

ANNEXURE-A

TECHNICAL SPECIFICATIONS FOR LIFE SUPPORT AMBULANCE

1. Scope, Purpose, and Classification

a. Scope

This document covers Life support ambulances built on integral monocoque panel vans that are suitable for the intended application and meet the requirements herein. This document will be used to procure an ambulance and the applicable additional systems as well as equipments.

b. Purpose

The Life support ambulance is defined as a vehicle for emergency medical care which provides: a driver's compartment; a patient compartment to accommodate a doctor / an emergency medical technician (EMT) / a paramedic and one patient located on the main automatic rolling stretcher cum trolley, in such a way and so positioned that the primary patient can be given advanced life-support during transit; equipment and supplies for emergency care at the scene as well as during transport and, when necessary, equipment for light rescue / extrication procedures. The ambulance should be designed and constructed to afford safety, comfort, and avoid aggravation of the patient's injury or illness.

c. Classification: Ambulance Types, Classes and Floor Configurations

This document would specifically deal with the authorized types of Life Support ambulances for Administration of D&NH with the necessary application space and facilities for Advanced Life Support devices as detailed in this documentation. If specified by the purchaser these types can also be made specifically for neonatal, critical patient transports including those for physically challenged persons, special fire suppression packages and / or specific rescue capabilities when specified so.

2. Applicable Documents

The following document forms a part of this specification and tender document. The bidder has to give compliance of this document that the quoted model of the ambulance shall be in conformance with the specifications detailed here.

3. UT Administration Specifications

Rust Proofing of the complete vehicle along with the body, should be ensured by the OEM during the construction of the base vehicle body before being converted as ambulance. The manufacturer / supplier should ensure that during the process of conversion and integration as ambulance all due care is taken for rust proofing for all the components and retrofits. The body should be manufactured by the engine / vehicle manufacturer as an integrated monocoque panel van. Traditional sheet metal bodies on truck / cab chassis should not be used for ambulance conversion.

4. Laws & Regulations

Indian Motor Vehicle Act (the base vehicle used for making the ambulance should be certified as an Ambulance and not any other commercial or load vehicles types).

Indian Pollution Control Act for New Motors Vehicles and New Motor Vehicle Engines.

5. Order

In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

6. Requirements

General Vehicular Design, Types and Floor Plan

a. Design

The ambulance and the allied equipment furnished under this specification shall be the manufacturer's current commercial vehicle of the Type, Class, and Configuration specified. The ambulance shall be complete with the operating accessories, as specified herein. It shall be furnished with such modifications and attachments as may be necessary to enable the vehicle to function reliably and efficiently in sustained operation as an ALS ambulance. The design of the vehicle and the specified equipment shall permit accessibility for servicing, replacement, and adjustment of component parts and accessories with minimum disturbance to other components and systems. The term "heavy duty", as used to describe an item, shall mean in excess of the standard quantity, quality, or capacity and represents the best, most durable, strongest, etc., part, component, system, etc., that is commercially available on the OEM chassis.

b. Life Support Ambulance

The base vehicle shall be OE Manufacturer's integral van with two divided rear doors with 270 degree opening and external side wall latching of the doors in the open conditions to enable safe movement of the vehicle in open patient compartment to narrow

areas / lanes and by lanes for speedy and easy evacuation. This vehicle shall be suitable for subsequent ambulance conversion / modification in compliance with the requirements herein.

c. Configuration of Patient compartment

Unless otherwise specified, Configuration Life support shall be provided in the patient compartment. All the devices, equipments, accessories and consumables etc., should be loaded to position the patient's head forward in the vehicle.

When specified for Life support applications, the patient would be located on the main automatic rolling stretcher cum trolley and four secondary seated attendants / patients (in case of any mass casualties or disaster) on the squad bench (four seater) and Doctor / EMT / Paramedic on the intended head end chair. The main automatic rolling stretcher cum trolley shall be slightly off centered mounted more towards the driver side wall in such a way that it does not collide with the side wall or any other fitments on it while loading or unloading.

d. Base Vehicle

The base vehicle to be used for the ambulance must be an integrated panel van in monocoque construction.

Engine : Diesel, 4 Cylinder, 4 Stroke, Direct Injection / Turbo charged inter cooled
Emission Norms : Minimum BS III
Wheel Base : Minimum 3200mm.
Maximum Engine Output : Minimum 75 BHP
Transmission Manual
Alternator Minimum 90 Amp. @ 13.5 Amp.
Battery Minimum 2x80AH Low Maintenance
Drive Rear wheel drive
Axles
Front: Dead rigid beam
Rear: Live rigid

Dimension (Patient Cabin)
Length: 3200 mm. Minimum
Width: 1600 mm. Minimum
Height: 1700 mm. Minimum
Ground Clearance: 190 mm. Minimum
GVW: 3.0T Minimum

e. Suspension: Leaf springs at both front and rear

Rear Door: Centrally Divided rear doors on high quality steel hinges ensuring 270o opening for both the doors. In the fully open condition the doors must get latched rigidly to the outer surface of the side-wall of the body on the respective sides. It must be mandatory to manually release the latch levers to free the doors for closing.

Both the rear doors should be provided with full width fixed windows made from toughened glass approved for automotive use.

There should be a full width rear footstep entry allowing easy entry and exit from the patient compartment.

f. Ambulance Body & Patient Area

Patient Compartment Interior Dimensional Parameters

The patient compartment shall provide a minimum of 8.75m³ space while complying with the following:

The length measured from the partition to the inside edge of the rear loading doors at the floor, shall be at least 3.2m. The width of the patient compartment at the floor level should be at least 1.6m. and the height of the patient compartment the height point should be minimum 1.7m.

g. Cabin Conversion of Patient Compartment

Complete interior panelling of the sidewalls, both sides of the partition wall between patient cabin and driver cabin, roof (of both patient and driver cabin) & back door panels should be made from Acrylonitrile Butadiene Styrene (ABS) Sheets.

