat to fix a mobile wireless set of 25W capacity. Power supply shall be provided from vehicle battery.

5.13.0 CONTROL PANEL

5.13.1 The following instrumentation and controls shall be mounted in the driving compartment and shall be clearly identified and visible to the driver while seated. Controls and switches that are expected to be operated by the driver while the apparatus is in motion shall be within convenient reach for the driver.

- (a) Speedometer;
- (b) Tachometer;
- (c) Odometer;
- (d) Oil pressure indicator or gauge;
- (e) Coolant temperature indicator or gauge;
- (f) Automatic transmission temperature indicator or gauge;
- (g) Voltmeter;
- (h) Hazard indicator light;
- (i) Air pressure gauge(s);
- (j) Turn signal control and indicator lights;
- (k) Headlight/DOT light switch;
- (l) High beam headlight switch and indicator;
- (m) Fuel level gauge(s);
- (n) Master ignition switch;
- (o) Heater/defroster controls;
- (p) Warning lights and siren switches;
- (q) Master disconnect switch;
- (r) "Master disconnect on" indicator light;
- (s) Windshield wipers and washer;
- (t) PTO-engaged indicator;
- (u) Pump engagement controls.

5.13.2 Adequately illuminated pump operating panel shall be provided at the rear side of the appliance and these shall include the following in addition to control and instrumentation details mentioned in clause 16.12 of NFPA 1901:

- (a) Auxiliary throttle control for the engine.
- (b) Independent pressure gauges calibrated to 25 kg/cm² for each pump discharge.
- (c) Threaded suction inlet of water pump with blind cap.

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- (d) Control for using the auxiliary foam compound pick up tube assembly.
- (e) Water and foam tank contents gauge calibration in litre.
- (f) Control of foam tank isolation valve and foam proportioner valve.
- (g) Delivery outlets of the pump along with the control levers.
- (h) Engine Temperature.
- (i) Engine Oil pressure gauge.
- (j) Quick opening valve for lining up water tank to pump.
- (k) Visual indication to show engagement of each PTO Unit.
- (l) Illuminated level indicator for water & foam tanks.
- (m) Priming valve for water pump.
- (n) System schematic etched on Stainless Steel plate.
- (o) Operating instruction plate and flushing out instruction plate (both on boldly etched Stainless steel plates).
- (p) Compound pressure gauges.
- (q) RPM for pumps.
- (r) Remote control water-cum-foam monitors control for horizontal vertical movements & jet spray pattern.
- (s) Lighting for control panel illumination.
- (t) Digital flow meter for foam monitor.
- (u) Valve control for hose reel.

5.13.3 "Pump Engaged" indicators shall be provided both in the driving compartment and on the pump operator's panel to indicate that the pump shift has been successfully completed.

5.13.4 In addition to the mentioned above, vendor shall provide any other items that he may find essential. Any of these items, which are also required in the driver's cabin, shall be provide at suitable locations in the driver's cabin. Each lever, switch, valve, gauges, outlet/inlet etc. shall have identification made on metal plate and duly riveted. The microphone of the PA system shall be fixed inside the driver cabin on a flexible stand at a suitable location. Flow diagram of the system shall be displayed on the control panel (engraved plate).

5.14.0 WARNING DEVICES

- 5.14.1 Optical warning devices shall be provided in line with clause 13.8 of NFPA 1901.
- 5.14.2 A 24 volts DC operated blinker light bar, 1 Set (Fitted on roof with PA system and siren) provided on top of the vehicle with firm support and assembly covered with SS grill. Assembly shall be operable from cabin.
- 5.14.3 Public address system: Battery operated with a control panel in driver's cabin should be provided. One loud speaker should be mounted on driver's cabin roof and should be capable of rotation in all directions. The range should be 1 km in still air and 500 m in noisy areas.

5.15.0 PIPING

- 5.15.1 All piping shall be designed to have minimum pressure drop and achieve the required pressure and flow at various locations.
- 5.15.2 All piping shall be seamless and designed for 10% over the maximum pressures encountered in pipe. All lines shall be hydraulically tested at 1.5 times the design pressure and shall be able to hold the pressure for minimum 2 hours. However in no case the lines shall be hydraulically tested below 25 Kg/cm² (g) pressure.

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- 5.15.3 The piping shall be flanged for ease of maintenance. However, flange joints shall be kept as minimum as possible.
- 5.15.4 Valves of less than 1.5 inch size shall be forged construction and valve of 2" or more size shall be of cast construction.
- 5.15.5 All lines shall be suitably supported so as to provide rigidity and avoid vibrations.
- 5.15.6 All lines less than 1.5" size can be socket welded matching with 3000 lbs rating fittings.
- 5.15.6 All lines of 2" size & above shall be butt welded with full penetration welds.

5.15.7 Foam Piping

- (a) Total piping in foam circuit shall be of SS-316.
- (b) All ball valves in foam circuit shall be of SS-316.
- (c) All gaskets in foam lines shall be spiral wounds with SS-304 and asbestos filler.
- (d) All Nuts, bolts & washers shall be of SS-316.
- (e) Provision shall be kept for flushing the foam lines with water from on board water pump and from an external source.
- (f) A Stainless Steel Y -type strainer shall be provided before the foam pump. The strainer shall be so located so as to permit easy removal for cleaning.

5.15.8 Water Piping

- (a) Water piping shall be of seamless carbon steel A 106 grade B. Pipe up to 2" diameter shall be of Schedule 80 (minimum) and pipes of more than 2" dia shall be of schedule 40 (minimum).
- (b) Pipes, fittings and valves in the water circuit which will come in contact with foam solution (foam -water mixture) shall be of SS-316.
- (c) Nuts, Bolts & washers for carbon steel lines shall be of carbon steel. However, wherever carbon steel lines joint with Stainless Steel lines, the bolts at break flanges shall be of SS-316 with SS washers on carbon steel side.

5.15.0 PAINTING AND MARKING

- (a) Vehicle and monitor should be painted with 2 coats of zinc phosphate epoxy primer each of 50 microns DFT and two coats of polyurethane finished red paint each coat of 50 microns DFT.
- (b) All the lockers, cabins shall be provided with Stainless steel Name Plates indicating the content.
- (c) Water & foam lines should be painted with zinc phosphate epoxy primer each of 50 microns DFT and two coats of polyurethane finished paint each coat of 50 microns DFT. Water lines shall be painted red in colour & foam lines shall be painted yellow in colour.
- (d) Owner's emblem in original colour together with name shall be furnished during detailed engineering.
- (e) The inside of lockers shall be painted in pale Cream colour.
- (f) The chassis frame shall be painted black and wheel arch shall be painted white.
- (g) Mud flappers of sufficient length and width shall be provided at wheels.
- (h) Under frame of Chassis shall be painted with chlorinated rubber paint.
- (i) The appliance shall be clearly having the following marks at suitable locations.
- Manufacturer's name & trade mark
 - Year of manufacture
 - Pump serial numbers and capacities
 - Capacity of water tank and foam compound tank in liters
 - Engine and chassis number

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vi. All instrument control & valves shall be identified with properly itched metallic Name plates

6.0.0 ACCESSORIES

Each foam cum water tender shall be provided with the minimum accessories in addition to those fitted to the chassis and as mentioned in above clauses. All the accessories shall be suitably fixed in position in lockers or other suitable place on the tender are specified in **Annexure I.**

B. DESCRIPTION OF AMBULANCE CAR

The ambulance car to be supplied by vendor shall be designed, tested, performed and equipped such as it qualifies patient transport ambulance type A₂ requirement of BS EN 1789 requirements as minimum and other details as mentioned in this specification.

Chassis used for manufacturing ambulance car shall have minimum GVW of 5000 Kg.

The chassis shall totally comply with the Bangladesh Road transport Authority Rules.

7.0.0 DESIGN AND CONSTRUCTION

7.1.0 General requirements

7.1.1 Maximum overall dimensions

The maximum overall dimensions shall be in accordance with the following:

Length 6500 mm;

Height 3 000 mm (measured at net vehicle mass excluding flexible antenna);

Width 2200 mm (measured excluding external fold back mirrors)

7.1.2 Wheel arch clearance

Vehicle converters shall maintain the minimum wheel arch clearance specified by the chassis manufacturer.

7.1.3 Performance-braking and acceleration

Acceleration

A road ambulance loaded to permissible gross vehicle mass shall be able to accelerate from 0 km/h to 80 km/h within 35 s.

Braking

An original equipment manufacturers anti-lock braking system shall be fitted.

7.1.4 Safety system

The vehicle should be fitted with a control system for stabilisation and a passive safety system.

NOTE Examples of a control system for stabilisation are an electronic brake distribution system and traction control. Examples of a passive safety system could be an air bag, a collapsible steering column and an energy absorbing body structure.

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7.2.0 Electrical requirements

7.2.1 General

Electrical installations added to the one of the base vehicle shall comply with those clauses of IEC 60364-7-721:2007 which are applicable to ambulances.

7.2.2 Electromagnetic compatibility (EMC) – Communication equipment

Communication equipment (e.g. radio installation) shall comply with national regulations.

For the supply system of the medical equipment the EN 60601-1 and EN 60601-2 series shall apply.

To minimize any risk to the safe operation of the complete ambulance and any of the equipment operated on or in the vehicle from the effects of electromagnetic influences created by the vehicle or its equipment, the complete operational vehicle should consists of components, equipment or sub systems that complies or are certified as conforming to the respective industry EMC regulations.

NOTE: An ambulance as supplied and certified may not be fully equipped and therefore some responsibility for added equipment after conversion rests with the customer/user.

7.2.3 Battery and alternator

Batteries shall be positioned to allow maintenance without removing the battery from its securing device. The construction of the battery and all connections to it shall be such as to prevent any possibility of an inadvertent short circuit.

The electrical system shall be capable of holding a reserve of electrical power for restarting the engine.

The starter batteries shall be of 63Ah (2x12V). Additional batteries, if required, shall be of 63Ah (2x12V).

NOTE: Additional batteries may be required to power the medical devices carried on board and the intended use of the ambulance.

The alternator shall be of 1200W minimum.

7.2.4 Electrical installation

A) There shall be a recessed externally mounted power connector to enable external power to be provided for following operations:

- charging battery(ies);
- operating medical devices, when installed;
- operating a patient compartment heater, when installed;
- operating an engine preheater, when installed.

The connector for 110 V or 220/240 V, shall be a male connector and not interfere with the electrical and mechanical safety.

It shall be not possible to start the engine whilst it is connected to an external power supply unless an automatic mechanical disconnection is fitted.

If no automatic mechanical disconnection is fitted, the connector shall be on the driver's side.

The 110 V or 220/240 V circuit shall be protected either by an "earth leakage device" with a maximum setting of 30 mA or by a separate transformer. If the protection is given only by an "earth leakage device" there shall be a label near the plug that reads as follows: "CAUTION! CONNECT ONLY TO AN AUTHORISED SOCKET."

