SPECIFICATIONS FOR FABRICATION OF VENNELA AC SLEEPER - HIRE BUS BODY TENDER – 2024

1.0 GENERAL DESIGN:

The general design shall be a streamlined body with passenger service door on left hand side (LHS) in front of front wheel with pneumatically operated **in-swing** door and passenger berths facing forward in 2X1 pattern at upper and lower areas.

2.0 REGULATION:

The general appearance, structure, seat layout etc., shall be in accordance with respective drawings. **The bus body design should comply with the provisions of latest CMVR, Bus Body Code AIS : 052 , AIS: 153 and AIS: 119, latest Motor Vehicle Rules, Government of Andhra Pradesh and any other statutory requirement. The coach interiors shall conform to the standard IS- 15061 / 2002.**

2.1 The firms shall possess Bus Body Accreditation Certificate issued by CIRT /ARAI or any other Agency approved by GOI and shall be registered with APSRTC.

3.0 MAIN DIMENSIONS: (ALL DIMENSIONS ARE IN MILLIMETERS)

SL NO	CHASSIS DESCIPRTION	AL 236" WB	TATA 244"WB	EICHER 244"WB
	Chassis Suspension : Front & Rear Air Suspension with Retarder			
1	Wheelbase	6000	6200	6200
2	Front overhang	2265	2265	2205
2	Rear overhang (OE Chassis & 60% Over hang)	Should be limited to 60%		
3	Overall length	Should be limited to 12000		
4	Overall width max	2600		
5	Pillar centers (std)	1900		
6	Waist rail height from Skirt level	2250		
7	Cant rail height from waist level	1402		
8	Interior saloon clear height (Maximum) after finishing	2240		
9	Clear aperture of passenger service door (minimum)	Min 650		
10	Clear aperture of Driver door	Min 650		
11	Berth capacity	30(15U+15L) Berth		

4.0 DRAWINGS: The list of drawings to be followed are shown at **ANNEXURE –I**.

5.0 MATERIAL: The fabrication of bus bodies shall be as per the specifications and the material shall be procured from the recommended sources/brands of material as mentioned in **ANNEXURE-II**.

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6.0 CHASSIS POSITIONING:

6.1 All chassis received by the firm for fabrication of bus bodies should be kept safely in a covered area. The chassis should not be kept open to atmosphere with out any protection to avoid damage to chassis and its units due to rain, dust and heat.

6.2 Before commencement of bus body fabrication all important units of chassis viz. alternator, self-starter, radiator, tyres, batteries, air cleaner, air cleaner indicator, power steering reservoir, fuse boxes, electrical relays, brake pipe lines, filters, clutch reservoir and meter cluster should be protected by providing suitable covering in addition to disconnecting the wiring connections to vehicle ECU, ABS ECU, Vehicle tracking unit protecting the wiring harness connection ends with proper covering to prevent from damages that may occur due to welding, drilling, cutting, hammering, riveting, falling of metal scrap or dust during the course of fabrication. Driver seat, steering wheel, hand brake valve etc., shall also be protected from any damage or paint spray.

6.3 Chassis number on long members and identification plates provided by the chassis manufacturer shall be properly covered and protected before commencing the fabrication work.

6.4 The Ashok Leyland /TATA / EICHER chassis are supplied with following items as OE fitment.

1. Cabin floor on RH side
2. Bulk head structure (AL)
3. Out riggers on RHS(AL)
4. Anti-sag channel (TATA)
5. Engine bonnet
6. Knitted Driver seat
7. Head lights 24v E2 with relays
8. Front indicators E2
9. Tail Lamps E2
10. Battery cut off switch
11. Wiper motor with twin blades/linkages(Tata/Eicher)
12. Washer tank with pipes(TATA)
13. Reflective warning triangles with stands
14. Wheel stoppers
15. Spare wheel carrier rope/cage type
16. First aid kit
17. Tools as per CMVR
18. Rear view mirrors with brackets (E2 plus 1 small mirror)
19. Electrical horn
20. ELR safety belt E1

7.0 PROTECTIVE TREATMENT:

7.1 All Mild Steel components, including rolled sections except GI tubes and sheets used for fabrication shall be PRE-TREATED WITH COLD PHOSPHATING PROCESS/Three in One Solution to a high quality by dipping and wiping off with a dry cloth to remove all dirt/oil etc. as per IS-3618. After the above process, all components shall be applied immediately (without any time lag) with anti-corrosive Zinc phosphate epoxy primer "Rust-o- Cap" (part no.24570608320) of M/s. Asian Paints or '60 BT PRIME GREY' of M/s. Akzo Nobel, to a thickness of 40 to 50 microns before assembly.