The ABS sheets in semi-gloss / matt finish should be of high impact resistant and stiff ABS. The ABS sheets should be co-extruded and UV Protected and should not be from recycled ABS sheets. The heat resistance of the sheets measured based on ISO 306B should be 94oC to 100oC.

The complete interior should be edgeless and suitable for easy cleaning / scientific fumigation / treatment of disinfectants. The panels must be suitably formed using the appropriate ABS processing technology so as to match to the contour of the vehicle and look aesthetically pleasing.

The panels for each of the surfaces should be produced as one single without any joints either along the length or the width of the panels.

Flat panel ABS sheets bend and glued / riveted / fixed to the structure of the base vehicle won't be accepted. The minimum thickness at any point of the panels should not be less than 2 mm.

The ceiling, both the sidewalls, both sides of the partition wall should be

produced in one single piece matching to the dimension of the patient compartment dimension of the ambulance.

Between the interior conversion panels and the internal surface of the base vehicle body there should be adequate insulation of appropriate grade to have a good climatic control environment inside the vehicles.

The joint of one panel to the other must be suitably engineered so that all the joints are functionally hygienic and protected from any ingress of liquids and any other medical secretions of any kind. The joints should be finished in such a way so that these appear aesthetically appealing. In case of any replacement needs (accidental repairs etc.) it should be possible to detach each individual panel and replace the same without damaging or affecting the other parts of the interior panels.

The interiors should have reinforced fixtures for holding medical, communication and extrication equipments. Partition wall between patient & driver cabin with sliding glass window having lock. The window should be made up of extruded aluminium profile in rounded rectangular shape (all the corner edges are curve so that there are no sharp corner edges along the window frame). There should be only one joint in the frame and the inner profiles must have synthetic sliders for smooth movement of the glass panes. The sliding glass should be of toughened glass as needed for automobile applications. The flooring should be made up of min. 12mm. thick marine grade ply, rigidly bolted the steel base plate of the base vehicle construction. The top layer of the floor should be made from minimum 1.5mm. thick vinyl layer laid as a joint less flooring. The flooring material should conform with EN 426 for Dimensions, EN 428 for Overall Thickness, EN 430 for Weight, EN 433 for Residual Identification After Static Load, EN 434 Dimensional Stability, EN 435 for Flexibility, EN 660-2 for Abrasion Resistance, BS 476 Part 7 for Surface Spread of Flame, BS 476 Part 6 for Fire Propagation, IS 15061-2002 (ARAI) for Horizontal and Vertical Burning Test, ISO 140-8 for Sound Absorption, ISO 105-B02 for Color Fastness to Day Light, DIN 51130 for Slip Resistance, EN 425 for Bearing a Castor Chair, EN 423 for Resistance to Chemicals, EN 685 for Performance Classification. The floor must withstand a distributed load of minimum 150Kg/m².

h. Internal Storage Compartments

All the internal storage compartments, surfaces and space provisions should be made to accommodate / fix the various medical life saving medical devices, trauma equipment for transportation and immobilization, medical glassware, medical disposables and consumables, fresh and dirty linens, infusion bottles, drugs, accessories, wastes, documents, records, files etc. as per requirement in the ambulances.

The storing consoles must designed keeping in consideration all the possible

requirements of a medical work place. The patient compartment should be provided with storing console at the head end of the patient across the complete width of the patient compartment integrated to the partition wall of the driver cabin and patient cabin and overhead storing compartments along the roof. All storage compartments should be aesthetically and ergonomically well designed. To preclude injury in the event of an accident all cabinet will be firmly anchored / fixed to the base structure of the ambulance. Storage cabinets, drawers and kits should be easily open-able but should never ever open during transit on account of the vehicle movement. All the internal furniture should be produced with double side laminated plywood in 19mm. thickness. The inlay, supporting, auxiliary and decorative elements can be in smaller thickness as the design may require. All the exposed thickness of the substrate should be edge banded with curved trimmed pvc edge bands. All the right angle ends should be finished in curve and not sharp 90 degree corners.

All the edges / joints / exposed surfaces should be appropriately finished to ensure that there are no sharp edges of any kind to cause any accidents. Storage compartments should be divided into various sections according to the different varieties of the medical items to be stored in it. All the sliding as well as openable doors should be provided with self-locking locks.

The locks should have integrated flushed handles for firm grip to open the sliders and the doors as the case may be. All the drawers should be keyless type self locking drawers. All the vertical flap doors with opening towards the topside should be latched using adequate capacity pneumatic lifters of appropriate capacity. The pneumatic lifters should have integrated friction mechanism to keep the lid / door at the point of opening and not to push it to the highest position once left.

i. Patient Compartment Seating

All seats in the patient compartment shall conform to detailed specification as mentioned below. These will be padded and have the largest practical padded back and headrests. Padding material shall be polyester urethane foam of a medium to firm density (not less than 50gsm), with a minimum finished thickness (padding and upholstery) of 50mm. for seat pads, headrest and backrests. All padding and upholstery shall be fire retardant. The upholstery shall be non-absorbent, washable and impervious to disinfectants. The upholstery should be made from reinforced vinyl based materials with minimum 1.5mm. thickness. All seats frames, surfaces and upholstery should be designed to facilitate cleaning and disinfecting. All exposed surfaces shall be free of vent devices that would permit the entrapment of biological contaminates. All seating positions in the patient compartment should have vertical overhead clearance for getting into the seat and coming out.

j. Doctor / EMT / Paramedic Seating

At the head end of the main patient stretcher the ambulance should have a rear

mounted foldable base EMT / Doctor seat.