B) The patient's compartment shall be fitted with the minimum 4 number of connections.

C) Any additional electrical systems fitted to the base vehicle shall be separate from the base vehicle electrical system and the body or chassis shall not be used as an earth return for additional circuits.

All circuits in the additional system(s) shall have separate overload protection. All circuits shall be well defined and cables clearly marked at the connection points and at a maximum of 1m intervals along its length.

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The system shall have enough circuits and be so constructed that when/if a circuit fails some illumination and some power supply sources for medical technical equipment still work.

D) The wiring and, where applicable conduits, shall withstand vibrations. No wiring shall be located in or pass through conduit intended for medical gas installation. The wiring shall not be loaded higher than that stated by the wire manufacture.

E) Where there are different voltage systems, the connections shall be non-interchangeable.

7.3.0 Visual and audible warning system

7.3.1 The vehicle shall be fitted with a visual warning and audible warning system to assist emergency passage.

7.3.2 Emergency Light Bar cum Public Address System at the top of the vehicle on the front end shall be provided. The layout should comprise of LED flashing lights. Each light bar should have minimum four high intensity LED flashers and a speaker in the centre.

The light bar control unit must have all the necessary control for the various components of the light bar. It must have a microphone. The control unit should be connected to the light bar via the connecting wires all inside a master wire sleeve. It should have variable tones like Wail, Yelp, Siren, Manual etc.

The operational voltage should be 12V DC.

The power consumption should be maximum 100W. All the controls should be provided on the driver's console.

7.3.3 External Lights & Flashers

There should be minimum six nos. of high intensity LED flashers in pair of red and orange on either side or rear.

On each side there should be at least one and on the rear side at least two LED white light for general lighting the area outside the ambulance in case of dark evacuations.

7.3.4 These systems shall comply with Bangladesh regulations.

7.4.0 Vehicle Body

7.4.1 Fire safety

The interior materials shall conform to the specification of EN 13501-1:2007 A1:2009.

7.4.2 The ambulance shall be equipped with two fire extinguishers of 2 Kg each.

7.4.3 Driver's seat configuration

The ergonomic space of the driver's compartment and of the seat adjustment as approved by the base manufacturer shall not be reduced.

7.4.4 The minimum loading capacity shall be as mentioned below:

Driver compartment: Driver- 01, Co-driver / Cab passenger: 01

Patient compartment: EMT- 01, Stretcher: 01, Patient attendant: 03.

7.4.5 Bulkhead

A full bulkhead (partition wall) shall separate the driver's compartment from the patient's compartment. One or two windows with a minimum separation of 100 mm shall be provided in the bulkhead.

The windows shall allow direct visual contact with the driver. The opening area of the window shall have a maximum area of 0.12 m². It shall be secured against self-opening and shall have an adjustable blind or other means of preventing the driver being disturbed by the light of the patient's compartment.

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7.4.6 Openings (doors, windows, emergency exits)

7.4.6.1 General

There shall be a minimum of two openings – one at the rear (door/tailgate) and one at the side (window) of the patient's compartment.

All openings shall have seals to protect against the ingress of water.

All openings shall comply with the following minimum dimensions:

Side opening: 1200 mm (width)x 660 mm (height)

Rear opening: 1200 mm (height)x 1050 mm (width)

Note:

a Corner radius of conversions which reduce the opening area by less than 10 % are permitted.

b The dimensions provided by the original manufacturer shall not be reduced.

7.4.6.2 Doors

External door allowing direct access to the patient's compartment shall be fitted with a security system which enables the following:

a) Lock and unlock from inside without use of a key;

b) Lock and unlock from outside with use of a key;

c) Unlock from the outside using a key when the door is locked from the inside.

NOTE: This security system may be integrated with a central locking system.

The patient's compartment doors shall be capable of being positively restrained in the open position.

An audible and/or visual signal shall warn the driver when external door to the patient's compartment, is not completely closed when the vehicle is in motion.

7.4.6.3 Windows

In the patient's compartment, there shall be a minimum of two external windows. There shall be one on each side or one on one side and the rear.

The windows shall be positioned or designed to ensure patient's privacy when required.

7.4.7 Loading area

The loading area dimensions shall be in accordance with followings

a. Tailgate height: 1900 mm (minimum) From ground to lowest point of fully opened tailgate at gross vehicle mass.

b. Loading angle (stretcher) maximum 16° (The loading angle shall be kept as low as possible)

c . Loading height (stretcher): When the patient is manually loaded or unloaded on the stretcher, the centre of the stretcher handles shall be no more than 825 mm above ground level. The maximum height of either the floor or the loading holding assembly above ground level shall not exceed 750 mm at net vehicle mass plus loose equipment.

7.4.8 Patient's compartment dimensions

7.4.8.1 General

The dimensions relate to the patient's compartment with lining. To achieve only structural solidity a reduction of the dimensions of up to 5 % is acceptable in limited areas; door openings excluded.

7.4.8.2 Patient's compartment dimensions

The patient's compartment shall comply with the minimum dimensions set out below:

W = 1400 mm (width measured from RH-side to LH-side, except the roof curvature);

L = 2500 mm (length measured from rear to bulkhead at height of stretcher)

H = 1600 mm (height, measured from floor to roof)

X = height of stretcher holding assembly to roof measured in the middle of the longitudinal axis of the stretcher;

7.4.8.3 Patient and attendant seating

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The minimum number of patient and attendant seats shall be 3 nos along one side of the stretcher.

7.4.8.4 Cabinet for storing medical equipment / supplies / wash basin / dust bin.

- Placed alongside the left side wall at the front end attached with partisan wall.
- Made of automobile grade material.
- Medical cabinet having sufficient utility and durability for storing medical consumables with in-built wash basin, space for accommodating two waste bins would also be acceptable.
- Stainless Steel (SS) / ABS wash basin with SS water tap supplying water through Motorized Pump (12 V DC power operated ISI mark submersible, heavy duty) with foot operated control, to pump the water from the fresh water tank to be provided.
- Fresh Water Tank and Drain Water Tank both made of 3mm thick food grade plastic quality with inlet and outlet connection below the wash basin both having 18 Liters capacity to be provided. Drain water tank should be a closed circuit without overflowing to ensure fool proof draining by users. Proper space to be provided in fresh water tank for replacement of washbasin pump. Both the Tanks should be easily removable for any sort of Maintenance and Cleaning purpose.
- All the drawers should be provided with lock and key of reputed brands to secure them against unintended opening during any kind of possible motion of the ambulance.
- Two Concealed Portable Stainless Steel Dust Bins with spring loaded lids for waste disposal are to be provided under the wash basin.

7.4.8.5 Ventilation system

There shall be a ventilation system which shall provide a minimum of 20 air changes per hour when the vehicle is stationary.

7.4.8.6 Cooling system

In addition to the cooling system of the driver's compartment there shall be an independent cooling adjustable system for patient compartment.

The AC compressor should be engine run. All hoses should be machine crimped to avoid the leakages. AC system should be certified for passenger vehicle usage. Both the patient compartment as well as the driver cabin should be air conditioned with separate and individual digital controls.

The cooling system should be such that, given an outside and inside temperature of 32 °C, the cooling down to at most 27 °C in the patient's compartment should not take longer than 15 min. After 30 min a temperature of at most 25 °C should be reached. The inside temperature should be measured in the centre of the stretcher and at the mid-point from the cooling outlets.

The installation of the system shall not encourage exhaust gases entering the patient's compartment.

7.4.8.7 Interior lighting

Natural colour balance lighting shall be provided as 300 Lx for stretcher area and 50 Lx for surrounding area.

The minimum distance of the measurement shall be 750 mm below the light and in an area with a minimum diameter of 200 mm.

Light levels shall be measured along the central longitudinal axis of the stretcher at the head, mid-point and foot position with the stretcher in its normal position for transportation in the ambulance.

7.4.8.8 Interior noise level

The interior noise level across the vehicle speed range shall be such that when tested in accordance with EN 1789 it shall not exceed the maximum graphical line resulting from coordinates 70 dB(A) at 60 km/h or

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40 % of the maximum speed, whichever is lower, to 78 dB(A) at 120 km/h or 60 % of the maximum speed, whichever is lower. A deviation of up to 3 dB(A) of the measured sound pressure level is permissible. Noise measurements shall be made using the most appropriate gear for the speed being examined as determine by the base vehicle manufacturer.

7.4.8.9 EMT's Seat

- At the head end of the patient stretcher the ambulance should have a rear mounted foldable base EMT / Doctor seat.
- Dimensions: Depth =410mm, Width =540mm and Seat height=380mm, Back Rest Height=460mm.
- It should have one waist seat belt.
 - Preferably PU molded seat with powder coated/stainless steel legs.

7.4.8.10 Holding system for infusion

A holding system shall be provided to support two vertically fixed infusions in such a way as to use the maximum available height above the stretcher holding assembly. It shall be possible to position the infusions for use at either end of the stretcher holding assembly. The infusion mounting shall have a minimum capacity of 5 kg and be able to hold two bags of fluids independent of each other and shall be designed to minimize oscillation.

7.4.8.11 Oxygen Cylinder Compartment and delivery System

The ambulance shall have medical oxygen system as per the detailed mentioned herein.

- Oxygen compartment shall be fabricated in such a way that the oxygen cylinders are accessible from outside of the vehicle with separate lockable door.
- Oxygen compartment should be dust proof (with frame and rubber profile) and all precautions should be taken to prevent the Dust entering this compartment from all sides and particularly from Door, hence a proper sealing should be provided on door edges.
- Two (2) nos jumbo 'D' Type oxygen cylinder along with its mounting trolley are to be provided, trolley shall be designed in such a way that both the cylinders could be handled independently.
- High pressure flexible SS braded Teflon tubing with male female bull nose connectors at both end to connect it from the oxygen gas cylinder to the pressure regulator inside.
- Two stage Preset Pressure Gauge cum Regulator: With static outlet pressure of 4.12 bar/ 60 psi with two safety valves at each stage; 2 nos each;
- Humidifier Bottle: Poly Carbonate Bowl with metal Cap and T type inlet outlet nipples, 2 nos.
- Flow Meter: Stainless Steel/ Brass body, Poly carbonate Tube, to regulate the flow from 0 to 15 ltrs per mints. It should be a back pressure compensated;
- Three plus one (3+1) four ports of Brass 3/8 inches nipple in size be provided in complete one assembly (One set) on a common rectangular Brass Tube (Rail) with two Needle Valves at both the ends.
- Two high pressure and two low pressure pipe connection to be made

7.4.8.12 Hat racks and Grab rails in the ceiling and near Rear door shall be provided as per the details mentioned below:

a) Hat Racks:

- Dimension approx: length =1500 to 3000 mm, Depth = 350 to 450 mm at bottom and 200 to 241 mm at ceiling, height = 350 – 360 mm. To be integrated with roof above the squad bench. Made in ABS (min 4 mm thick) and required reinforcement to be provided. It should spread from rear-left top side wall to the front end.
- Inner surface is to be pasted with soft Heatlon sheet of 4mm thickness.