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7.2 After assembly of structure and completing the welding work, all the joints shall be carefully cleaned, ground and applied with Epoxy primer without any time delay and then complete body structure shall be applied with the above anticorrosive paint once again fully.

7.3 After completion of body assembly, bitumen based anti-corrosive, abrasive resistance and sound deadening property coating (Morrai Hydroban/3M/Sika) of the make as specified in material specifications shall be applied on the under-floor body frame members and chassis.

7.4 All Alu. Components shall be carefully cleaned with thinner. Bi-metallic paint shall be used at joints of dissimilar metals. The interior and exterior panels should be cleaned with thinner and then self-etching primer shall be applied.

8.0 BODY STRUCTURE:

8.1 **GI STRUCTURE:** All principal structural members should be in Galvanized Iron Tubes as per BIS 4923-2017 of grade YST-310.

8.2 **Aluminum components:** All Aluminum extruded sections should be of Alloy designation 64430, 63400 and 65032, condition WP as per IS: 733 – 1983. All Aluminum sheets shall conform to alloy designation 19000, condition H2 of IS: 737 of 2008. All aluminium chq. sheets shall confirm to BIS: 737:2008, alloy designation 65032, Temper WP.

8.3 Chart no. CB23CTG132 and Drg.no. CB23AEG112 (sheet 1&2) containing the details of specifications of Aluminum extruded sections and sheets shall be followed.

8.4 **Other GI Steel structural members:** Galvanized steel sheets should be as per grade 175GSM of IS: 277- 2018. Rolled sections should be as per IS - 2062 of 2011. The structural joints shall be by bolting, MIG welding and combination of both. The welding should be full length of joints. After welding, slag to be removed and ground to smooth finish to avoid sharp edges and then Epoxy primer to be applied without any time delay.

8.5 All bolts used shall be of sizes reckoned in Metric system. The bolts shall be of high tensile hexagonal head bolts of fine thread, conforming to property clause 8.8 of IS: 1367 of 1979. The nuts of approved anti-vibrate type such as Nyloc conforming to IS: 1364 of 1983 shall be used. All bolts, nuts and washers should be galvanized. Each bolt and nut shall be provided with a flat washer. A spring washer should accompany every tapped bolt. The approved brands of bolts are TVS / STL / UNBRAKO/ IMPERIAL FASTENERS/ KFL/HFL only.

9.0 PARTICULARS OF IMPORTANT STRUCTURAL MEMBERS:

All structural members should be in GI steel tubular sections, pressed sections or MS rolled sections as mentioned below:

Sl. no.	Description	Material
1	Cross bearers & runners	Formed GI 3 mm Box 'C' type 50X175X50 mm
2	Anti-sag bar	Rolled steel channel ISJC 75x40x6 mm
3	Floor longitudes	GI Pressed inverted 'U' section 25x50x25x3 mm thick
4	Pillars, Stump pillars and horizontal supports	GI Rectangular tubes 60X40X3 mm main pillar & horizontal supports and GI Square tubes 40x40x2 mm for stump pillars
5	Roof sticks	GI rectangular tubes 60x40x2mm
6	Roof longitudes	GI rectangular tubes 60x40x2mm
7	Crib rail	GI Pressed L in 40x40x2 mm