The seat should have two foldable armrests. When unfolded for sitting the backrest should offer a soothing angle (more than 95 degree) to the base offering optimum comfort and safety to the occupants, who sits in directions not in line with the movement of the vehicle.

The back rest (without the head rest) should be minimum 500 mm. in height. The head rest should be minimum 200mm. in height.

k. Seat Safety Belts and Anchorages

All designated seating positions in the patient compartment shall be equipped with safety restraint systems appropriate for each type of seating configuration. The seat should have an adjustable headrest and retractable seat belt. The seat should be aesthetically pleasing and ergonomically well designed. The seat base should have the largest padded backrest with contoured support for the back.

Padding should be furnished with polyester urethane foam of a medium to firm density and should be minimum 60 mm. on the base, backrest and headrest (at the thickest cross section of the head rest the headrest may be contoured to the lateral ends). Padding should provide ultimate comfort to the occupants.

The upholstery should be of leather-match vinyl / polyurethanes / leatherette, color in dark colors matching the interior color of the ambulance. The padding and upholstery should be fire retarded.

Additionally the upholstery should be non-absorbent, washable in impervious to disinfectants. The seat should be fully foldable and rear mounted providing complete clean floor below the base without any framework for fixation.

l. Squad / Attendant Seat

Additionally there should be three more seats for the squads / attendants on the co-driver side in the patient cabin. These seats should be single pivot point base mounted chairs with complete clean floor below the base without any framework for fixation.

The seats should have integrated revolving mechanism by which these can be turned from facing the patient stretcher to the front of the vehicle with a single activation of the revolving control.

This would enhance the safety of the occupants to align their position from a side way sitting to a front facing seating the ideal position in a moving ambulance. The seat should be completely foldable.

The backrest should have integrated head rest means it should be tall enough beyond the shoulder level in the sitting position. The seats should have retractable seat belts and foldable armrest.

The seats should be aesthetically pleasing and ergonomically well designed.

The seat base and backrest should be padded at least 420mm wide and have the largest padded backrest with contoured support for the back. The base should be at least 370 mm. in depth.

Padding should be furnished with polyester urethane foam of a medium to firm density, identical to that of the Doctor / EMT / Paramedic. Padding should provide ultimate comfort to the occupants. The upholstery should be of leather-match vinyl / polyurethanes / leatherette, color in dark colors matching the interior color of the ambulance.

The padding and upholstery should be fire retarded. Additionally the upholstery should be non-absorbent, washable in impervious to disinfectants.

m. IV Holder For Intravenous Fluid Containers

At least two ceiling / wall mounted IV bottle holders specifically designed for firmly holding IV containers should be provided, which should include Velcro type or other identical straps to adequately secure an IV bag / bottle when the vehicle is in motion.

In ceiling mounted holders the mount should protrude too much below the internal surface of the finished ceiling level of the patient compartment thereby creating any safety hazards.

This should be placed securely around the main automatic rolling stretcher cum trolley in such way that infusion administration to any part of the body is easy.

n. Wash Basin

The internal furniture layout must include a washbasin made up of ABS / SS material or any other pvc / acrylic based composite material in an aesthetic finish.

The water tap of the washbasin should be operated with a foot / elbow switch at a convenient and safe place around the wash basin area, so that it is easy for the users to activate the switch and get water flow.

The tap should be operated using 12V DC water pump placed at the fresh water tank. The capacity of the fresh water tank as well as the waste water tank should be at least 20L.

The fresh water tank should be suitably placed in the driver cabin so that water refilling can be done easily without water spillage. Even in case there is any water spillage it should not wet the driver cabin.

The waste water tank should be mounted below the base vehicle chassis / body frame with an easy operating valve to drain the waste water at any designated place.

o. AC System

The patient compartment must be provided with an engine driven air conditioning system of adequate capacity matching to the total heat load of the patient compartment when fully occupied and the patient loaded.

The compressor should be engine mounted and 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.

There should be no cross ventilation / contamination / free air flow of air between the driver cabin and the patient compartment with the partition wall window closed.

p. Compressor

Displacement: Minimum 160 m³/Rev.

Cooling Capacity: Matching the cooling capacity of the driver and patient compartment.

Refrigerant: R-134a

The installation of the compressor should be done with brackets as per the requirement of the engine without any modifications to any engine components.

q. Evaporator

Cooling Capacity for Patient Compartment: Minimum 6.5 KW

Cooling Capacity for Driver Compartment: Minimum 4 KW

r. Condenser

Roof mounted condenser unit matching to the cooling capacity of the Evaporator

s. Oxygen, Main Supply and Installation.

Oxygen System

The ambulance shall have medical oxygen system capable of storing and supplying minimum two 7m³ gas capacity (equivalent to 46.7L water capacity) high pressure oxygen cylinders manufactured as per IS:7285, BIS-certified and approved by the Chief Controller of Explosives, Administration of India, Nagpur.

The facility provided should be for cylinders fitted with bull-nose 5/8" BSP RH (f) outlet valve as per IS:3224, BIS-certified. The seal should be by direct contact between the bull-nose connector of the high pressure hose (from the manifold block) and the cylinder valve.

The installed medical oxygen piping and outlet system shall be leak test at 150% of the rated pressure level for the respective parts (source and distribution) of the system. After the successful completion of tests, the system shall be capped then tagged with date and signature of person and firm performing the tests.

Replacement of empty cylinders would be done from outside of the vehicle.

Oxygen piping system should be concealed and not exposed to the elements, securely supported to prevent damage, and be readily accessible for inspection and replacement, whenever needed.