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iii) The Hat rack should have suitable closures to cover the opening which are easy/comfortable to operate and do not have any sharp edge at the openings.

iv) The doors of the hat rack should have adequate locking system to avoid abnormal opening during operation.

v) Rear portion should be closed and front should have about 80 mm high wall support provided so material should not fall down

b) Grab Rails:

i) A 2380mm long pipe of 30mm dia. made of stainless steel (SS) be placed as grab rail on the Ceiling with proper supports at four places;

ii) A 610mm long pipe of 30mm dia. made of SS is placed as Grab Bar near the LHS rear door at LHS wall with firm support at the ends.

7.4.8.13 A proper heavy duty bracket support at rear LHS corner for placing a fire extinguisher should be provided.

7.4.9 Mounting systems

Permanent seats and their anchorages in the patients' compartment, designed for use by patients and attendants when the ambulance is in motion, shall comply with the requirements of Directive 74/408/EEC modified. The seat belts anchorages of such seats shall comply with the requirements of Directive 76/115/EEC modified. The seat belts shall comply with the requirements of Directive 77/541/EEC modified.

All persons and items e.g. medical devices, equipment and objects normally carried on the road ambulance shall be restrained, installed or stowed to prevent them becoming a projectile when subjected to accelerations/ decelerations of 10 g in the forward, rearward, left, right and vertical directions.

When subjected to these accelerations/decelerations, the distance travelled by a person or item shall not endanger the safety of persons on the road ambulance.

After being subjected to these accelerations/decelerations:

a) No items shall have sharp edges or endanger the safety of persons in the road ambulance;

b) The maximum distance the stretcher and any item attached to either the holding assembly or stretcher may travel shall be no more than 150 mm. The displacement of the patient during the test may exceed 150 mm.

c) It shall be possible to release all persons in the road ambulance without the use of equipment not carried on the road ambulance.

7.5.0 Body graphics and visibility of ambulance

7.5.1 Color

The basic colour of the complete exterior should be brilliant white, RAL-Code 9010, front, rear and side bumpers included. The colour should be weather resistant and withstand daily cleaning and washing.

7.5.2 Emblems

Customer logo and marking shall be done prior to vehicle dispatch and details shall be provided during detailed engineering.

7.6.0 Equipment to be supplied along with ambulance.

Equipment's to be supplied along Ambulance are specified in Annexure-II.

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FOR
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SECTION IC

ANNEXURE-I

Schedule of Equipment to be supplied with Foam cum water Tender



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA



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Schedule of Equipment to be supplied with
Foam cum water tender

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**ANNEXURE I: Schedule of Equipment to be supplied with Foam cum water tender
(With each Fire Tender)**

S.No.	Description	Detail
A	Accessories and Equipment to be supplied with Foam cum water tender	Unit (No. / m)
1	6 lb (2.7 kg) pickhead axe	1 no
2	6-lb (2.7-kg) flathead axe	1 no
3	6 ft (2 m) pike pole or plaster hook	1no
4	Portable hand lights with mounting bracket.	2 nos
5	Approved dry chemical portable fire extinguisher with a minimum 80-B:C rating	1 no
6	8-ft (2.4-m) or longer pike pole	1 no
7	(9.5-L) or larger water extinguisher with bracket	1 no
8	SCBA complying with NFPA 1981, for each assigned seating position, but not fewer than four, mounted in brackets fastened to the apparatus or stored in containers supplied by the SCBA manufacturer	1 no
9	Spare SCBA cylinder for each SCBA carried, each mounted in a bracket fastened to the apparatus or stored in a specially designed storage space	1 no
10	First aid kit	1 no
11	Combination spanner wrenches	4 nos
12	Hydrant wrenches	2 nos
13	Double female 2 1/2 in. (65 mm) adapter with National Hose (NH) threads	1 no
14	Double male 2 1/2 in. (65 mm) adapter with NH threads	1 no
15	Rubber mallet, suitable for use on suction hose connections	1 no
16	Wheel chocks, mounted in readily accessible locations, that together will hold the apparatus, when loaded to its GVWR or GCWR, on a hard surface with a 20 percent grade with the transmission in neutral and the parking brake released	2 or more nos.
17	Traffic vest for each seating position, each vest to comply with ANSI/ISEA	1 no



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Foam cum water tender

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	207, Standard for High-Visibility Public Safety Vests, and have a five-point breakaway feature that includes two at the shoulders, two at the sides, and one at the front	
18	Fluorescent orange traffic cones not less than 28 in. (711 mm) in height, each equipped with a 6 in. (152 mm) retroreflective white band no more than 4 in. (102 mm) from the top of the cone, and an additional 4 in. (102 mm) retroreflective white band 2 in. (51 mm) below the 6 in. (152 mm) band	5 nos
19	Illuminated warning devices such as highway flares, unless the five fluorescent orange traffic cones have illuminating capabilities	5 nos
20	Automatic external defibrillator (AED)	1 no
21	Hard Suction hose with strainer, 1 length	6 m
22	Soft suction hose with female couplings (for coupling with local hydrant outlet connection on one end and the pump intake connection on the other end), 1 length.	4.6 m
23	65mm fire hose with couplings	240 m
24	38mm fire hose with couplings	120 m
25	750 LPM minimum foam/ water hand line nozzles	4 nos
26	360 LPM minimum foam/ water hand line nozzles	2 nos
27	Straight ladder, a minimum of 14 ft (4.3 m) in length and equipped with roof hooks	1 no
28	10-ft (3-m) folding ladder.	1 no
29	Any other equipment as per NFPA 1901	1 Lot

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SECTION IC
ANNEXURE-II

Schedule of Equipment to be supplied with Ambulance Car



BHARAT HEAVY ELECTRICALS LTD
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Schedule of Equipment to be supplied with
Ambulance car

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ANNEXURE II: Schedule of Equipment to be supplied with Ambulance car

S.No.	Description		Detail
E.	Equipment/Accessories to be supplied with Ambulance Car	:	
1	Automatic loading stretcher	:	01 Number
2	Transfer mattress / carrying sheet	:	02 Nos
3	Oxygen cylinder	:	01 No
4	Oxygen mask		02 Nos
5	Defibrillator with rhythm and patient data recording		01 No
6	First Aid Kit		01 No
7	Pillow , Blankets, sheets, towels		02 Sets
8	Dressing ,Bandage , Nursing , personal protection and rescue material		1 Lot
9	Personal protection equipment's		1 Set
10	Rescue and protection material		1 Set
11	Portable Suction Aspirator , Manual		1 Nos
12	Fire Extinguisher		1 No
13	Nebulizer kit		1 No
14	Resuscitate or with oxygen inlet and masks and airways for all ages and oxygen reservoir		02 Nos
15	Mouth to Mask ventilator with oxygen inlet		1 No
16	Electric Portable Suction Aspirator with air flow of at least 30 L/min and a vacuum level of at least 600 mm Hg (ISO 10079-1-1999)		1 No
17	Portable Suction Aspirator, Manual		1 No

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SECTION IC
ANNEXURE-III

List of Firefighting and Rescue equipment's



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA



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List of Firefighting and Rescue equipment

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ANNEXURE III: LIST OF FIRE FIGHTING AND RESCUE EQUIPMENT

S.No.	Description	Units
1	Portable gas indicator	3
2	Heavy duty hand lamp	4
3	Breathing apparatus with cabinet	7
4	Dry powder transferring and refilling rig	1
5	Pneumatic vice for extinguisher locking	1
6	CO2 extinguisher filling and powder pressurizing rig	1
7	Electric screwing-unscrewing	1
8	Hydraulic inspection unit	1
9	First aid kit	3
10	Paramedic standard equipment	2
11	Hose repair equipment	1
12	Firefighting suits	5
13	Firefighting blankets	10
14	Multi-purpose nozzles	4



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TECHNICAL DATA SHEET OF FIRE FIGHTING SUIT

1.0	GENERAL	
1.1	TYPE OF SUIT	FIRE ENTRY SUIT
1.2	QTY.	05 NOS.
2.0	MATERIAL OF CONSTRUCTION	<u>ALUMINIZED KEVLAR BASED PROTECTIVE CLOTHING</u> <u>LESICO SEVEN LAYERED ALUMINIZED HEAT PROTECTIVE SUIT</u> Lesico aluminized seven layered heat protective suit made from Kevlar based aluminized material. The suit consists of Coat, Pant, Hood, glove and boot.
3.0	DESIGN OF THE SUIT	The suit is designed in Coat and Pant form.
3.1	COAT	➤ The coat is designed to offer maximum protection with limited discomfort to the user. ➤ The coat is provided with front zip fastening arrangement with overlapping flap with Velcro. ➤ The coat is provided with high protective collar with throat guard and Velcro tightening arrangement for better protection. ➤ The sleeves of the coat are provided with elastic wrist and finger loops with additional press buttoning tightening arrangements. ➤ The coat is stitched with flame retardant and mechanically strong Kevlar thread. ➤ The coat will have Provision for wearing Breathing Apparatus.
3.2	PANT	➤ The pant is designed to offer maximum protection with limited discomfort to the user. ➤ The pant is provided with heavy duty nylon suspenders for fit adjustment with quick release snap buckles. ➤ The pant is provided with zipper and Velcro overlapping at fork area. ➤ The pant is provided with fastening arrangement at the bottom. ➤ The pant is stitched with flame retardant and mechanically strong Kevlar thread. ➤ The trousers will be having regular braces, the belt for marking the waist slimmer in the lower parts of trousers, a metal zip for more comfortable putting up the shoes on the feet. ➤ Leggings:- Steel in lay on the in step, the lower steel support for fasting the shoes and protecting against getting up the leggings. ➤ Velcro option will be provided for easy fastening of shoes.
3.3	HOOD	➤ The hood is designed to cover the full head area and overlapping the shoulder. ➤ The hood is provided with two fastening arrangements to hold the hood firmly on the head. ➤ The hood is provided with Polycarbonate gold plated



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		reflective visor for better heat reflection and is integrated with the Helmet. ➤ The inner of the hood is provided with CE certified Fire man helmet certified to EN 443. ➤ The hood is be stitched with flame retardant and mechanically strong Kevlar thread. ➤ The hood will have visor with golden reflexive and un-sweaty modification, double protective glass, double fastening metal zip and Velcro being located in to the area of hood. ➤ The visor is certified to EN 166 & 171.
3.4	HAND GLOVE	➤ The hand glove is designed in Mitten type with thumb. ➤ The hand glove is provided with additional layer of Kevlar on palm and fingers area for added heat and mechanical protection. ➤ The length of the glove is 14”. ➤ The glove is provided with fastening arrangement at the cuff area. ➤ The glove is stitched with flame retardant and mechanically strong Kevlar thread.
3.5	BOOTS	The boot consists of two portion; inner safety shoes and upper cover made from aluminized materials.
3.6	ADDITIONAL FEATURES	Provision for wearing Breathing Apparatus.
5.0	CONFIRMITY	➤ The aluminized outer fabric (DICKSON 4584) is tested and certified to EN, ISO, EN11612 and EN 1486. ➤ The moisture & thermal barrier (Dickson 5474) is tested to EN 1486 for moisture and thermal protection. ➤ The Inner layer (Klopman Gemini FR) is tested and certified to EN ISO 11612. ➤ The helmet is certified to EN 443. ➤ The visor is certified to EN 166 & 171. ➤ The shoe is certified to EN20345 for S1P/HRO.
6.0	PACKING	• Suit will be supplied in easy to carry nylon bag.
7.0	INSPECTION	Test Certificate and certificate of conformity.
8.0	SHELF LIFE	Five years kept under packed condition.
10.0	HIGHEST DIRECT RADIANT TEMPERATURE	1200 deg. C, duration will depend on other factors like exposure of water, training skills etc.
11.0	USER / MAINTENANCE MANUAL	Will be submitted at the time of supply
12.0	CERTIFICATION	Test certificate of the fabric as per EN-1486 and conformity certificate of complete Suit for EN-1486 Level-III from OEM will be provided.