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8	Cant rail	GI Rectangular tubes 60x40x3mm
9	Sole bar	GI Rectangular tube 60x40x3 mm
10	Waist rail	GI Rectangular tubes 60x40x3mm
11	Gussets for saloon, cabin under frame and roof structure	GI Triangular gussets 75x75x3 mm thick
12	Skirt rail	GI Rectangular tubes 40x20x2mm thick
13	Step edge beading	Indal 5701 section
14	Body side beading	Hindalco SP-6551 section
15	Window sections a) Window guide b) Sweep rubber section	 a) Hindalco 6482 section b) Hindalco 2691 section
16	Flap door stiffener	Hindalco SP-4822 section
17	Flap door hinge	Hindalco SE- 9390, SE- 9389 sections
18	MS Tapping plates	6 mm thick
19	Steel rod for door hinges	6.35 mm dia of EN 430 bright grade

10.0 PRECAUTIONS:

10.1 "NEGATIVE TOLERANCES" are not allowed either for Aluminum Extruded sections or Aluminum sheets and GI sheets/tubes.

10.2 All welding shall be done with MIG welding process only. Under any circumstances, arc welding shall not be allowed. Welding of Stainless-steel components shall be done with TIG welding process only with same grade SS filler rod.

10.3 The following workmanship must be carefully followed during the fabrication.

i. All castings must be truly formed and free from blow holes.
ii. All bolts and rivets should be well fastened.
iii. Thorough water test shall be carried out before fixing the interior ceiling using pressurized water spray system. The fabricator shall equip water leak test facility conforming to IS: 11865/1982 at the firm for conducting leak test in two stages i.e., before fixing the interior ceiling and before dispatch of vehicle. At all stages the coach shall be water leak proof.
iv. All welded joints must well ground to get a smooth surface finish. All the welded joints shall be applied with epoxy primer anti-corrosive paint immediately without any delay to prevent the corrosion.
v. Sharp corners shall be grounded and made smooth.
vi. Wherever pitch for rivets / bolts is not specified, it shall be 100 mm.
vii. Bolt ends shall protrude at least 2 to 3 threads length above the nuts
viii. Roof stick, roof longitude, floor longitude and waist rail members shall butt properly at mating joints and shall not have gaps at the joints.
ix. All tapping bolts such as grab rail, handles and assist rail bolts etc., shall be tightened using thread lock adhesive of approved makes.
x. All fixed glasses shall be provided with ceramic coating of suitable width on periphery.
xi. There shall not be any air pockets, wrinkles in laying vinyl mat and edges of mat are to be hot welded at all the mat joints.

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11.0 FIBER REINFORCED PLASTIC (F.R.P.):

All the FRP profiles shall be of FR grade and to comply with the provisions of IS: 15061:2002. The thickness of front & rear FRP shall be 4 mm and dash board shall be 3 mm. The FRP profiles developed shall be produced for approval of Chief Mechanical Engineer before taking up for fabrication. The layup of FRP profiles shall be as detailed below:

a. Two coats of ISO UV FR grade Gel coat and surface mat 30
b. CSM 400 mat layer with ISO FR grade resin
c. WR 610 mat layer with ISO FR grade resin
d. CSM 400 mat layer with ISO FR grade resin
e. WR 610 mat layer with ISO FR grade resin
f. Permitted pigments and additives
g. Grey primer coat
h. Suitable reinforcements at all points of fastening
i. Front bumper reinforcement

12.0 CAB UNDERFRAME STRUCTURE:

12.1 The Ashok Leyland 236" WB chassis will be supplied with OE cab floor, bulk head structure, out riggers, driver seat and engine bonnet. The cab under frame shall be fabricated as per the Drg NR23659.16UF23313. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side & LH side of cabin shall be connected in line with the 1 st cross bearer with **a ISMC channel 100X50X6mm**. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

12.2 An Anti-sag bar in 3-pieces in ISJC 75x40x6 mm connecting both 1st pillars and chassis frame shall be provided.

12.3 Out riggers in M.S. angles 50x50x6 mm shall be provided connecting 'B' (2nd) pillars to the chassis long members by means of clamps made of M.S flat 50x6 mm.

12.4 The dashboard frame shall be covered with FR- grade FRP mould of **5mm thick in** approved design.

12.5 Flap doors with Auto Hinges, Steel collapsible handles and tower bolts shall be provided at AC Compressor, fuel feed pump, air cleaner, power steering reservoir, instrument panel etc., to facilitate easy maintenance and access.

