

## Detail of Item- Equipping and Fabrication of BLS Ambulances

1	<b><u>Technical Specifications of Equipping and Fabrication of BLS Ambulances</u></b>
<b>1. Plywood cabinet with SS cladding for storing medicine / wash basin / dust basins &amp; Driver partition</b>	
<ol style="list-style-type: none"> <li>1. Cover the width of fabricated ambulance end to end that is approximately 1680 mm, depth 610 mm and height 910 mm. Place along side the partition wall behind the pilot compartment out of 910 mm height 400 mm is to be used for oxygen cylinder compartment and remaining 510 mm for drawer and cabinets.</li> <li>2. House the Stainless Steel, (SS) wash basin of minimum 335 mm diameter with Ss water tap supplying water through Motorized Pump (12 V DC power operated, heavy duty) with foot operated control, to pump the water from the fresh water tank.</li> <li>3. Fresh water and drain water tank both made of Stainless Steel 0.8 mm thick stainless steel sheet (SS-334 or 202), both 10 ltrs capacity. The same can be replaced by a food grade plastic tank which will be approved by the technical committee.</li> <li>4. Two Concealed Portable Steel Dust Bins to be fixed with at least two screws in movable with spring loaded lids for waste disposal are to be provided under the wash basin of 420 mm height and 200 mm dia (including spring loaded leads).</li> <li>5. After housing dustbins, washbasin and water tank remaining space in length wise to be divided in three parts for drawers for storing of medicines etc. First and Third parts has to divided equally having three drawers in vertical each row and remaining one part without any partition fitted with folding flap so it can be utilized as the back of EMT foldable seat.</li> <li>6. The above drawers and partitions has to be made of high density BRW fire retardant plywood with the combination of 12 and 19 mm thick confirming IS 303 specifications</li> <li>7. It should be cladded with 0.8 mm thick stainless steel sheet (SS334 or 202) from all expose to patient compartment sides and areas.</li> <li>8. All other areas / sides expose to air should be covered with 1 mm high duty mica of silver gray color.</li> <li>9. All the hardware like rails, channels, locks, catches, hinges, handles should be of Ebco, HETTICH make.</li> <li>10. The drawer should be provided with ball socket locks or double magnet catchers for each drawer at back to secure them against unintended opening during any possible motion of the ambulance.</li> <li>11. Pilot cabin partition frame in place of novapon to be made in 25x25x0.8 mm thick mild steel tube of prime quality, with marine grade ply covered with FRP from both sides sandwich to be fastened to the MS frame form both sides.</li> <li>12. Pilot cabin partition to be provided with window (which is supplied by bare vehicle) (size 850mm width 420 mm height) with two sliding glass with proper beadings in center of the partitions.</li> <li>13. Provision for liquid hand wash carrier to be fitted on to the left side of the wall near wash basin with sufficient reinforcement. Liquid should fall directly into pot when pressed.</li> <li>14. A plywood with lamination tray to be fix on the right side of the wooden cabinet approximately 350 into 300 mm of suitable height.</li> <li>15. Leather stitched Velcro mounting to be provided to secure needle destroyer and manual BP apparatus over the right side of the wooden cabinet.</li> </ol>	
<b>2. Flooring</b>	
<p>After removing Existing PVC floor water proof fire retardant marine grade ply wood with 12 mm thickness is to be used for flooring with maximum two joints coming around the central of the body including oxygen compartment base area ply wood mounting should be equal surface around the floor. Ply wood should be mounted on the floor with sufficient reinforcement has to be glued with 1.6 mm thick Anti-skid PVC vinyl matting or FRP with Anti-skid coating. It has to be properly glued on present plywood floor without entrapped air babbles and without any joints anywhere and the vinyl mat to be extended up to 24 mm on the side was Only one sheet to be used from below wooden cabinet to end of the floor a suitable size of 0.8 mm thick SS sheet to be provided in rear side (stretcher loading area) to prevent scratches with flat head screw upto the stretcher wheel travel area. All floor level moldings, edging and trim shall be sealed to prevent fluids from seeping under cabinets, walls and ply board.</p>	
<b>3. Wall and Interior panelling</b>	
<p>Remove existing soft interior panelling completely patient saloon having size of 3300 mm length, 1680 mm width and 1850 mm height approximately then inner panelling of the sidewalls, partition between patient cabin and driver cabin, roof &amp; back door panels has to be made from long life superior quality Fibre Reinforced Polymer (FRP). Chopped Strand Mat/Isophelic Polyesters/Gel Coat (Naphtha/Saint Gobain or equivalent) with superior quality painting.</p> <p>The FRP wherever used, should have the following characteristics:</p> <ul style="list-style-type: none"> <li>• Thickness – minimum 3.0 mm for FRP.</li> <li>• Inbuilt colour</li> <li>• Fire retardant as per IS – 6746 of 1988 or latest</li> <li>• Should meet lamination standard IS – 10192 or latest</li> </ul> <p>There should be PUF / PU min. 12 mm thick or thermocol min. 45mm thick or equivalent insulation for reduction of heat and noise within the patient compartment. The insulating material should be non-toxic, non-settling type, vermin proof, mild dew proof and non hygroscopic.</p>	