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TECHNICAL DATA SHEET OF BREATHING APPARATUS SET

1.0	GENERAL	
1.1	QTY.	07 NOS.
1.2	CARBON COMPOSITE CYLINDER	(A) 30 MIN. WORKING DURATION WITH RESERVE PERIOD OF ATLEAST 15 MIN. (B) VOLUME – 6.8 LTRS. X 300 BAR PRESSURE (2040 LITRES)
2.0	DESCRIPTION / SPECIFICATION	
2.1	FEATURES	• SECOND MEDIUM PRESSURE HOSE (BUDDY BREATHER) • PANO MASK WITH HUD LIGHTS AND INTEGRATED COMMUNICATION • DIGITAL GAUGE WITH INTEGRATED PASS ALARM • LOW PRESSURE ALARM AND ADSU FEATURING A MOTION SENSOR WHICH GIVES ALARM IF THE USER IS MOTIONLESS FOR 30 SECONDS
2.2	FLEXIBLE CONNECTOR DEMAND VALVE WITH EXCEPTIONAL MOBILITY	WHETHER THE USER IS CLIMBING, BENDING, CRAWLING, OR REACHING FOR EQUIPMENT ON THE APPARATUS, THE TECHNICALLY SUPERIOR PUSH-TO-CONNECT FITTINGS, BANJO CONNECTOR VALVES, FUNCTION WITHOUT TOOLS, ARE EASY TO OPERATE AND HAVE BEEN DESIGNED TO ENGINEER MORE FLEXIBILITY WHEN WEARING THESE DEMAND VALVES. THIS SIMPLE DESIGN HELPS TO MINIMIZE BULK AND ALLOWS FREE MOVEMENT IN DIFFICULT SPACES. IT MINIMIZES THE PRESSURE HOSE CLOSER TO THE USER'S CHEST TO AVOID THE RISK OF THE HOSE BECOMING HOOKED SO THAT IT CREATE CREATING A MORE BALANCED LOAD.
2.3	ERGONOMICALLY DESIGNED HARNESS SYSTEM	TO TAKE SOME OF THE WEIGHT OUT OF THE SCBA, HONEYWELL T8000 AN ADVANCED ERGONOMIC DESIGN OF THE SHOULDER STRAPS, HIP PAD AND BACK FRAME THAT ALLOWS THE WEIGHT TO BE DISPLACED SO THAT ONLY A MINIMAL LOAD IS FELT ON YOUR SHOULDERS AND BACK. THE DESIGN PROVIDES MAXIMUM COMFORT AND IS QUICK AND EASY TO MAINTAIN. • A MEDIUM AND HIGH PRESSURED HOSE ARE POSITIONED ON BOTH SIDES WRAPPED TIGHTLY AGAINST THE BACK PACK TO ENSURE SAFETY AND BALANCE. • THE BROADENED STRAPS ENSURE COMFORT AND EQUIPPED WITH REFLECTIVE STRIPES FOR EASY OBSERVATION IN DARK ENVIRONMENTS.
2.4	CLARITY OF VISION WITH PANO MASK	THE SCBA LENS FORMS A CRITICAL BARRIER THAT IS DESIGNED TO WITHSTAND PHYSICAL AND THERMAL IMPACTS WHILE MAINTAINING INTEGRITY AND VISUAL ACUITY. • WIDE PANORAMIC VISION WITH DISTORTION FREE CLARITY • ITS ERGONOMIC DESIGN PROVIDES EXCEPTIONAL ALL DAY COMFORT • ONE SIZE FITS ALL • AIR CLICK SYSTEMS ALLOWS THE USERS TO SNAP THE VALVES INTO PLACE



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		• THE FACE PIECE, INTERNAL HALF MASK AND SKIRT IS MADE OF A SPECIAL SUBSTANCE CALLED EPDM THAT PROVIDES OPTIMAL RESISTANCE IN FIRE AND CHEMICAL ENVIRONMENTS • NO TOXIC MATTER CAN ENTER THE MASK
2.5	TECHNOLOGICALLY ADVANCED HIGH PRESSURE HOSE WITH CHEST WHISTLE	DEVELOPING AN EFFECTIVE FIRE STREAM IS ONE OF THE MOST BASIC FUNDAMENTALS OF ANY FIRE FIGHTING OPERATION. HONEYWELL'S TECHNOLOGICALLY ADVANCED T8000 SCBA DETERMINE AN EFFECTIVE PRESSURE IS DELIVERED TO ENSURE USERS SAFETY. • AN IN- BUILT HIGH PRESSURE HOSE IS EQUIPPED WITH EXPOSURE HOLES OUTSIDE TO ENSURE USERS SAFETY. • THE CHEST WHISTLE IN THE FRONT CAN BE HEARD LOUD AND CLEAR SO THAT THE PERSON HEARING IT CAN RESPOND AND BE SAVED.
2.6	RELIABLE REDUCER SYSTEM WITH EQUALIZED AIR FLOW	• FIRST STAGE REDUCER SYSTEM PROVIDES SAFETY AND RELIABILITY • THE BUDDY BREATHER OUTLET ENSURES THE SAFETY OF THE RESCUER AND RESCUED, BY PROVIDING EQUALIZED AND MEDIUM PRESSURE OF AIR FLOW TO THE RESCUED WITHOUT DECREASING IT.
3.0	APPROVALS	• EN 137:2006 TYPE 2 • FULL-FACE MASK TYPE-APPROVAL - EN 136 CLASS III • COMMUNICATION DEVICE, DIGITAL GAUGE AND HUD- APPROVAL - EX IA IIC T4 GA; EX IAD 20 T135°C
4.0	SPECIFICATIONS	
4.1	HIGH-PRESSURE PNEUMATIC GAUGE	0-400 BAR, PHOTO-LUMINESCENT GAUGE, RUBBER PROTECTION AND INTEGRATED ALARM WHISTLE
4.2	ALARM ACTIVATION	55±5 BAR
4.3	ALARM VOLUME	>90 DBA
4.4	APPROVE TEMPERATURES	-30°C – 60°C
4.5	COMMUNICATION DEVICE-OPERATING TEMP.	-30°C to +60°C
4.6	COMMUNICATION DEVICE, DIGITAL GAUGE AND HUD -ENCLOSURE PROTECTION DEGREE	IP67
4.7	ADSU	PROVIDED



MAITREE STPP
(2 X 660 MW)

DATA SHEET OF FIRE FIGHTING AND
RESCUE EQUIPMENTS

PE-TS-421-550-A001

REV 00

DATE: 28.01.2019

TECHNICAL DATA SHEET OF FIBRE GLASS BLANKET

1.0	GENERAL	
1.1	MAKE	GENTEX
1.2	QTY.	10 SETS
2.0	APPLICATION	FIRE BLANKERS ARE GENERALLY USED BY WELDOR FOR COVERING THE AREA USED WHILE WELDING AND IN CASE OF EMERGENCY FOR EXTINGUISHING FIRE.
2.1	APPROVAL / CERTIFICATION	CENTER OF ENVIRONMENT AND EXPLOSIVE SAFETY (CFEES).
3.0	FEATURES	
3.1	SIZE	6' X 6'
3.2	MATERIAL	GENTEX ALUMINISED FIBER GLASS FABRIC
3.3	TEMPERATURE RESISTANCE	RADIANT HEAT OF 1800 DEG. C



MAITREE STPP
(2 X 660 MW)

PE-TS-421-550-A001

REV 00

DATA SHEET OF FIRE FIGHTING AND
RESCUE EQUIPMENTS

DATE: 28.01.2019

TECHNICAL DATA SHEET OF MULTIPURPOSE NOZZLE

1.0	GENERAL	
1.1	QTY.	04 NOS.
2.0	MAIN FEATURES	• LIGHT WEIGHT / EASY HANDLING • LONG RANGE JET AND FOG PATTERN • OPTION OF FIXED / SPINNING TEETH • SELECT / VARIABLE FLOW FACILITY • VERY LOW MAINTENANCE • STURDY NOZZLE • LOW AND MEDIUM EXPANSION FOAM ATTACHMENT AVAILABLE
2.1	EFFECTIVE PERFORMANCE PRESSURE RANGE	30 TO 35 MTRS.
2.2	FLOW SETTINGS	380 – 480 – 650 – 780 – 900 LPM
2.3	PRESSURE	7 KG/CM ²
2.4	SPRAY ANGLE	160 DEG.
2.5	HORIZONTAL THROW	35 METERS AT 7 - 8 BAR PRESSURE
2.6	INLET DIA.	63 MM INSTANTANEOUS MALE COUPLING

2 X 660MW MAITREE STPP

TECHNICAL SPECIFICATION
FOR
FIRE TENDER AND AMBULANCE CAR

SECTION IC

ANNEXURE-IV

List of Maintenance tools & tackles



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA



MAITREE STPP
(2X660 MW)

List of Maintenance tools and Tackles

PE-TS-421-550-A001

REV 00

DATE 29.03.2019

SHEET

ANNEXURE IV: List of Maintenance tools and tackles

S.No.	Description	Units
1	DE spanner set 6.25 mm	1 set
2	Ring spanner set 6.25	1 set
3	Adjustable wrench 200 mm	1 nos
4	Pliers cutting	1 nos
5	Pliers round nose 150 mm	1 nos
6	Pipe wrench 300 mm	1 nos
7	Screw driver 150 mm	1 nos
8	Screw driver 250 mm.	1 nos
9	File half round smooth 150 mm	1 nos
10	Hammer ball pen ½ kg.	1 nos
11	Grease gun.	1 nos
12	Oil feeder.	1 nos
13	Carpenter saw 450/500	1 nos

Note:

- (1) The above list is bare minimum, if any other maintenance tools and tackles are required as per the vehicle requirement, same shall be provided to BHEL without any cost implication.
- (2) Above tools and tackles shall be supplied with every vehicle separately.