13.0 BODY FRAME STRUCTURE:

13.1 The bus body frame structure should be fabricated as per the following drawings.
Ashok Leyland 6000 mm (236") WB chassis :NR23659.16SL23311 and NR23659.16SR23312

13.2 Cant rail joint shall be provided with box type reinforcement formed by welding of two GI pressed U sections of 17x27x17x2 mm in 300 mm length and to be plug welded on both sides.

13.3 The body structure has to be prepared with GI square and rectangular sections suitably reinforced at stress concentric points for structure.

13.4 All the pillars located at front & rear end, Main pillars, Entrance door pillars and AC mounting supporting shall be provided in GI of 3 mm thick.

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13.5 Additional reinforcement has to be provided in roof structure to withstand weight of A.C. Unit.

13.6 Engine protection guard to be provided in the front-end structure to safe guard the engine in case of front collision.

13.7 FRP mat reinforcement layers have to be provided at rear corner areas and wheel arch top areas for additional strength.

13.8 1st pillars on both sides are to be formed to match the shape of front wind screen glass profile.

13.9 Fuel oil tank mouth shall be provided with an opening of size 250 mm x 250 mm, flap with suitable auto hinges, collapsible handles and locking arrangement.

13.10 MS tapping plates of 150 mm length in 30x3 mm flat shall be provided wherever necessary for fixing body components such as light weight luggage rack, assist rail, partition etc.

13.11 Chassis long members shall not be disturbed (as shown in the respective drawings) while fabricating the rear luggage booth.

13.12 Pillar to waist rail joints shall be provided with plus type gussets, the joints connecting waist rail to diagonals/stump pillar shall be provided with proper gussets.

13.13 AC Ducting shall be provided for upper & lower berths on both sides of the bus.

13.14 The duct has to be provided in GI sheet covered with approved good quality foam type Rexene and providing support brackets at every one meter.

13.15 Further the AC facility has to be provided to the driver and attender also.

13.16 Emergency door shall be provided at rear end at gangway level.

14.0 CABIN AND BODY MOUNTING:

14.1 The OE Cabin floor and mounting arrangement shall be retained. The remaining portion of cabin floor connecting 1st cross bearer and OE floor shall be fabricated as per Drg.no. NR23659.16UF23313. for Ashok Leyland 6000 mm (236").

14.2 The saloon gangway shall be made in line with cabin floor.

14.3 The body should be mounted on the chassis web duly providing 6 mm (inverted pressed "L" type) 150 X 150 X 6 MM M.S. plate as per the size shown in the respective drawings over the chassis long members. These "L" plates shall be bolted together at every cross bearer mounting to long member web with M12 X 50 H.T. bolts at least 4 nos. per plate.

14.4 OE holes on the chassis long members shall only be picked up for mounting this plate. Wherever the holes are not matching holes shall be drilled on the web 40 mm below the top level of long member with prior approval.

14.5 Box type cross bearers formed with two C type GI formed sections of 50X175X50X3 mm completely MIG welded are to be provided. On these Cross bearers, **60X40X3 mm GI tubes** of 170 mm length are provided vertically to provide a belly dickey space for luggage in between chassis and body floor. On top of these GI tubes, flooring structure has been fabricated with 40X40X3 mm MS 'L' angular and chequered plywood.

14.6 The C type cross bearers should be fully welded with the structure main pillars and stump pillars on all the four sides.

14.7 These cross bearers are to be inter connected at bearer bottom surface (base plate top) level by using GI Square tubes of size 40 x 40 x 2 mm thickness on both sides along the chassis longitudinal members. At rear wheels, the cross bearers shall be mounted and welded on MS 450X160X6 mm thick base plate. The base plate should be fastened to the chassis with 16 mm dia. "U' bolts of approved make and with 150X6 mm thick base plate welded to the bottom of cross bearer **wherever L plate is not possible.**

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14.8 Spacers made of Aluminum casting shall be placed between bottom flanges of chassis long member and "U" bolts. The "U" bolts are to be made out of EN-15/14B steel as per IS 5517-1978 (Tensile strength 80 kg/Sq.mm minimum). The "U" bolts should be galvanized and fitted with galvanized nyloc nuts as per drg.no.CB23UBG114. The length of bolt shall suit the depth of chassis long member and should not project more than 6 mm after tightening the nuts.