#### 4. Provision for storage of Emergency rescue tools

A tool box below the stretcher fitted at LHS has to be built with FRP of 3 mm thick painted with PU paint sufficient reinforcement by MS angle for storage of emergency rescue tools with outside open able top seat. The tool box has to be design in such a manner that gangway between tool box and auto collapsible should not be less then 400 mm. If required strature can be swifited near to Right Hand Side inner panel.

Inner area of the box should be cover with 4 mm thick heatlon sheet properly glued to the inner surface.

#### 5. Provision for housing auto collapsible stretcher

One stretcher fitted at the RHS has to be removed for loading of auto collapsible stretcher and holes left in the floor has to be packed to restrict the dust entry to the compartment. Fabricator has to fix holding and lock system for auto collapsible stretcher at the floor of ambulance.

#### 6. Spine Board, Scoop stretcher and Wheel Chair Hold

A provision should be made available for securing the Spine board and Scoop stretcher above the RHS wheel hump cover with double strip Velcro band at both the ends of the board.

Wheel chair to be placed on Rear Right side door, using a suitable C type 19 mm wide SS metal trip placed at suitable height on door properly screwed (as per Drawing) and a Velcro strip at the top to be provided to tighten it.

#### 7. EMT's foldable sheet

A seat to be mounted to the oxygen cylinder compartment splint rack can be used for back rest for seat.

Dimensions should not be less then Length = 400 mm, width = 500 mm and height = 380 mm, Back Rest height = 400 mm

S.S. Powder coated steel pipes of 20 mm dia & 1-5 mm wall thickness to be used. It should have one waist seat belt. A minimum 70 mm thick 50 or higher density fire retardant foam cushion to be provided for comfort. And the same should be upholstered with non absorbent fire retardant Rexene. The seat should be Velcro Belts to fold it up. Bracket resting on floor to have spring loaded mechanism to close the bracket Ribbed bushes to be provided to the brackets resting on floor Back rest to be provided with good locking system to hold the seat in both the conditions (When the chair is open or closed).

#### 8. Grab Rail

A 2200 ± 10 mm approximately long pipe of 30mm dia, 1.5 mm wall thickness made of stainless steel (SS) to be placed as grab rail on the Ceiling with proper aluminum oval shape support metal brackets at four places in equal distance for hanging handles has to be provided to hold while standing. All the brackets should be riveted with grab rail. A 700 mm long pipe of 30mm dia, 1.5 mm wall thickness made of SS is to be placed as Grab rail near the LHS rear door at LHS wall 550 mm from the floor with firm metal support brackets at the ends with proper reinforcement.

#### 9. Head Rack

Dimension approx: Length = 1600mm, Width = 350mm, Height = 270mm. To be integrated with roof above the squad bench. Made in FRP (min 3mm thick) and required 32X4 MS reinforcement to be provided. Inner surface is to be pasted with soft Heatlon black colour sheet of 4mm thickness ISI quality toughened glasses thickness 4mm to be provided with Aluminum sliding channel with velvet beadings (1.5MM thickness and 40 mm width). The Head rack should have suitable oval shaped closures to cover the opening which are easy/comfortable to operate and do not have any sharp edge at the openings.