2 X 660MW MAITREE STPP

TECHNICAL SPECIFICATION
FOR
FIRE TENDER AND AMBULANCE CAR

SECTION IC

ANNEXURE-V

QUALITY ASSURANCE PLAN



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA



MAITREE STPP
(2X660 MW)

QUALITY PLAN

PE-TS-421-550-A001

REV 00

DATE 29.03.2019

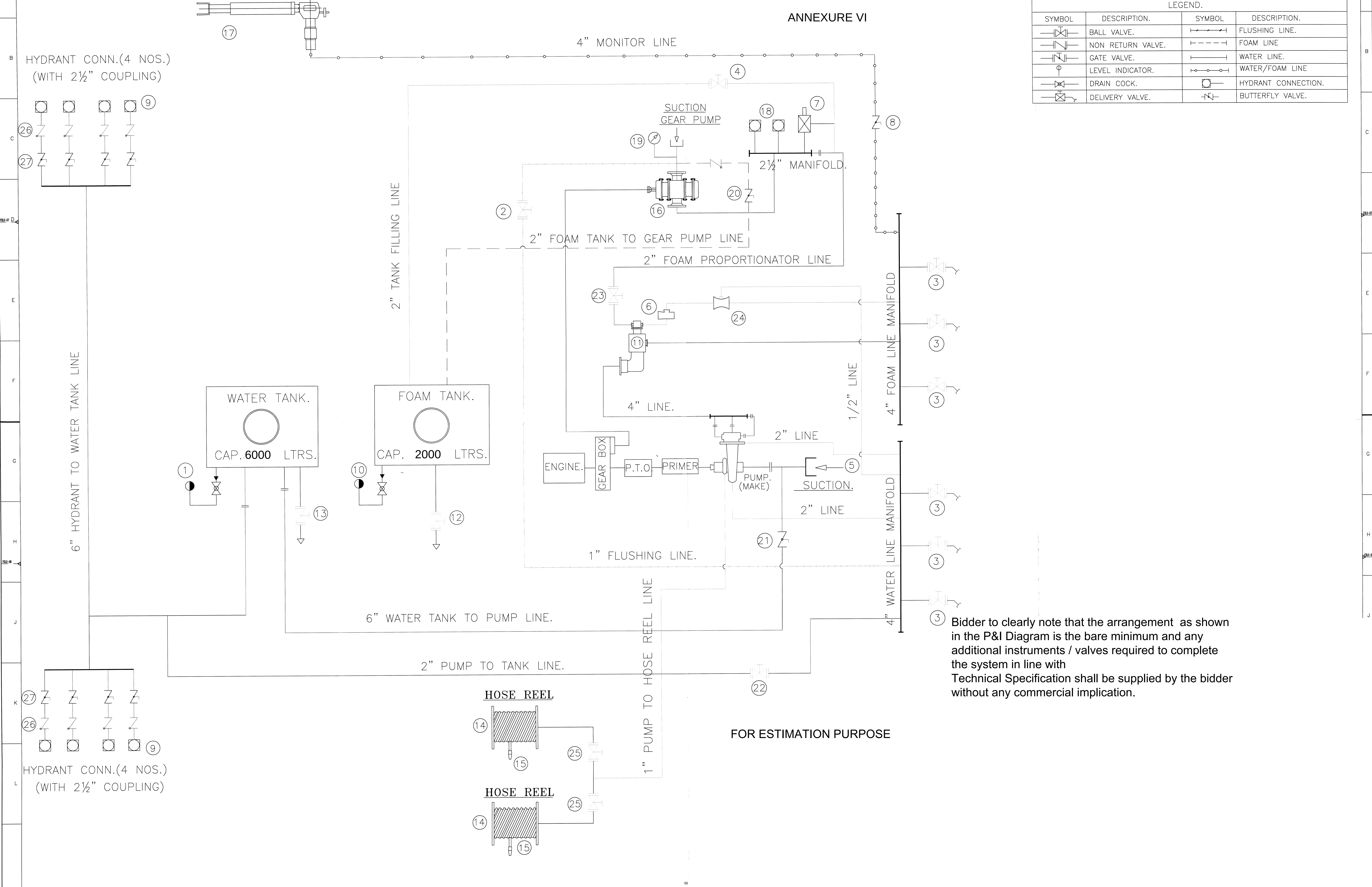
SHEET 1

QUALITY PLAN FOR MANUFACTURE OF EQUIPMENT:

- 1.0** The quality plan for manufacture is a document, which presents in a tabular form, the Quality Control checks to be exercised by the Contractor during the various stages of manufacture and despatch in order to meet the requirements of this contract. This plan shall details the components manufactured, characteristics being controlled and acceptance norm for this characteristic and the agency responsible for performance and witnessing the checks.
- 2.0** The detailed quality plans to be followed during manufacture of equipment shall be furnished by contractor during detailed engineering. These quality plans shall be approved by the owner.
- 3.0** The details of the quality assurance / quality checks envisaged by the contractor during manufacturing of the equipment supplied by him or procured through his sub-vendor/ sub –contractors shall be detailed out in the quality plans to be submitted by the contractor. The contractor may also furnish any additional information regarding quality assurance / quality checks in the additional sheets, if required. Quality plan for major equipment's manufactured by the contractor or procured through his sub-vendors / sub-contractors shall be submitted during detailed engineering. The contractor shall ensure that the approved quality plans are followed scrupulously by him and his sub-vendor/ sub-contractors and manufacturing of the items covered under the quality plans shall be taken up only after Owner has approved the quality plan.
- 4.0** Reference quality plan for foam cum water tender are attached.

		MANUFACTURER'S NAME & ADDRESS		QUALITY ASSURANCE PLAN				PROJECT: 2X6600 MW MAITREE STPP PACKAGE: FIRE TENDER BHEL NO:				
				ITEM: FIRE TRUCK		REV Rev 00						
						DATE						
						PAGE		Page 1 of 2				
S.NO.	Component & Operation	Characteristics	Class	Type of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record	P	W	V	Remark
1	2	3	4	5	6	7	8	9		10		11
1	Water & Foam Tanks	1.Properties of Plates 2. Fabrication 3. Hydro Test	Major Major Major	Physical & Chemical Visual	100% 100%	As per approved Data sheet	As per approved Drawing	Mfg TC or Lab TC IIR	3 3 3	2	2/1 1	
2	Fabrication of Fire Truck	Visual and Dimension	Major	Visual	100%	As per approved G.A. drawing	As per approved G.A drawing	IIR	3		1	
3	Painting & marking	Visual	Major	Visual	100%	As per approved procedure	As per approved procedure	IIR	3	2		
4	Electrical	Function	Major	Visual	100%	As per Specification/ approved Data sheet	As per Specification/ approved Data sheet	IIR	3		1	
5	Final inspection of complete fire truck	1.Hydraulic leak test for foam & water tanks 2.Pump running test 3.Monitor test 4.Stability test 5.Road test	Major Major Major Major Major	Visual Visual Visual Visual Visual	100% 100% 100% 100% 100%	As per approved. Drawing As per approved document As per approved data sheet As per approved document As per approved document	As per approved. Drawing As per approved document As per approved data sheet As per approved document As per approved document		3 3 3 3 3	2/1 2/1 2/1 2/1 2/1		

		LEGEND: CLASS A: Critical, B: Major, C: Minor		DOC. NO.:	
		** 3: MANUFACTURER / SUB-CONTRACTOR D: Records for Data Fold 2: CONTRACTOR /NOMINATED INSPECTION AGENCY, ND: NDT LAB 1: Customer R: Test / Dim Report, IR-Inspection Report INDICATE "P" PERFORMS, "W" WITNESS, MTC: Mfr's Test Cert. "V" VERIFICATION, ALC: Approved Laboratory Certificate, QCR: Quality Control Report, IIR: Internal Inspection Report			
MANUFACTURER	CONTRACTOR			NAME & SIGN OF APPROVING AUTHORITY & SEAL	
NAME & SIGNATURE					



ANNEXURE-VII

AFFIDAVIT

We, the undersigned, do hereby solemnly affirm and declare that:

We accept and confirm that the OFFERED FIRE TENDERS, AMBULANCE CAR, SAFETY EQUIPMENT, OTHER ACCESSORIES AND SERVICES against your RFQ/NIT Reference _____ for _____ for 2 X 600 MW BIFPCL MAITREE KHULNA STPP- BANGLADESH shall be supplied AS PER STANDARD INDICATED IN CLAUSE NO. B0.6.2 OF BIFPCL SPECIFICATION ENCLOSED IN TECHNICAL SPECIFICATION PE-TS-421-550-A001.

ANNEXURE-VIII

AFFIDAVIT

We, the undersigned, do hereby solemnly affirm and declare that:

We accept and confirm that the offered Ambulance against your RFQ/NIT Reference _____ for _____ for 2 X 600 MW BIFPCL MAITREE KHULNA STPP- BANGLADESH shall be supplied from such manufacturer who have manufactured and supplied at least one (1) number Road Ambulance, which is in successful operation.

2 X 660MW MAITREE STPP

TECHNICAL SPECIFICATION
FOR
FIRE TENDER AND AMBULANCE CAR

SECTION ID

CUSTOMER SPECIFICATION AND CODES & STANDARD



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA

B12.5.2.4 Fire brigade and fire station equipment

The Maitree-STPP fire brigade shall be equipped with two (2) fire fighting trucks with foam/water tanks and one (1) ambulance car including all standard fire fighting and rescue equipment. The Contractor shall provide complete equipped Fire fighting trucks according to relevant national and international regulations.

The periodic inspections, checking and maintenance of the firefighting equipment until PAC shall be undertaken by the Contractor.

Description	Quantity
Portable gas indicator	3
Heavy duty handlamp	4
Breathing apparatus with cabinet	7
Dry powders transferring and refilling rig	1
Pneumatic vice for extinguishers locking	1
CO2 extinguishers filling and powder pressurization rig	1
Electric screwing-unscrewing	1
Hydraulic inspection unit	1
First aid kit	3
Paramedic standard equipment	2
Hose repair equipment	1
Fire fighting suits	5
Fire fighting blankets	10
Multipurpose nozzles	4



The vehicles shall be located in the fire brigade building which shall also house a command room, offices, staff rooms, a fully equipped medical station with a first aid room, workshops, stores, etc. and refilling units for portable fire extinguishers and breathing apparatus, as well as any other equipment required for the completion of the fire brigade building.