14.9 **At rear axle H- portion, along the chassis, longitudinal and cross-wise diagonal 60x40x3mm and 40 x40x3mm GI tubes are to be provided as truss.**

14.10 The body mounting must be easily detachable from the chassis during major overhauls/repairs.

15.0 CABIN AND SALOON FLOOR:

15.1 The cabin and saloon floor and fire shall be laid with 12 mm thick polymer impregnated compressed chequered plywood conforming to IS: 3513 (Part-3)-1989. The Plywood should be bolted to the under-frame members with CSK self tapping screws of 6 mm size (for steel application) at a pitch of 200 mm.

15.2 The floor plywood should be overlaid with 2.0 mm thick non-skid safety vinyl mat of FR grade with good quality adhesives of approved brands with minimum joints, without gaps and air bubbles.

15.3 Aluminum step edge beading of Isuzu/Scania/AL-SLF type with insert duly anodized/ yellow powder coated shall be provided along the edges of step well, gangway and at rear raised floor.

15.4 FRP mat reinforcement layers have to be provided at rear corner areas & wheel arch top areas for additional strength and to avoid dust and water entry into saloon.

15.5 **At wheel arch areas, FRP layer shall be formed over 0.5 mm SS sheet before laying 12 mm compressed plywood and followed by vinyl mat**

15.6 The height of rear wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

15.7 Trap door of 580 x 540 mm must be provided in cabin flooring above gearbox. One more trap door of size 860 x 520 mm shall be provided in gangway above rear axle for maintenance. Trap doors in floor shall be finished with vinyl mat and Aluminum Fluted strip. Sunken type steel collapsible handles to be provided to lift the trap door.

15.8 On both sides, side luggage booth's structure shall be fabricated with MSL 40X40X6mm, GI 25X40X25X2 mm pressed section and 40x6 mm MS flats.

15.9 The vertical panelling of the booth and finishing of out riggers in side luggage booth is to be done with 0.91 mm GI sheet covered with hammer tone paint.

15.10 SS tube of OD 25 X 2 mm thick shall be provided in side luggage booth to ensure safety for luggage.

15.11 Flap doors are to be provided at Air bellows area with tapped bolts for easy access of air bellows.

15.12 Separate cut outs are to be provided in side luggage booth area for easy maintenance of EMR unit at top and side areas.

15.13 Removable doors are to be provided in side luggage booth area for easy maintenance of EMR unit at top and side areas.

15.14 Plastic caps are to be provided on top of the U clamp projections in side luggage booth areas.

15.15 A cut out shall be provided with a flap door for maintenance of DEF tank at right side back area of front wheel.

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15.16 A cut out shall be provided with a flap door having air vent lovers at EATS unit area for proper heat dissipation.

16.0 BODY PANELING:

16.1 Truss Panel: The interior panel from waist to crib to be provided with 3 mm ACP of FR grade/design as per the design and source approved by APSRTC pasted with PU sealants to the structural members.

16.2 All main pillars are to be covered with Foam Rexene. Other finishers covering vertical and horizontal members should be in ALP window vertical finishers (Fixed Glass type) /0.5 mm SS Sheet. Plastic buttons and screw caps for metal screws shall be used for fixing finishers on the pillars.

16.3 The mud wings should be in G.I of 0.91mm thick formed to suit the wheel arch and to be welded to transverse angle at wheel arch. While providing mud wings, care shall be taken to avoid damages to air bellows of suspension system. Proper gap shall be maintained between Air bellows & body members.

16.4 Dash cabin vertical portion i.e., front truss panel at pedals and side truss panel from front end to driver door pillar shall be covered with 0.5 mm Stainless Steel sheet of scotch brite finish and 430 grade.

16.5 Thermocole insulation of 40 mm thick of FR grade shall be provided between exterior and interior panels of body side structure between waist rail to floor and roof.