#### 10. Oxygen cylinder compartment & delivery system

A door has to be cut at right side of the ambulance and fabrication of door with bonnet type locking with a lever in the pilot compartment to house two D-type Oxygen cylinder. Oxygen cylinders has to be mounted on a trolley trolley built out of 40x40x4 mm thick angle with a toggle clamp for fastening safety lock to be provided to prevent accidental opening of toggle clamp. Reliable and durable locking /unlocking the trolley and cylinders on trolley with auto locking provision to be provided. Oxygen cylinder covering brackets top and bottom should be riveted with asbestos material for cylinder grip to avoid movement and noise in running should be fitted properly and delivery system to be provided. Oxygen cylinder trolley housing is to be provided under medical cabinet, both the cylinders can be handled independently. High pressure fire proof tubing (280 bar/4060 PSI) with male & female bull nose brass connector at both ends to be provided for connecting cylinder to gas regulator. Gas regulator is to be two stage pressure gauges. 2 No. humidifier bottles and flow meters (0-15 lit per min.) to be provided. Four points of brass (3+1) 3/8" to be provided in complete one assembly. Oxygen door cylinder should not obstruct with the structural members. There should not be any electrical connection in near vicinity or inside the oxygen cylinder housing. Oxygen cylinder compartment should be dust proof and proper sealing has to be provided.

#### 11. Fuse and Other Safety Measures

- a) A separate fuse to each of the circuits be given.
- b) There should be an indicator mark to each fuse on the fuse box be given to identify the fuse separately.
- c) There should not be any joints be given within the circuits wiring.
- d) At any unavoidable wiring junction (s) the wires should be joined through Bakelite connectors only.
- e) There should not be any loose wiring and loose joints.

Other than vehicle wiring harnesses, all wires/harness used for should be (Flexi cab, Finolex or equivalent make).

- a) All the electrical accessories should carry ISI mark and be approved by technical committee and should be of

(ARAI/ISI) automobile standard.

All other unspecified parts necessary for the wiring should be of Automobile grade and/ or ISI certified.

#### 12. Light bar

- a. Rhombic shaped, Double layered structure, Combination of continually lit, turning lamps, High quality tungsten bulbs and xenon lamp tube (e.g. GRAND/SHOLPHIN).
- b. LED based configuration will be preferred.
- c. Long life span, high luminance, Voltage: DC 12V, Power: 92W + 18W,
- d. With integrated Public Addressing System of 100W (PMPO).

#### 13. Flashers, Spot Light, Tube Light

- a. (6Nos) high intensity Flashers, red-orange pair on either side, and both red on the rear of the vehicle.
- b. (3Nos) Spot/flood lights on three sides, except on the front, in the middle of each pair of Flashers.
- c. Spot lights 4 (non-external lighting) (LUMAX/AUTOLITE/GRAND MAKE) or EQUIVALENT AUTOMOBILE GRADE in Ceiling inside the Patient Compartment, equality placed.
- d. (4 Nos) four LED tube light with fixture and built in inverter 12V DC powered on the both sides for internal lighting each on separates circuit. (METALITE OR ANY AUTOMOBILE GRADE) Voltage: 12V DC, Amps: 2.1, Lumens: 2175 Dimension (mm): 920.8x66.1x63.5 weight (kg): 0.953.
- e. 220V AC/15 amp-3 pin (4Nos) and 12V DC- Round sockets (2Nos) power source with Crabtree or equivalent modular switches.
- f. External charge port with spring loaded lid has to be located at suitable location.
- g. One Mobile AC 15/5 amp  3 pin Charging Switch Socket assembly is to be provided

#### 14. Electrical Wiring

All electrical wiring should be done internally (concealed without joints). Wires use should be of ISI specification e.g Finolex / Havels. All the main components like

- (a) Each of internal lightings (Tube lights)
- (b) Internal lightings (spot lights)

Should have separate circuits, (Power drawn directly from source (with proper cut off switch after Battery/Inverter) and a Fuse in it.) A laminated copy of standard wiring diagram should be provided with each ambulance for reference or fixed with lamination in ambulance driver compartment.

220V/240V circuit should be fitted with ELCB of suitable rating to prevent electric shock to human.

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. Overload protection may consist of either fuses or so called Electronic Management Control systems. All circuits shall be well defined and cables clearly marked at the connection points and at a maximum of 1m intervals along its length.