Fire safety instructions in the Bangladesh and English languages shall be provided in all zones.

The instructions shall clearly describe what personnel are required to do upon discovering a fire, hearing the fire warning signals or hearing the fire evacuate signals.

The fire safety instruction shall be specific to the zone in which they are located and marked with the zone number and name. Any special care required when using or maintain fire protection equipment within the zone shall also be indicated. The instructions shall be protected by glass or transparent plastic material secured in a metal frame in a prominent position within the zone.

B0.6.2 Standards and codes

ls The work must be performed according to the most recent relevant codes, standards, accident prevention regulations and local rules and legal regulations.



All materials and equipment supplied and all work carried out as well as calculation sheets, drawings, quality and class of goods, methods of inspection, specific design features of equipment and parts and acceptances of partial plants shall comply in every respect with the applicable standards, codes and regulations to be chosen from the following:

- American Association of State Highway and transportation Officials

AASHTO



• American Concrete Institute	ACI
• American Gear Manufacturers Association	AGMA
• American Institute of Steel Construction	AISC
• American Iron & Steel Institute	AISI
• American Moving and Conditioning Association	AMCA
• American National Standards Institute	ANSI
• American Petroleum Institute	API
• American Public Health Association	APHA
• American Society for Testing and Materials	ASTM
• American Society of Civil Engineers	ASCE
• American Society of Heating, Refrigeration & Air Conditioning Engineers	ASHRAE
• American Society of Mechanical Engineers	ASME
• American Water Works Association	AWWA
• American Welding Society	AWS
• American Wire Gauge	AWG
• Anti-Friction Bearing Manufactures Association	AFBMA
• Architectural Institute of Japan	AIJ
• Association Francaise de Normalisation	AFNOR
• British Standards Institute	BS
• Chlorine Institute	CI
• Crane Manufacturers Association of America	CMAA
• Deutsches Institut für Normung	DIN
• Diesel Engine Manufacturers Association	DEMA
• European Norm	EN
• Expansion Joint Manufacturer Association	EJMA
• Fédération Européenne de Manutention	FEM
• Heat Exchanger Institute	HEI
• Hydraulic Institute	HI
• Illuminated Engineers Society	IES
• Institute of Electrical and Electronics Engineers	IEEE
• Instrument Society of America	ISA
• Insulated Power Cable Engineers Association	IPCEA
• International Electrotechnical Commission	IEC
• International Standards Organization	ISO
• Japanese Architectural Standard Specification	JASS
• Japanese Electrical Manufacturers Association	JEMA
• Japanese Electrotechnical Institute	JEC
• Japanese Industrial Standards	JIS
• Manufacturers Standardization Society	MSS
• National Association of Corrosion Engineers	NACE
• National Electrical Code (USA)	NEC
• National Electrical Manufacturer's	NEMA

Association (USA)	
• National Electrical Safety Code	NESC
• National Fire Protection Association	NFPA
• National Structural Code for Building	NSCB
• Occupation Safety and Health Administration	OSHA
• Portland Cement Association	PCA
• Properties of Water and Steam	IFC
• Scientific Apparatus Manufacturers Association	SAMA
• Society of Automotive Engineers	ASE
• Standards of Japanese Electrotechnical Committee	JEC
• Steel Structures Painting Council	SSPC
• Technische Vereinigung der Grosskraftwerksbetreiber	VGB
• Tubular Exchanger Manufacturers Association	TEMA
• Underwriters Laboratory	UL
• Uniform Building Code	UBC
• Verband Deutscher Elektrotechniker	VDE
• Verein Deutscher Ingenieure	VDI
• Vereinigung Deutscher Elektrizitätswerke (Association of German Power Plants)	VDEW
• Water Pollution Control Federation	WPCF

Generally, all internationally and nationally recognized standards as above will be applied, except if specific standards called for by:

- a) Occupational Safety Board of Bangladesh
- b) Department of Inspection for Factories and Establishments, Bangladesh
- c) Department of Environment, Bangladesh
- d) Bangladesh Power Development Board
- e) Bangladesh Energy Regulatory Commission
- f) Ministry of Power, Energy and Mineral Resources
- g) Bangladesh Fire Service and Civil Defence Ministry
- h) All relevant Bangladesh National Statutory Regulations
- i) Bangladesh National Building Code
- Local Authorities.



All steam boilers and unfired pressure vessels together with associated pipework and fittings shall comply with the Bangladesh Boiler Act, 1923 with amendments.

All pressure parts shall be designed in accordance with applicable ASME codes.



All services, supplies and works shall comply with the requirements of the relevant laws of Bangladesh and the IFC/World Bank Group Standards and Guidelines in their latest edition, including but not limited to:

- Environmental Conservation Rules
- Bangladesh Energy Regulatory Commission Act;
- BERC Licensing Regulation
- BERC Technical Quality Standards;
- Bangladesh National Building Code;
- other applicable laws in Bangladesh;
- IFC Performance Standards on Environmental and Social Sustainability;
- IFC / World Bank Group Environmental, Health and Safety (EHS) General Guidelines ;
- IFC / World Bank Group EHS Guidelines for Thermal Power Plants;
- IFC / World Bank Group EHS Guidelines for Electric Power Transmission and Distribution.

It is the Contractor's responsibility to provide sufficient evidence that any national or other standard the Contractor proposes (other than those mentioned above) will ensure an equivalent or higher standard.

Immediately after effective date of the Contract the Contractor shall supply an indexed list of all standards, codes and associated standards referred to, to which the work is to be performed. A copy of all applied standards shall be forwarded to the Employer. The Contractor shall supply preferably two (2) searchable softcopies, else two (2) hardcopies each.

Note: Only codes and standard as stipulated in the Technical Specification shall apply. Application of other codes and standard , such as i.e. Indian or Chinese , is not acceptable.



B12 Fire Protection Systems

B12.1 General

The fire fighting system shall consist of Fire Protection System and Fire Detection System.

The fire protection system equipment shall be complete in every respect and suitable for safe and reliable operation.

The fire fighting system shall cover the whole area of Maitree-STPP site. Fire protection system shall cater for all potential risks from fire and provide automatic and/ or manual response to any fire detected. Automatic and manual extinguishing systems operation is anticipated.

B12.1.1 Design standards and codes

The fire fighting protection and detection system shall be designed according to NFPA/ Equiv. International Standards. All relevant NFPA standards shall apply, including but not limited to the following:

NFPA 1	Fire Prevention Code
NFPA 2	Fire Fighting Pumps
NFPA 10	Portable Fire Extinguishers
NFPA 11	Foam Extinguishing Systems
NFPA 13	Installation of Sprinklers System
NFPA 14	Standpipe and Hose System
NFPA 15	Water Spray Fixed Systems
NFPA 16	Deluge Foam-Water Systems
NFPA 20	Standard for the Installation of Centrifugal Fire Pumps
NFPA 22	Standard for Water Tanks for Private Fire Protection
NFPA 24	Private Fire Service Mains and Their Appurtenances
NFPA 25	Water Based Fire Protection Systems
NFPA 30	Flammable and Combustible Liquid Code
NFPA 31	Oil Burning Equipment
NFPA 70	National Electric Code
NFPA 71	Central Station Signaling Systems Protected Premises Unit
NFPA 72	National Fire Alarm Code
NFPA 72A	Local Protective Signaling System
NFPA 72E	Automatic Fire Detectors
NFPA 101	Life Safety Code
NFPA 231	Standard for General Storage
NFPA 291	Recommended Practice for Fire Flow Testing and Marking of Hydrants
NFPA 307	Marine Terminals, Piers and Wharves
NFPA 600	Standards on Industrial Fire Brigades
NFPA 850	Protection for Electric Generating Plants



All fire safety facilities shall be provided in accordance with the international (i.e. ICE, CEE, EN), British (i.e. BS, BSI), German (i.e. DIN, VDS, VDE) and American (i.e. NFPA) Standards, in the latest edition.

2 X 660MW MAITREE STPP

TECHNICAL SPECIFICATION
FOR
FIRE TENDER AND AMBULANCE CAR

SECTION-II

ANNEXURE -IX

MASTER DRAWING LIST WITH SCHEDULE OF SUBMISSION



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA

ANNEXURE-IX

MDL FOR FIRE TENDERS, AMBULANCE CAR & FIRE SAFETY EQUIPMENT FOR 2 X 660MW MAITREE STPP

S.N	DRWG NO	DRWG TITLE	CATEGORY	SCHEDULED SUBMISSION (NO. OF WEEKS FROM LOA DATE / PO DATE) or AS SPECIFIED IN NIT, WHICHEVER EARLIER.	RESUBMISSION AFTER COMMENTS INCORPORATION
1	PE-V0-421-550-A001	TECHNICAL DATA SHEET & GENERAL ARRANGMENT DRAWING OF FOAM CUM WATER TENDER	I	8	WITHIN 1 WEEK
2	PE-V0-421-550-A002	TECHNICAL DATA SHEET & GENERAL ARRANGMENT DRAWING OF AMBULANCE CAR	I	8	WITHIN 1 WEEK
3	PE-V0-421-550-A003	TECHNICAL DATA SHEET OF SAFETY EQUIPMENTS	I	8	WITHIN 1 WEEK
4	PE-V0-421-550-A004	MQP FOR FOAM CUM WATER TENDER	I	8	WITHIN 1 WEEK
5	PE-V0-421-550-A005	MQP FOR AMBULANCE CAR	I	8	WITHIN 1 WEEK
6	PE-V0-421-550-A006	Sub Vendor List with Inspection Category	I	8	WITHIN 1 WEEK
7	PE-V0-421-550-A007	O & M MANUAL	I	16	WITHIN 1 WEEK

Note:

(1) Drawing / Document shall be uploaded by the successful bidder on WRENCH /DMS. Procedure for the same will be informed after award of contract

(2)The above drawing list is tentative and shall be finalized with the successful bidder after placement of order. While some of the drawings indicated above may not be applicable, some additional drawings may also be required based on scope of work.

(3)After award of LOI, following minimum drawing/documents shall be submitted by the bidder for BHEL and Customer approval. However any additional drawing/document if found necessary for completion of the engineering, the same shall be submitted by bidder without any commercial & delivery implication to BHEL.

(4)The bidder has to submit the revised drawing/document along with the compliance sheet indicating enumerate reply to all BHEL and customer comments or observations. Without compliance sheet the submission of the drawings/documents will not be considered and the delay on this account will be solely on bidder's side only. Bidder to comply with the observations of the BHEL and CUSTOMER without price & delivery implication.