A cylinder changing wrench shall be furnished. The wrench shall be chained and clipped within the oxygen cylinder compartment.

The cylinders should be fastened to a loading platform, which should rigidly fix the cylinders in position ensuring that the cylinder is absolutely safe all the time it is inside the ambulance including the all the dynamic situations during the movement of the vehicle. The fastening and unfastening system to fix and release the cylinders should be easy to use and preferably single hand operation. The loading platform should have system to easily load and unload cylinders to and from the vehicle. The number of fixing points for each cylinder on the loading platform should be optimum (minimum two) as per the length of the cylinder.

The connections at the cylinder pressure level should be done using high-pressure flexible hose appropriate for the rated pressure of the oxygen cylinder (150 Bar or more). The outlet of the high-pressure regulator should be connected to the terminal outlet block inside the patient compartment using low pressure flexible medical gas hoses complying and color coded specific to oxygen as per ISO 9170-1:2008. This should hose should be crimped to the connectors at both end (outlet of high-pressure regulator and inlet of terminal outlet block assembly) using crimping ferrules.

The patient compartment must have an oxygen distribution block having two oxygen outlets, connected in parallel through one common feeding port. The terminal outlets should comply with DIN-EN-ISO 9170-1:2008 standards for medical gas supplies as well as medical device directives 93/42/EEC. The outlets must have two completely distinguishable parking and operating positions. Both the parking and operating positions should have the facility of unlocking by means actuators. The terminal outlets should operate at the standard distribution pressure level corresponding to the outlet pressure of the high- pressure regulator, which is 4 - 5 bar. The terminal outlet should be in all metal

(non-ferrous grade preferably brass, aluminium and stainless steel) construction, appropriately nickel or chrome plated or anodised in matt finish. It must be possible to operate the outlets in one hand for the purpose of coupling and decoupling.

t. Oxygen Pressure Regulator & Pressure Display System

The pressure regulator should be meant for reducing the cylinder pressure of the oxygen tank to the distribution pressure level suitable for feeding to the medical oxygen terminal outlets as well as other inhalation and respiratory equipments in the ambulance and should be specifically designed and manufactured for use with medical oxygen. It should have the facility to adjust the distribution pressure level as well as the pressure relief valve for safety. Each ambulance should be provided with two nos. of pressure regulators in such a way that one acts as the duty regulator and the other as a stand-by in case of any faults to the duty regulator. Changing from one cylinder to the other should not affect the distribution pressure in any way and this change over should occur with manual operation of single valve. The inlet port of the regulator should be connected to both the cylinders in parallel using two nos. of ball valves, allowing any of the cylinders to be in line or out of line with the cylinder at any point of time without closing the individual cylinder valves.

The patient cabin must have a digital display panel for oxygen supply status display as per DIN-EN-ISO 7396-1:2000 and certified as per Medical Device Directives (93/42/EEC). The display panel should have three individual LED display windows to constantly indicate the pressure level of both the cylinders as well as the distribution pressure level. The digital displays should show the actual pressure measured by three individual digital pressure sensors as per the pressure level under monitoring (one each for both the cylinders and one for the line pressure).

The connections of the high-pressure regulator, isolation valve, high & line pressure sensors, high-pressure connecting hose from cylinder to high-pressure regulator, low-pressure hose from the outlet of the high-pressure regulator to the terminal outlet block should be connected to each other using high pressure flexible connectors. There should be no welded joints in the entire connection assembly of the oxygen distribution system.

u. Electrical System

The ambulance electrical system should be equipped with, but not limited to, the following:

Dual, OEM's batteries.

Generating, starting, lighting, visual and audible warning systems.

Specified electronics equipment and devices (including master consoles located in the cab and patient compartment).

Other specified accessory wiring.

All electrical system components and wiring should be readily accessible through access

panels.

All switches, indicators, and controls should be located and installed in a manner that facilitates easy removal and servicing.

All exterior housings of lamps, switches, electronic devices, connectors, and fixtures should be corrosion resistant and weatherproof grade all preferably integrated to the exterior of the vehicle.

All electrical devices and equipment installed, including the electromagnetic coils of high current solenoids, and relays etc, which produce RFI, should include filters, suppressers, or shielding to prevent electromagnetic radiation and the resultant interference to radios and other electronic equipment.

v. Warning Indicators

The electrical system should, incorporate a warning light panel located in the driver's compartment. It shall provide indicator light as well buzzer for open patient compartment entry doors.

w. Wiring Installation

The ambulance body and accessory electrical equipment should be served by circuit(s) separate and distinct from vehicle chassis circuits.

All wiring provided by the manufacturer / supplier should be copper.

All wiring should have high temperature cross-linked polyethylene or better insulation. The use of multi conductor or ribbon cables are permitted provided they are not exposed to under hood or under vehicle temperatures/conditions.

The wiring should be permanently color coded or marked for the entire length of the wire.

Wiring should be routed in conduit or appropriate looms.

When cables are supplied by a component manufacturer to interconnect system components, these cables need not be continuously color coded/identified. They should be coded / identified at the termination or interconnection points.

All added wiring should be located in accessible, enclosed, protected locations and kept at least 150mm. away from exhaust system components.

Electrical wiring and components should not terminate in the oxygen storage compartment except for the oxygen controlled solenoid, compartment light, and switch / sensor plunger or trigger device.

Wiring necessarily passing through an oxygen compartment should be appropriately protected from damage.

All conduits, looms, and wiring should be secured to the body or frame with insulated cable straps. All apertures on the vehicle should be properly grommited for passing wiring. All items used for protecting or securing the wiring should be appropriate for the specific application and be standard automotive, aircraft, marine, or electronic hardware.