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.

#### 15. Water Dispenser

A water dispenser of 5-6 liter is to be provided with straps near wash basin area.

#### 16. MP3 Player

MP3 with FM Radio player of good quality/reputed brand like Pioneer/ Sanyo /Sony/ Philips is to be provided in the driver compartment with 300 watt output speakers of good quality speakers (Company Warranty card covering one year and with details of repair facilities available in Rajasthan to be mounted on the pilot cabin roof.

#### 17. Clock

A digital clock is to be provided in the patient compartment. It should have a minimum letter (font) Size of 50 to have better visibility.

#### 18. DC Connections Socket

ISI Marked 2 DC sockets 12V near Equipments area.

#### 19. Fans

One fan in Driver (Pilot) compartment has to be fitted and Existing two fans has to be placed in patient compartment at appropriate place.

#### 20. Exhaust Fan

To be mounted to partition wall between driver and ambulance compartment, to pump ambient air into the patient compartment. One 6-8 inches bush less exhaust fan on partition wall of renowned brand e.g. bajaj, hevells, Crompton or equivalent brand.

#### **21. Hand free telephony**

Provision for conversation between pilot and EMT while moving with patient. System should be hand free speaker type.

#### **22. Fire extinguisher**

4- 5 kg capacity dry powder A B C type fire extinguisher to be fitted at LHS patient saloon extreme rear corner with the provision to hold by Velcro strips & a stainless steel holding bracket to be provided at floor has to be provided at floor. Fire extinguisher available with ambulance has to be suitably placed and fixed in driver compartment.

#### **23. Inverter**

1. True sine wave inverter
2. The batteries placed inside the driver's cabin with provision to be charged from external AC power
3. The inverter should be of well known brands like SUKAM/ Luminous/Microtek.
4. Inverter Capacity – 600 watts/800 VA
5. Input Range – AC 130 v 270 V/DC 9.5 V – 13.8 V
6. Frequency 50 Hz
7. Power factor : 0.8
8. Output Voltage to low charged 220 (±)10% (regulated output from full charge battery voltage)
9. Waveform – Single Pulse PWM
10. Efficiency - 85%
11. Charger – Heavy duty CC/CV type with current limit at 12A with wide input range (150V-270A)
12. Integrated AC/DC supply inside the vehicles synchronous with alternator.
13. Battery has to be made available by fabricator himself maintenance free battery of the same make as the inverter.

#### **1. General**

1. The FRP wherever used, should have the following characteristics. It should be minimum 3 mm thick in built color fire retardant as per IS – 6746 of 1988 or latest and should meet lamination standard of IS – 10192 or latest.
2. Curtain rod and curtains:- Hospital curtains to cover door glasses for patient privacy to be provided. Foldable sun wiser to be provided on the windows of patient saloon one right hand and in two left hand windows and between patient and pilot cabin.
3. Pilot cabin light: Light should be provided in pilot cabin having luminosity good enough to enable pilot in reading and writing in the registers.
4. Velcro strips should be provided everywhere arresting the movement of any equipment/trays, curtains etc.
5. Name Tagging: Etched & color coded name tags should be provided on the medical drawers.
6. Medical equipment's has to be fitted in patient compartment at right side in such a way so they may not fall and convenient to use.
7. All areas fabricated / altered should be neatly painted / finished in white PU paint.
8. Velcro strips should be provided everywhere arresting the movement for any equipment / trays / curtains etc.
9. White, yellow, red retro reflecting tape to be fixed at front, rear and sides of the ambulance as per RTO requirement.
10. The registration in the name of consignee will be sole liability of the Tenderer.