2 X 660MW MAITREE STPP
TECHNICAL SPECIFICATION
FOR
FIRE TENDER AND AMBULANCE CAR

SECTION-II

ANNEXURE -X

FORMAT FOR OPERATION AND MAINTENANCE MANUAL



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA

Check List for Operation & Maintenance Manual

Project name:

Project number:

Package Name:

Sl.no. & Sections	Description	Yes	No	Not Applicable	Remarks
1.	Cover page				
1.1	Project Name				
1.2	Customer Name				
1.3	Name of Package				
1.4	Supplier details with phone, FAX email address				
1.5	Name and sign of prepared by , checked by & approved by				
2.0	Index				
2.1	showing the sections & related page nos All the pages should be numbered section wise				
3.0	Description of Plant				
3.1	Description /write up of operating principle of system equipment/ associated sub-systems & accessories/controls system , operating conditions, performance parameters under normal , start up and special cases				
3.2	Equipment list and basic parameter with Tag numbers				
3.3	Data sheets approved by Customer/for information and catalogues provided by original manufacturer				
3.4	Associated other packages and Interface /terminal points				
3.5	P&ID & Process Diagrams				
3.6	GA Layout drawings, As-built drawings				
3.7	Single line/wiring diagrams				
3.8	Control philosophy /control write-ups				
4.0	Commissioning Activities (if not covered in separate document i.e. erection manual, commissioning manual)				
4.1	Pre-Commissioning Checks				
4.2	Transportation and handling at site				
4.3	Storage at site				
4.4	Unpacking & Installation procedure				
5.0	Operation Guidelines for plant personal/user/operator				
5.1	Interlock & Protection logic along with the limiting values of protection settings for the				

	equipment along with brief philosophy behind the logic, drawings etc. to be provided.				
5.2	Start up and shut down procedure for equipments along with the associated systems in step by step mode. Valve sequence chart, step list, interlocks etc with Equipment isolating procedures to be mentioned.				
5.3	Do's & Don't of the equipments.				
5.4	Safety precautions to be taken during normal operation. Safety symbols, Emergency instructions on total power failure condition/lubrication failure/any other condition				
5.5	Parameters to be monitored with normal values and limiting values				
5.6	Trouble shooting with causes and remedial measures				
5.7	Routine operational checks, recommended logs & records				
5.8	Changeover schedule if more than one auxiliary for the same purpose is given				
5.9	Painting requirement and schedule				
5.10	Inspection, repair , Testing and calibration procedures				
6.0	Maintenance guidelines for plant personal				
6.1	List of Special Tools and Tackles required for Overhaul/Trouble shooting including special testing equipment required for calibration etc.				
6.2	Stepwise dismantling and re-assembly procedure clearly specifying the tools to be used, checks to be made, records to be maintained, clearances etc. to be mentioned. Tolerances for fitment of various components to be given.				
6.3	Preventive Maintenance & Overhauling schedules linked with running hours/calendar period along with checks to be given				
6.4	Long term maintenance schedules especially for structural, foundations etc.				
6.5	Consumable list along with the estimated quantity required during commissioning, normal running and during maintenance like Preventive Maintenances and Overhaul.				
6.6	List of lubricants with their Indian equivalent, Lubrication Schedule, Quantity required for each equipment for complete replacement is to be given				

6.7	List of vendors & Sub-vendors with their latest addresses, service centres ,Telephone Nos., Fax Nos., Mobile Nos., e-mail IDs etc.				
6.8	List of mandatory and recommended spare parts list				
6.9	Tentative Lead time required for ordering of spares from the equipment supplier				
6.10	Guarantee and warranty clauses				
7.0	Statutory and other specific requirements considerations.				

2 X 660MW MAITREE STPP

TECHNICAL SPECIFICATION
FOR
FIRE TENDER AND AMBULANCE CAR

SECTION – II

ANNEXURE -IX

(SEAWORTHY PACKING MANUAL)



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-INDIA



CORPORATE STANDARD

AA0490004

Rev No.00

PAGE 1 of 6

SEAWORTHY PACKING

(PACKING INSTRUCTIONS FOR GENERAL COMPONENTS / ASSEMBLIES / EQUIPMENTS)

1.0 GENERAL

This standard lays down packing instructions for packing of Components /Assemblies/Equipments to be dispatched against Customer's contracts, for which there are no special instructions issued by the Engineering Departments.

The Components/Assemblies need to be packed suitably to avoid physical damage & corrosion during transit for storage. For specific applications the concerned engineering department shall issue a product standard. Reference of this standard, must appear in the Shipping list/Packing List.

2.0 SCOPE:

This procedure gives minimum guidelines to be complied with for packing of Components /Assemblies / Equipments. This packing shall be suitable for different handling operations and for the adverse conditions during transportation and during indoor / outdoor storage for periods more than one year.

3.0 CROSS REFERED SPECIFICATION:

Expanded Polyethylene Foam Sheet	: AA51420
Packing Wood	: AA51401
Silica gel	: AA55619
Thermocole	: AA51416
Packing slip holders	: AA7240901
Corrugated Fibre Board	: AA51414
Rubber sheet	: AA59001
VCI paper	: AA51406

4.0 WOOD SPECIFICATION FOR PACKING:

The wood shall conform to specification AA51401.

5.0 TYPE OF PACKING:

The following 5 types of packings have been standardized for packing of General Components /Assemblies.

- 'OP' - Open Type
- 'PP' - Partially Packed
- 'CP' - Crate Packing - Components/Equipments requiring physical protection
- 'CQ' - Case Packing - Small medium Components/ Assemblies/ Equipments which require corrosion & physical protection
- 'CR' - Case Packing - Electrical Components/Assemblies which require special packing viz. Water Proof, Shock Proof, etc.

Revisions: Refer 25 th MOM of MRC-M&CD			APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(M&CD)		
Rev No.00	Amd No.	Reaffirmed	Prepared	Issued	Dt. of 1 st Issue
Dt:17-08-2013	Dt:	Year:	HPBP, Trichy	Corp.R&D	17 Aug 2013

6.0 DESCRIPTION OF TYPES OF PACKING:

The various types of packing, as standardized above, are described below.

6.1 'OP' - Open Type:

In case, of components which are not affected by water & dust & do not require special protection &, are generally not machined, shall be sent as open packages. However these components may be sent in crates, wherever necessary.

6.2 'PP' - Partially Packed:

Components which need special protection, at selected portions only, shall be dispatched partially packed. Machined surfaces should not be allowed to come directly in contact with the wood. Such surfaces after application of TRP should be protected with Polyethylene Coated Bitumen Hessain Kraft Paper to AA51409 or Polyethylene sheet to AA51408 of at least 100 micron thickness.

6.3 'CP' - Crate Packing - General:

Assemblies/Components which need only physical protection from the point of view of handling shall be dispatched duly packed in crates.

6.4 'CQ' - Case Packing - Machined Components/Assemblies/Equipments:

- a) Small & Medium sized components/assemblies/equipments due to size/weight & to avoid handling, and pilferage, problems shall be packed in Case/Containers.
- b) Wherever required adequate quantity of silica gel to AA55619 or VCI Powder/ Tablets, packed in thin muslin cloth cotton bags shall be suitably placed.
- c) Small machines/components of less weight shall be provided with suitable cushioning. Wood Wool/Expanded Polyethylene Foam Sheet, if used, shall be sandwiched between polyethylene sheets and sealed.
- d) The components inside the case shall be entirely covered with a polyethylene sheet of at least 100 micron thickness to AA 51408, where-ever required.

6.5 'CR' - Case Packing - Electrical & Electronic Components/Assemblies:

Delicate components likely to be damaged e.g. Gauges, Instruments etc. are to be wrapped in waxed paper or polyethylene air bubble film and packed in cartons.

- a) Adequate quantity of Silica gel to AA55619 packed in cotton bags, of 100 grams each are to be suitably placed in the cartons. The cartons shall be entirely covered with a polyethylene sheet to AA51408 of at least 100 micron thickness, before being packed in the cases.
- b) VCI Powder/Tablets can be used as an alternative to Silica Gel to AA55619.
- c) Empty space in the cartons shall be filled with small chips of Expanded Polystyrene (Thermocole), Wood Wool etc. Polyethylene air bubble film shall conform to IS:12787/AA51420 Expanded polystyrene (Thermocole) shall conform to AA51416.
- d) The cartons shall be manufactured from corrugated Fibre Board, meeting requirements of AA 51414.

6.6 Volatile Corrosion Inhibitor (VCI) Paper:

- a) Un-protected surfaces of steel and cast iron components, tools bearing, shaft seals etc. are covered with VCI paper. VCI paper has been impregnated with

corrosion inhibitors which by evaporation and chemical conversion protect metals in an enclosed area against corrosion.

- b) 7 m³ VCI paper is necessary for 1 m³ of packed item approximately as per AA51406.

Application Limitation:

VCI paper shall not be used for components made of aluminium, aluminium alloys as well as Zinc, copper, brass, cadmium and silver.

VCI powder is sprinkled inside the piping components ends shall be protected with end cover as specified in plant standards, drawings.

6.7 Moisture Absorber:

Silica gel is used for this purpose to protect the contents over sufficiently long time from corrosion. At the time of use, silica gel should be so dried that its colour becomes dark blue. These shall be filled in small cotton bags. Before sealing the equipment, the silica gel bags should be kept inside the polyethylene film cover at different locations. The quantity of silica gel should not be less than 1.0 kg per cubic metre volume of the packing box

7.0 TYPE OF CASES:

For specific requirement of packing the cases are to be provided with Tongue and Groove joints.

8.0 PREPARATION OF PACKING CASE:

- 8.1. The base of the case shall be made of wooden batons for planks giving necessary reinforcement, such that the bottom of the equipment is at a height of 100 to 200 mm from the ground level depending upon size, ft weight of equipment. However for packing cases of smaller size equipment can be at a height of -40 mm from the ground level.

- 8.2. In case of 'CR1 - Packing Viz. Electrical ft Electronic components for instruments /assemblies, a rubber sheet, Self-expanded polyethene foam sheet, preferably 10 mm thick, shall be fixed on to the base to act as cushioning to the equipment.

- 8.3. The four sides, shall be lined, from inside with packing paper water proof bitumen laminated to AA51410 Type - I or polyethylene sheet to AA51408 of at least 100 micron thickness and tacked at suitable places.

Whenever specified in addition to the bitumen laminated paper/polyethylene sheet the top cover will have a layer of bitumen felt over the cover. This should project about 100 - 250 mm on all sides.

It is preferable to have a single piece of the above Kraft paper fixed on the four sides. In case jointing is unavoidable, it should be done by overlapping of approximately 100 mm.

- 8.4. Place the Components/cartons with corrosion inhibitors duly applied wherever necessary for place suitably, thin muslin cloths bags containing 100 grams (approx.) of activated Blue Silica Gel to AA55619, wherever necessary. Alternatively VCI Powder or Tablet may be used.

- 8.5. In case, depression is formed, at the top, after the equipment is lowered, provide ply board/wooden batons.

- 8.6. Cover the whole equipment with polyethylene sheet of at least 100 micron thickness, on all sides preferably by a single piece.