Cable ties should not be used to support harnesses, but may be used for bundling

purposes. Electrical panels that are accessible to accidental contact should have a protective cover, shield, etc. to prevent shorts that can result in injury, fire, or damage to the electrical system.

x. Wiring Criteria

All wiring (including grounds), devices, switches, outlets, etc., except circuit breakers, should be rated to carry at least 125% of the maximum ampere load.

A service loop of wire or harness should be provided as required at electrical components, terminals, and connection points.

All splices and terminals provided should comply with applicable standards meant for specific applications.

All terminals should be permanently numbered or coded.

Terminal strip(s) block(s), or multi-pin connector(s) should be readily accessible for checking and service.

All exterior wiring to lights or any other component should utilize sealed connectors or splices.

The ambulance electrical system should incorporate a master circuit breaker or other electronic, non-disposable, current protection devices, in each circuit, which comply with specific application. (if circuit breaker is used it should be readily accessible for resetting by the driver).

When multi-conductor cables / ribbon cables are used for low current (self limiting) circuits, additional fuses / circuit breakers are not required.

All circuit breakers should be securely mounted, easily removable, and readily accessible for inspection and service.

All electrical and electronic components, switches, connectors, circuit breakers, lamps, and indicators, including the vehicle batteries, should be marked with an easily read identification code number and / or letter..

y. Grounding

Dedicated grounds for the appliances, circuits, etc. should be furnished. The use of appliance mounting screws / hardware should not be used for grounding purposes unless specifically designed for such use by the appliance manufacturer. Emergency Light Bar cum Public Address System

Emergency Light Bar cum Public Address System at the top of the vehicle on the front end. 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. External Lights & Flashers

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

z. Cabin Lighting & Electrical

There should be minimum four nos. of 12V / 36W lighting elements in the patient compartment emitting white light meant for general lighting of the compartment.

The lighting fixtures should preferably be seamless in construction without much edges and joineries in the frame and diffuser. There should be three LED spot lamps along the length of the main stretcher for purpose of patient examination. There should be two 12V DC operated and minimum 6" wall mounted fans one on each side of the patient compartment.

The patient compartment should have minimum 2Nos. of 230V / 6Amp AC Sockets with switches and minimum 4 Nos. of 2\12V DC Sockets for the various medical and general equipments in the ambulance.

The driver cabin should also be supplied with 1No. 230V / 6Amp AC Socket with switch. The driver cabin should be supplied with a FM Radio Player with two speakers.

aa. Marking of Switches, Indicators and Control Devices

All switches, indicators, and control devices supplied by the manufacturer / supplier shall be clearly visible to the driver / co-driver / doctor / EMT / paramedic / squad / attendant or anybody using the ambulance. They shall be perceptively and permanently identified with at least 12 point letters for the noun or function, and 8 point letters for the remainder of the legend. The identifications shall be contrasting colors etched or engraved in plastic or metal, or printed and laminated in see through plastic, and grouped according to function.

True sine wave inverter with SMPS Power Supply

Inverter Capacity - Minimum 600 watts / 800 VA

Waveform: TRUE SINUSOIDAL

Efficiency - 85% Minimum

Minimum 10 Meter length three core 10 mm. charging wire with male 15Amp. three pin ends to be provided

Ab. External Charging Socket

There should be a weather protected and spring loaded external charging port with spring loaded lid.

The charging port should allow charging of the ambulance batteries from external AC source when the ambulance is stationary.

The charging port should be located near the driver door area so that the pilot is aware that the ambulance is connected to external AC source and must be disconnected before moving the ambulance.

Ac. Standard Mandatory Miscellaneous Equipment

Each ambulance shall be equipped with, but not limited to the following:

Fire extinguishers: Two, (ABC dry chemical or carbon dioxide) minimum 1Kg. unit, in a quick release bracket, one mounted in the driver/cab compartment or in the body reachable from outside the vehicle and one in the patient compartment.

“No Smoking”, “Oxygen Equipped” and “Fasten Seat Belts” signs: Conspicuously placed in the cab and patient compartment.

Ad. Patient Transport & Immobilization Equipments

Roll-in Patient Stretcher cum Trolley

The base frame of the stretcher cum trolley should be modelled to consent more comfortable and effective operations on the patient.

The wheels must have diameter of minimum 200 mm. and should be made from plastic tyre compound to optimise bump absorption. The backrest should be infinitely adjustable having pneumatic shock-absorbers and not with fixed point adjustments. The stretcher must have at least one intermediate position apart from the two distinct fully folded and fully unfolded position.

There should be a manually activated mechanical lock to keep the legs in completely folded position and use the trolley as a stretcher if required so under certain evacuation requirements.

The stretcher must be supplied with its own fixture to rigidly fix the stretcher to the floor of the ambulance. The fixture should be an integrated loading platform with three point

anchorage activated automatically once the stretcher slides into position and all the three anchorage points deactivated by single latch when the stretcher to be released from the fixation platform.

The locking of the stretcher should be fully automatic without any manual intervention or activation of any locks or latches. The unlocking of the stretcher should be possible with one hand. The loading and unloading of the stretcher should be completely seamless and the loading wheels should not roll on the floor of the ambulance directly.

While loading the no part (including legs) should touch any part of the vehicle (like the rear entry foot step or the rear edge of the patient compartment at the floor level).

The loading platform should have an integrated foldable flap to guide the stretcher in and out of the ambulance without any part of the stretcher (including the legs) striking any part of the ambulance body including the rear footstep.

The loading platform should have integrated space in it to firmly accommodate a full body length spine board or even a scoop stretcher inside it for ergonomic storing. Once the loading is completed the foldable flap of the loading platform should be lifted and remain firmly in position not getting inadvertently opened when the vehicle is in move. This should be supported with pneumatic lifters.