#### **2. Workmanship criteria for acceptance**

General appearance of the vehicle shall not be tempered. The following shall be reason rejection:

1. Rough, sharp or unfinished edges, burrs, seam, sharp corners, joints, cracks, and dents.
2. Paint runs sage, orange peel, "fish eyes", etc. and any other imperfection or lack of complete coverage.
3. Improperly fabricated and routed wiring or harnesses.
4. Improperly supported or secured hoses, wires, wirings, wiring harnesses, mechanical controls.
5. Looses, vibrating, abrading body parts, components, subassemblies, hoses, wiring harnesses or trim.
6. Leaks of any gas fluid lines, (AC, coolant, oil, oxygen, etc.)
7. Sagging, non-form fitting upholstery or padding.
8. Incomplete or incorrect application of rust proofing.
9. Inappropriate or incorrect use of hardware, fasteners, components, or methods of construction. All fasteners used should be of 8.8 grade.
10. All metallic parts used in fabrication should be coated with epoxy (primer) e.g. Asian paints, SD or equivalent.
11. A seamless appearance & finish is desirable to keep the ambulance bacteria free.
12. All welding has to be done by MIG welding.

#### **Technical Specifications of Equipment/Instrument to be supplied/installed in BLS Ambulance**

For each ambulance vehicle following equipments will be supplied and installed by the fabricator:

Sr. No.	Equipment / Instrument	Qty.
1	Auto loader- collapsible stretcher	1
2	Scoop Stretcher	1
3	Spine board with straps and Head Blocks	1
4	Wheel chair	1
5	Oxygen Cylinder Portable (IS: 7285 part-2)	1
6	Oxygen Cylinder D - type (IS: 7285 part-2) with Key	2
7	Nebulizer Machine	1
8	Electric Suction Pump	1
9	Pulse Oxymeter	1

**(1) . Auto loader- collapsible stretcher**

1. Automatic loading, made of ambulance alloy.
2. Collapsible, wheeled to slide into the ambulance with ease without damaging the ambulance floor.
3. One person should be able to raise and lower it into an ambulance easily.
4. Provision for head end elevation adjustable Sitting posture for breathless patients-Maximum Angle of the Back 60°.
5. Side Railings to prevent fall of patient either side and to hold medical equipment.
6. IV fluid holding rod to go with the stretcher.
7. Should be light, safe and reliable trouble free.
8. Levers to control front and hind legs to fold while loading the stretcher in to the ambulance.
9. Lock to lock & unlock the legs to prevent collapse of the stretcher while standing.
10. Lock for the wheels.
11. Straps to restrain the patient.
12. Fixing devices to secure the stretcher in place not allowing side to side or vertical movements in the ambulance while on run.
13. 50 mm thick high density foam matters with Head rest up holstered with water proof and fire proof rexin.
14. Net weight approx : 40 Kgs.
15. Load bearing minimum : 150 Kgs
16. Product dimensions approx: 190x55x90 cms tolerance  $\pm$  5%
17. Product should be CE certified.

**(2) . Scoop Stretcher**

1. Should be light, safe and reliable. Made of aluminum alloy
2. Clutch Design in the middle so that the stretcher can be divided into left and right halves.
3. Adjustable length according to patients height
4. Easy to lock & unlock
5. Quick release buckle belts.
6. Dimension approx. Size (LxWxH) 225x45x7cm & Min. Size (LxWxH) 168 x 43 x 7cm tolerance  $\pm$  5%
7. Net weight approx : 9 Kgs
8. Load bearing minimum: 150 Kg
9. Product should be CE certified.

**(3) . Spine board with straps and Head Blocks**

1. High Density Poly ethylene – Single piece
2. Rigid, Light & Floatable
3. Resistant to bumps and corrosion
4. Non absorbent, immune to infiltrations
5. Easy to clean – water & soap should be enough.
6. X-Ray & MRI compatible
7. Net weight approx : 8 Kgs.
8. Load bearing minimum: 150 Kg
9. Dimensions (LxWxH) approx : 185 x 45 x 5cm tolerance  $\pm$ 5%
10. Product should be CE certified.

#### (4). Wheel chair

1. Should be foldable, light, safe and reliable. Made of aluminum alloy
2. Folded size approx: 93x51x16 cms tolerance  $\pm 5\%$
3. Back Height: 91 cms Width : 50 cms
4. Seat height : 49 cms Width : 50 cms
5. Net weight approx : 8 Kgs
6. Pull through, telescoping long handles built in to lift patients & Carry them through narrow passages.
7. Load bearing minimum: 150 Kg

#### (5). Oxygen Cylinder Portable (IS: 7285 Part-2)

1. Max. Working Pressure at 15°C : 150Kgf/cm<sup>2</sup>
2. Test Pressure : 250 Kgf/cm<sup>2</sup>
3. Water capacity : 1.0 ltrs
4. Gas Capacity (Cu.m.) : 0.15 Cu.m.
5. Out side Dia 'D' (mm) : 76-80 mm
6. Min. Wall Thickness 't' (mm) : 3.2 mm
7. Length 'L' Approx. (mm) : 310 mm
8. Tare weight aprox. (kg) : 2.5 Kg
9. Certificate from Petroleum and Explosive Safety Organization is required.