- 8.7. For indoor panels/equipments, provide suitable packing batons with covering of Thermocole/expanded soft polyethylene foam/polyethylene air bubble film wrapped with suitable cords, to avoid cutting of the polyethylene sheet so that finished surface is not damaged.
- 8.8. Empty space in the box shall be filled with adequate cushioning material e.g. Thermocole Chips, Wood Wool etc. to avoid movement for shocks. Alternatively put wooden blocks/batons wherever necessary.
- 8.9. The inner side of the top cover shall be lined with polyethylene sheet, of at least 100 micron thickness, which shall project approximately 25 to 150 mm depending upon the size of the case on all sides of the top cover shall be provided below the top cover. This projection, after nailing the top cover, shall be folded over, on the sides of the crates ft tacked, to, prevent ingress of water from the top.

9.0 STEEL CONTAINERS:

Steel containers for packing can be used in case of repeated supplies of the same equipment. Empty steel containers are to be returned back from customer's end and to be reused for the next supplies.

The containers are to be made of structural steel as per AA 10108 with proper reinforcement with I, C and T Sections.

Following precautions are to be taken during packing:-

Put the Components/Assemblies/Equipments in the steel container properly.

Cover the Components/Assemblies/Equipments with polythene.

To arrest the movement in the steel container necessary wooden Blocks/Batons may be put.

Put cover on steel, container and Bolt Properly.

10.0 SEALED PACKING:

Components sub-assemblies and assemblies sensitive to climatic conditions shall be packed seal tight. All the openings of the sensitive components, sub-assemblies and assemblies shall be blanketed to prevent the ingress of dust and moisture.

The components sub-assemblies and assemblies are completely covered with 2 layers of polyethylene sheet. All sharp corners and edges are to be protected by rubber mats to prevent the polyethylene sheet from damage. Top surface of the case shall be free from dents to prevent rain water pockets.

11.0 SLING PLATE:

Sling plate shall be provided to prevent damage to the packing box during lifting. Size of the sling plate shall be selected depending upon the net weight of the consignment.

12.0 PACKING SLIP HOLDERS:

Two nos. steel packing slip holders, specification no. AA7240901 containing the packing list, sealed in thick polyethylene film, shall be fixed one inside and the other outside the packing box.

13.0 GENERAL PRECAUTIONS:

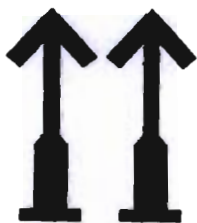
- a) While fixing nails during packing, necessary care shall be taken to ensure that materials used for protection inside the case e.g. paper, polyethylene sheet, coir etc. do not get damaged.

- b) Sling protection brackets to be provided on cases wherever required.
- c) It shall be ensured that all stencil marks external, front & rear sides of the casing shall be of water proof Material to prevent obliteration in transit.
- d) The various caution signs shall be marked with stencil on both sides of the packing box.
- e) Do not pack any other Mechanical items with this case.

THE FOLLOWING DETAILS ARE TO BE MARKED ON THE PACKING CASES.

- a) Address of consignee.
- b) Purchase Order No.
- c) Description of item or title of packing list.
- d) Case identification Number.
- e) Net Weight.
- f) Gross Weight.
- g) Dimensions of box
- h) Marking showing upright position.
- i) Marking showing sling position.
- j) Marking showing umbrella (i.e. for machines/components to be stored under covered storage).

MARKING ON PACKING BOXES



A



B



C



D



E

- A** UPRIGHT
- B** FRAGILE
- C** PROTECTION FROM FALLING OR CONDENSING MOISTURE
- D** SLING POSITION
- E** PROTECTION FROM DIRECT RADIATION

CORPORATE STANDARD**14.0 PROVISION FOR INSPECTION:**

This clause is applicable only where contractual requirement of customer is there. For other packings this is not applicable.

Each transportable packing's shall have provision for inspection by customer authority etc. during transport from origin of dispatched till destination. This inspection may require opening of the package and subsequently closing it again. For this purpose suitable designed opening with bolted cover shall be provided. Such an opening shall be clearly marked as "OPENING" with clear instruction for opening & closing written on this cover. For large consignment the size of the opening shall be suitable to facilitate entry of personnel.

2 X 660MW MAITREE STPP

TECHNICAL SPECIFICATION

FOR

FIRE TENDER AND AMBULANCE CAR

SECTION - III

DOCUMENTS TO BE SUBMITTED BY BIDDER



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA



**2X660 MW ENNORE SEZ STPP
FIRE TENDERS & FIRESAFETY
EQUIPMENT**

SPECIFICATION No: PE-TS-412-550-A001

SECTION : III

SUB-SECTION : III A

REV: 00

DATE: 27.03.2019

BIDDER SHOULD SUBMIT THE SIGNED AND STAMPED COPY OF THE FOLLOWING DOCUMENTS ALONG WITH TECHNICAL BID:

1. Compliance cum confirmation certificate (Section-III B)
2. Pre bid clarification schedule (Section-III C)
3. No deviation certificate(Section-III D)
4. Un-priced price bid indicating "Quoted / Not quoted / Not applicable" as the case may be.
5. Equipments to be supplied with Foam cum water tender (Annexure-I)
6. Equipments to be supplied with Ambulance car (Annexure-II)
7. List of Firefighting and rescue equipment's (Annexure- III)
8. List of Maintenance Tool & Tackles (Annexure-IV)
9. Notarised affidavit (Annexure-VII & Annexure-VIII)

Please note that all the schedules shall be submitted even though they may not be applicable. Under such circumstances it shall be clearly mentioned across such schedules that these are not applicable. (E.g. in case of there are no technical deviation, it shall be mentioned in the deviation schedule that 'THERE ARE NO DEVIATIONES TO THE TECHNICAL SPECIFICATION').

Name:
Signature:
Designation:
Company:
Date:

Bidder Stamp

	TITLE: TECHNICAL SPECIFICATION 2X660MW MAITREE STPP COMPLIANCE CUM CONFIRMATION CERTIFICATE	SPEC. NO.: PE-TS-421-550-A001	
		SECTION: III B	
		REV. NO. 0	DATE
		SHEET 1	OF 2

COMPLIANCE CUM CONFIRMATION CERTIFICATE

The bidder shall confirm compliance with following by signing/ stamping this compliance certificate (every sheet) and furnish same with the offer.

- a) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions other than those mentioned under "exclusion" and those resolved as per 'Schedule of Deviations', if applicable, with regard to same.
- b) There are no other deviations w.r.t. specifications other than those furnished in the 'Schedule of Deviations'. Any other deviation, stated or implied, taken elsewhere in the offer stands withdrawn unless specifically brought out in the 'Schedule of Deviations'.
- c) Bidder shall submit QP in the event of order based on the guidelines given in the specification & QP enclosed therein. QP will be subject to BHEL/ CUSTOMER approval & customer hold points for inspection/ testing shall be marked in the QP at the contract stage. Inspection/ testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc. This shall be within the contracted price with no extra implications to BHEL after award of the contract.
- d) All drawings/ data-sheets/ calculations etc. submitted along with the offer shall be considered for reference only, same shall be subject to BHEL/ CUSTOMER approval in the event of order.
- e) The offered materials shall be either equivalent or superior to those specified in the specification & shall meet the specified/ intended duty requirements. In case the material specified in the specifications is not compatible for intended duty requirements then same shall be resolved by the bidder with BHEL during the pre - bid discussions, otherwise BHEL/ Customer's decision shall be binding on the bidder whenever the deficiency is pointed out.

For components where materials are not specified, same shall be suitable for intended duty, all materials shall be subject to approval in the event of order.
- f) The commissioning spares shall be supplied on 'As Required Basis' & prices for same included in the base price itself.
- g) All sub vendors shall be subject to BHEL/ CUSTOMER approval in the event of order.
- h) Guarantee for plant/equipment as applicable, shall be as per relevant clause of GCC /SCC /Other Commercial Terms & Conditions.
- i) In the event of order, all the material required for completing the job at site shall be supplied by the bidder within the ordered price even if the same are additional to approved billing break up, approved drawing or approved Bill of quantities. This clause will apply in case during site commissioning additional requirements emerges due to customer and/ or consultant's comments. No extra claims shall be put on this account.
- j) Schedule of drawings submissions, comment incorporations & approval shall be as stipulated in the specifications. The successful bidder shall depute his design personnel to BHEL's/ Customer's/ Consultant's office for across the table resolution of issues and to get documents approved in the stipulated time.



TITLE:

**TECHNICAL SPECIFICATION
2X660MW MAITREE STPP
COMPLIANCE CUM CONFIRMATION
CERTIFICATE**

SPEC. NO.: PE-TS-421-550-A001

SECTION: III B

REV. NO. **0** DATE

SHEET **2** OF **2**

- k) As built drawings shall be submitted as and when required during the project execution.
- l) The bidder has not tempered with this compliance cum confirmation certificate and if at any stage any tempering in the signed copy of this document is noticed then same shall be treated as breach of contract and suitable actions shall be taken against the bidder.

SIGNATURE: _____

NAME : _____

DESIGNATION: _____

COMPANY: _____

DATE: _____

COMPANY SEAL



**2X660 MW ENNORE SEZ STPP
FIRE TENDERS & FIRE SAFETY
EQUIPMENTS**

SPECIFICATION No: PE-TS-421-550-A001

SECTION: III

SUB-SECTION: III C

REV. NO. 00

DATE:

PRE-BID CLARIFICATION SCHEDULE

S. NO.	SECTION/CLAUSE/PAGE NO.	STATEMENT OF THE REFERRED CLAUSE	CLARIFICATION REQUIRED

The bidder hereby clarifies that above mentioned are the only clarifications required on the technical specification for the subject package.

Signature: _____

Name: _____

Designation: _____

Company: _____

Date: _____

Company Seal

DEVIATION SHEET (COST OF WITHDRAWAL)**PROJECT:- 2 x 660MW MAITREE STPP****PACKAGE:- FIRE TENDERS & AMBULANCE CAR****TENDER ENQUIRY REFERENCE:-****NAME OF VENDOR:-**

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF WITHDRAWAL OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWAL OF DEVIATION IS APPLICABLE	NATURE OF COST OF WITHDRAWAL OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION
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TECHNICAL DEVIATIONS

COMMERCIAL DEVIATIONS

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	DESIGNATIONS	SIGN & DATE	
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NOTES:

- For self manufactured items of bidder, cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
- For directly dispatchable items, cost of withdrawal of deviation will be applicable on the basic price including taxes, duties & freight.
- All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
- Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
- Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable.
- Bidder shall furnish price copy of above format along with price bid.
- The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
- Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
- For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
- Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
- All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
- Cost of withdrawal is to be given separately for each deviation. In no event bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of such deviations which have been clubbed together shall be considered as NIL.
- In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
- In case of discrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.