The loading platform should be manufactured as an original equipment accessory by the stretcher manufacturer complying with the same standards as that of the stretcher.

The stretcher should be made from high grade aluminium and should not be more than 40 Kg. in weight.

The load capacity of the stretcher cum trolley should be 200 ± 10 Kg. The physical dimensions of the stretcher should be: Length: 200 ± 5 cms.,
Width: 59 ± 5 cms.,
Height: Adaptable to the height of the ambulance.

The stretcher must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency. The device must comply with EN 1789 standards. The device must be manufactured in an ISO 13485 certified facility.

The universal head immobiliser must ensure optimum head immobilization to trauma patients. The immobiliser must have integrated universal belts for fixation with spine boards thereby allowing transportation of patients in critical conditions during long and uncomfortable journeys as well. The immobilizer should have physiological shape

supporting the brain and avoiding as much as possible further compression of cranium and completing the immobilization the rachis through the cervical collar.

The unit should comprise of two mono block shells made of a soft plastic and a base. The mono block shells should be impermeable and should avoid absorption of any organic liquid (blood, vomit, mucous) and should be free from any seams and should have optimum thick protective film. The mono block shells should not get damaged by routinely used chemical substances or solvents in the ambulance and should remain soft in varying temperature conditions. The mono block shells should be positioned on the base using wide and stable velcro system sewn to the base. Both the mono block shells must have through holes allowing inspection of the aural pavilion ALSo permitting verification of any loss of blood or liquids.

The holes also generously accommodate the aural pavilion there by allowing the rescuer to communicate with the patient. The base should be able to accommodate two types of mono blocks for adult and pediatric patients by just removing an additional cushion in the centre of the base.

The device must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency. The device must be manufactured in an ISO 13485 certified facility.

The spine board should be extremely rugged in construction and should be built from high quality material thereby avoiding splintering and cracking.

The surface should be impervious to body fluids and secretions and should be completely seamless to eliminate ingress of fluid. It should have a firm surface for CPR & immobilization.

It should have compact dimensions for easy maneuvering and should have provision for cervical collars or head immobilizers. It should have easy underside allowing easy lifting access. It should be x-ray translucent.

The weight of the spine board should not be more than 10 Kgs.

The load capacity of the spine board should be 180 ± 10 Kg.

The physical dimensions of the spine board should be: Length: 180 ± 5 cms., Width: 40 ± 5 cms., Height: 5 ± 0.5 cms.

The device must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency. The device must be manufactured in an ISO 13485 certified facility.

Ae. Universal Head Immobiliser

Spine Board.

Scoop Stretcher

The stretcher should be designed allowing coupling and uncoupling of any of the ends and gently scoop up the patient using the two scoops of the stretcher.

The stretcher should be telescopic to accommodate the tallest patient and should be folded for compact storage. The frame should be made of high quality anodised aluminium and blades should be made up of extruded aluminium.

The scooping blades should be fixed with aluminium frame by interposition of alloy fusions. It should have an integrated handle to select the length of the distal part of the stretcher. The scoop stretcher should be easily foldable in one swift movement.

It should have easy locking and unlocking nylon restraint belts to fix the patient to the stretcher. The fixture should have two points of holding the stretcher but only one point of fastening. The fastening point should have a locking system operated by single hand with lockable twist with locking arrangement to protect any inadvertent use.

The stretcher must be supplied with an ambulance mount manufactured as an original accessory by the manufacturer to rigidly fix the stretcher in folded condition to the wall of the ambulance in vertical position.

The weight of the stretcher should not be more than 10 Kgs.

The load capacity of the stretcher should be 180 ± 10 Kg.

The physical dimensions of the stretcher should be: Maximum Unfolded

Dimension: Length: 220 ± 5 cms., Width: 44 ± 5 cms., Height: 6 ± 0.5 cms.

Maximum Folded Dimension: Length: 170 ± 5 cms., Width: 44 ± 5 cms., Height: 6 ± 0.5 cms.

The device must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency.

The device must be manufactured in an ISO 13485 certified facility.

Evacuation Chair

Evacuation Chair should be made from aluminium alloy with built-in pull through handles for easy handling.

The chair should have four wheels out of which two should be fixed and two should be pivoting type.

The evacuation chair should be mounted to the rear door (on the co-driver side).

The weight of the stretcher should not be more than 12 Kgs.

The load capacity of the wheel chair should be 150 ± 10 Kg.

The physical dimensions of the wheel chair should be: Height: 90 ± 5 cms., Width: 50 ± 5 cms., Depth: 20 ± 1 cms.

The device must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency.

The device must be manufactured in an ISO 13485 certified facility.

Af. Resuscitation & Airway Management Equipments

Oxygen Flowmeter

The oxygen flow-meter should be fully compatible to the oxygen terminal

outlets. These must be direct mounted and operated by oxygen supply inside the ambulance.

The oxygen outlet should have integrated outlet probes complying with DIN-13260-2 made up of stainless steel and manufactured as an original OE either by the terminal outlet manufacturer or the oxygen flow meter manufacturer. Any other third party manufactured probe won't be accepted.

The flow tube should be calibrated in the range of 0 to 15 litres per minute. The flow tube must be calibrated in dual scale thereby allowing precision settings in low flow ranges as well. The ultra accurate flow tubes must have extra accuracy in low flow ranges there by ensuring high clinical efficiency to the end users.

The tubes should have accuracy not exceeding +/- 0.05 LPM for flow in the range of 1 LPM. The Flow-meter body should be made of high quality chrome plated brass. Both the inner and outer tubes should be made from special clear and impact resistant high-grade polycarbonate.