#### (6). Oxygen Cylinder D- type (IS: 7285 part-2) with Key

1. Medical Oxygen Cylinder with valve 220 Cu.Ft.
2. Bulk Size D- Type High pressure seamless cylinders for medical oxygen cylinder gas.
3. Cylinders should conform to IS: 7285, certified by the Bureau of Indian Standard (BIS) and approved by Chief Controller of Explosives (CCOE), Government of India.
4. 46.7 Ltr. water capacity (220 Cu.Ft.), fitted with bull nose type valve as per IS:3224 and neck cap.
5. Color code of the cylinder should be as per IS: 3933-1966 with updating till date.
6. Certificate from Department of Explosives, Government of India should be provided for each cylinder.
7. Working pressure should be 150 Kg. f/cm<sup>2</sup> at 15° C, Hydraulic test pressure 250 Kg.f/cm<sup>2</sup>

#### (7). Nebulizer Machine

1. Piston/Atomiser-type electric aspirator. Compressed air nebulizer.
2. Motion Tolerant and for continuous use in Pre Hospital transportation.
3. Operating Voltage : 230 V AC
4. Maximum pressure 35 psi.
5. Air power: 14 liters per minute
6. Aerosol output : 106 per minute
7. Residual volume: 1.24 ml
8. Droplet size: MMAD 3.3 microns
9. Filling volume : maximum 7ml
10. Noise level: 55 db.
11. Provisions for fixing/Hanging in the Ambulance.
12. Check valve to protect the device against contamination due to backward inhalation.
13. Unbreakable lids.
14. Dust filter.
15. Product should be CE certified.

#### (8). Electric Suction Pump

1. 0 to 30 Ltrs flow rate
2. **Max. Vacuum / LPM** : - 600mm of Hg
3. Portable & with a mounting bracket.
4. Battery backup of 90 minutes minimum – rechargeable in ambulance
5. Collection bottle 1000 ml capacity and sterilizable
6. Overflow protection insured.
7. It should be supplied with one set of all standard accessories like Microbial filter, tubing with combination of suction tip & angled connector.
8. Product should be CE certified /ISI Marked.

**(9). Pulse Oximeter**

1. Light weight, convenient handheld.
2. Accurate during motion and low perfusion.
3. Long battery life: 10 to 12 hours
4. Up to 24 hours of trending memory.
5. microprocessor based non-fade memory monitor.
6. for spot check or continuous monitoring.
7. Audible and visual alarms for High/Low saturation.
8. Pulse Rate, Sensor off & low battery – Alarms.
9. Probes :-
  - For adult purpose - 1 no.
  - For child and Neonatal purpose - 1 no.
10. Extension cable for Y probes.
11. Perfusion : 2%-20%
12. Resolution- saturation (% Spo2): 1%
  - Saturation: 70% to 100%
  - Low perfusion
  - Range of Display : 0 or 1% to 100%
  - Pulse Rate Range : 30-240bpm
  - Pulse Rate (bpm) resolution: 1bpm
13. Product should be CE certified.

**Note:**

1. The bidder should submit technical compliance sheet as per technical specifications mentioning the make & model of quoted item along with catalogue for all the equipment in the Technical bid.
2. Documents related to CE/ European CE / USFDA / ISI etc (as applicable) for each equipment should be submitted in technical bid
3. The bidder shall provide one year guarantee for all equipments.

Fabrication work will be checked by technical committee at final stage along with equipment; Modification in arrangement of equipment installation will be allowed-by the Technical Committee. Equipment should be installed properly so that no damage occurs during the travelling. The bidder -shall request in writing for approval of prototype. If technical committee takes more-than 3 days in the- inspection/approval then this period shall be provided to bidder in addition, Shower test has to be conducted for any leakage for each vehicle.