The float be made up of stainless steel and should rest on chrome plated solid brass, vitone rubber and plastic. The humidifier must ensure moderate relative humidity to the breathing oxygen.

Bubble humidifier with porous diffuser should be designed to increase the humidity level with minimal noise.

The humidifier should be reusable and auto-clavable till 130 degree C and made of Polycarbonate.

The scope of supply should include insufflation kits and nasal prongs.

The body of the flowmeter should have a flow selector switch to bypass the flow of the oxygen through the humidifier and allow nebulization to the patient directly using the flow of the oxygen. Once the process of administering nebulizer is complete the flow selector switch can be set back to standard oxygenation.

The device must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency.

The device must comply to the latest international standard ISO 15002:2008.

The device must be manufactured in an ISO 13485 certified facility.

Suction Aspirator

An electrically powered portable suction unit of highly rugged and modern design should be provided. It should be very compact, handy and housed in ergonomically designed ABS casing. The unit must have integrated oil free no maintenance piston pump ensuring high level of functionality and dependability as a professional suction unit.

The suction capacity of the pump should be minimum 30 LPM. The on / off switch should be water resistant. The unit should be equipped with a vacuum gauge to

show the vacuum level.

The vacuum level should be adjustable from 0 to 630 mm. of Hg by means of a rotary control knob on the front panel of the machine, easily accessible by the Doctor / EMT / Paramedic.

The unit should be supplied with a 1000 ml. polycarbonate collection jar auto-clavable at 121°C with overflow safety valve that, during operation, there by preventing any liquid or secretion from reaching and damaging the vacuum pump.

The device must have integrated built-in lead batteries allowing minimum 1hour autonomous operation. The unit should be able to work on 12V DC and 240V AC. The total weight of the unit should not be more than 5 Kg. The scope of supply must include bacteria filter and suction hose.

The unit should be supplied with its own wall fixture to rigidly fix the unit to the ambulance wall. The fixture should be manufactured as an original equipment accessory by the manufacturer.

The device must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency.

The device should be certified for application in an ambulance and the ambulance wall mount for the device must be EN1789 compliant.

The device as well as the wall mount must be manufactured in an ISO 13485 certified facility.

Intubation Kit

The contents of the kit should include the following:

Laryngoscope Handle (Minimum 28mm. Diameter) - 1No.

Made from Chrome Plated Brass

Stainless Steel Fibre Optic Macintosh Blades (One each of size: 1, 2, 3 & 4) - 1 Set

The laryngoscope and the blades must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency.

The device as well as the wall mount must be manufactured in an ISO 13485 certified facility.

Guedel airway set (0,1,2,3,4) - 1 No.

Endotracheal Tube set (6,7,8,9) - 1 No.

Adhesive Tape - 1 No.

Emergency Kit

The contents of the kit should include the following:

Sphygmomanometer with Adult & Paediatric Cuff

Stethoscope

Portable Oxygen Bottle 1L with Pressure Reducer and Connecting

Tube

Resuscitator Bag with Mask (1 Adult, 1 Paediatric)

Adult Resuscitator with capacity of 1600 ml. & Paediatric Resuscitator with capacity of 500 ml. respectively

Should be CE or its equivalent certified

Components made from Latex free Silicone material

Should be Non-Toxic & Non-Allergic

Easy to disassemble/assemble for efficient cleaning

Autoclave-able

Should have reservoir bag and transparent face mask

Should have intake valve with oxygen connector & an additional connector to connect to reservoir bag

Should also be decontaminated by ETO sterilization or cold sterilization

Should have transparent, low resistance, non-rebreathing valve without any forward or backward leaks

Should have pressure relief device

Should have a standard 15mm. / 22mm. (ID/OD) at the patient end which connects to all standard masks & 15mm E/T Tube connectors

Should have quick and uniform bag re-expansion

Should allow use in spontaneously breathing patients

Should allow effective IPPV

Portable Manual Suction Device

Should be independent of any power source and should be able to develop 500mm. of Hg of vacuum and 25 LPM of suction flow rate.

Should be simple to operate by foot, hand or knee to clear patient's airways safely and efficiently, anytime, anywhere.

All components should be easily accessible and should be remove-able, for cleaning and replacing.

Should be completely autoclave-able

The device should be complete with aspiration pump, suction vessel and over spill protection

Physical Dimensions should not exceed: Length: 220±5 mm., Width: 170±5 mm., Height: 110±5 mm.

The weight should not exceed 1.5±0.1 kg.

Magill Forceps

Universal scissor

Non-rebreathing Mask - Adult & Paediatric (1 Each)

Low Resistance Check valve to prevent the re-breathing through the mask

Should be CE or its equivalent certified

Should Allow exhaled gases to escape

Latex Free , Odorless, Transparent Vinyl

Adjustable elastic band

With 1.5 Lt Reservoir bag

Tubing : 7 ft length

Tongue forceps

Tourniquet

Plastic penlight

Digital Thermometer

Tongue Depressor

Medical Equipments for Advance Life care Support Ambulance:

Ag. Cardiac Defibrillator cum Patient Monitor

The device should be a combined device with:

Therapy Unit for Defibrillation and Non-invasive Pacing

Monitor Unit for ECG, SpO₂, Non-invasive Blood Pressure, End Tidal Carbon Dioxide

The device must be supplied with its ambulance wall mount as an original accessory manufactured and certified by the manufacturer. The ambulance mount should have built-in charger to automatically charge the internal battery of the device when the device is mounted on it. It should be portable and lightweight - Weight should not exceed 8 (with battery)

The device with the ambulance mount and all the accessories must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency.

The device with the ambulance mount must comply with EN 1789 standards. the device must be certified against Environmental Conditions, Operational Shocks, Crash Safety Category as per RTCA/DO-160F Standard.

It should have a minimum 8 inch diagonal colour monitor with bright displays visible from any angle and in most lighting conditions.

The monitor should be able to display at least up to 6 traces simultaneously.

The device should also be certified as minimum IP X4 for waterproof & IP 5X for dust proof as per IEC 60529.

E.C.G

E.C.G. pick up from paddles, pads and leads
Multiple lead ECG monitoring
Facility of 12-lead ECG
Facility for arrhythmia detection of at least the peri-arrest rhythm disturbances
ST segment analysis
Generates audio-visual alarms for arrhythmia and set parameter
Lead off detection

Defibrillator

Should be both Manual and AED
Changeover from AED to manual by switching the knob or pressing the button
Biphasic wave form with full impedance compensation
Should be able to Defibrillate using either paddles or pads
Selection level of energy from minimum 2 joule up to 200 Joules
Energy selection and Charging possible from the front panel of the device and from the paddles
Should be able to charge to its highest energy level in less than 10 seconds.
User friendly method of delivering shock Specified buttons on the equipment with clear indications of steps of defibrillation
Should have capability to assess paddle-to-patient contact and to make compensation to the selected deliverable shock
On synchronized mode “SYNC” message should be flashed on the screen

AED Mode

Usable for 8 years to adult age group
Energy Output: Biphasic with energy output conforming to the latest international guidelines
Charge Time less than 10 seconds
Analysis Time less than 15 seconds
Loud and clear Audible Prompts to guide through the steps of CPR as well
Clearly visible Visual Prompts
Easy to understand and operate controls
Low Battery Indicator
Battery Capacity: At least 100 discharges for use in adults

Transcutaneous (Non-invasive) Pacing

Demand and Fixed modes
Adjustable rate and output (mA)

Pulse Oximetry

Should have separate displays for SpO₂, Pulse rate and Plethysmographic waveform

Should have bar graph displays for Pulse Amplitude and Perfusion quality indication

Should have a variable audible tone that varies in pitch with rise and fall of oxygen saturation

Should have on screen display of SpO₂ and Pulse Alarm limits readings

Should have audible & visual alarm for low/high pulse rate and saturation

Functioning and accuracy should be Low perfusion tolerant

Sensor Probe should be reusable

User selectable alarm limits

Non Invasive Blood Pressure

Display of systolic, diastolic and mean arterial pressures

Capable of making continuous, manual and interval measurements

Alarm Limits: Selectable alarm limits.

End Tidal Carbon Dioxide

End Tidal Carbon Dioxide Monitoring using Main Stream Technology

Capable of monitoring both intubated and non-intubated patients.

Configurable digital display and waveform display as required.

Rechargeable

Capable of minimum 4 hours of monitoring and giving up to minimum 100 energy shocks at the highest level.

Low battery and charging indicator should be there.

Should be capable of delivering DC shock with AC plugged in even if battery is fully discharged.

Minimum 100mm. wide integrated strip chart printer.

Prints the primary ECG lead with event annotations and event summary reports, including ECG rhythm strips and 12-lead ECG reports.

Should print measurements in real-time.

Ah. Communication

Facility for Wireless data transfer via integrated GSM modem to computer and central console / receiving hospital.

Ai. Transport Ventilator

Time-cycled, volume controlled and pressure limited emergency ventilator for the controlled ventilation of patients.

Compact dimension of the ventilator should not exceed 225x100x225 mm. (WxHxD) and the weight not exceeding 3.2 Kg. maximum.

The ventilator must have integrated handle for lifting and carrying by hands as well as quick latching to all common rail and pole profiles.

Ventilation Mode: IPPV / CMV

Ventilation Frequency: 4 to 54 per minute

Minute Volume: 3 to 20 LPM

I:E Ratio: 1:1.5 Fixed. Maximum

Airway pressure: 25 to 60 mbar

Oxygen Concentration: Approx 60% in Air Mix and 100% in No Air Mix Modes.

Gas consumption of control: Not exceeding 1 LPM

Pressure Gauge Display: -10 to 80 mbar.

Both audible and visual alarms for Supply Pressure Low, Airway Pressure High and Airway Pressure Low.

The device should be supplied with the ambulance mount complying to the same standard as the ventilator as well as manufactured as an OE by the manufacturer not any retrofit item from any other sources.

The device with the ambulance mount and all the accessories must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency. The ventilator must be vibration tested and certified as per MIL STD 810 F standard. The device must comply with EN 1789 standards.

The device must be manufactured in an ISO 13485 certified facility.

Aj. Syringe Infusion Pump

Should be of continuous mode operation.

Must have programmable flow rate from 0.1 to 500 ml/hr.

Should accept standard disposable syringes

Selectable occlusion pressure trigger level from 100 mm hg to 900 mm hg to allow user a range of application

Comprehensive alarm package including alarm pressure, pre alarm, end of infusion, low battery, near empty alarm, syringe disengaged alarm etc.

The device with the ambulance mount and all the accessories must comply with Medical Device Directives (93/42/EEC) having the CE mark along with the four-digit code from the certifying agency.

The device must be manufactured in an ISO 13485 certified facility.

Ak. Refrigerator

Compressor: 12V or 24V compressor

Usable capacity: 50 Liters

(L X B X H) : 21.5" X 19.5" X 18.0"

Electricity: DC 12V, 3A @ evaporating temp of -250C

Refrigerant: HFC-134a

Chiller temperature: + 3

Insulation: 1 inch polyurethane foam @ 36kg/m³

External walls: coated steel cabinet

Internal walls: Plastic

Weight: (approx.) 10-15 kg

AC DC operated.