16.6 USB and 5 pin socket wiring harness to be provided in both sides of saloon and rear side with PVC Conduit of with suitable connectors.

16.7 Stretch panel:

i. The exterior body from waist to crib level (660mm) to be in 0.91mm Skin Pass quality GI sheet and shall be laid horizontally in single piece by stretching in a fixture by applying load and then welded rigidly to the rear most pillar and rear pillar of entrance door and driver door. There should not be any wrinkles or waviness or rattling in the stretch panel after welding.

ii. The stretch panel shall be formed to 'Z' profile on top edge to a depth of 12 mm in roller machine.

iii. The top edge of the stretch panel to be sealed with P.U. sealant to avoid leakage of water to the structure. P.U. sealant shall also be applied on the structural members for bonding the stretch panel to the structure.

iv. Approved brands of P.U. sealants are: Sikaflex, Total seal, 3M, Anabond and Henkel.

16.8 Side Modular panels:

i. The exterior body below stretch panel up to skirt rail shall be in 2.00 mm thick Aluminum Sheet i.e., at front wheels, rear wheels and rear of rear wheels. All flap doors including Spare Wheel Carrier door and rear luggage booth door shall be in 2.5 mm thick Aluminum sheets.

ii. All the wheel arches shall be provided with FRP wheel fenders in 3 mm thick.

iii. The waist rail shall be of GI Tubular section of size 60x40x3mm shall be mounted horizontally between the pillars as per drawing.

iv. Box type gussets of size 25 x 50 x 2mm shall be welded at bottom corners of waist rail with side and stump pillars.

v. One row of GI Tubular rectangular section of size 60x40x3mm be provided on both sides as crib rail for fixing waist (stretched panel) and skirt panels.

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vi. A top hat formed GI section with AC duct with suitable brackets has to be be provided in GI rectangle tube 40x20x2 mm, 25x12x40x2mm and M.S. flat 40x6 mm shall be welded to the roof sticks duly providing cleats in formed GI.
vii. The interior portion of the A/C duct should be pasted with 6 mm nitrile foam.
viii. The exterior of hat section bottom shall be welded with 0.91 mm GI sheet duly pasted with 6mm heatlan and over laid with good quality rexiene of approved shade and color with good quality adhesive.
ix. Proper reinforcements shall be provided for fitment of A/C louvers at every berth.
x. E 2 consoles (Louvers) shall be of VOLVO type of PACOLINE or any approved make have to be provided for individual berth.
xi. The fixed AC consoles(Louvers) are to be fitted in offset at center hat side edges on both sides.
xii. Above the wheel arches, two rows of GI tubular section of size 40x40x2mm be fully welded from wheel arch bay to front end and at rear wheel arch bays.
xiii. The crib rail shall be of GI tube of size 40X40X2 mm. It can be mounted on top of the floor structure on the corner edge of the side pillars right round and it should be welded fully with the side pillars.
xiv. The waist rail finishers have to be provided with ALP waist rail PVC finisher / 0.5 mm SS sheet at all window bays.
xv. Inside portion of window pillars, berth partition pillars and waist rails be provided with ALP window vertical finisher / 0.5 mm thick SS sheet.
xvi. Below cant rail level and below the upper berth, provision be made for fixing the curtain cloth by providing aluminum extrusions hooks.
xvii. Between waist rail of bottom and crib rail, 40x20x2mm GI Tube truss reinforcement shall be provided diagonally as shown in the Drawing.
xviii. The side flap doors shall be fabricated with 2.5 mm thick Aluminum sheet with hinges in Hindalco SE9389 and SE9390 sections and Aluminum pressed top hat profile of 25X25X150X2mm bonded with P.U. sealants of approved make. The hinge sections shall be joined together with a 430 Grade bright grade stainless steel rod of 6.35 mm dia. Flap doors should be reinforced duly pasting the Hindalco SP4822 section with P.U. sealants along the four edges. The hinge at top should be welded to this stiffener before pasting. The Aluminum hinges should be fastened to the bottom side of tube 60x40x3 mm at floor level duly providing tapping plate of GI 3 mm thick with M6 screws. P.U sealant shall also be applied for bonding hinges to the structural members while fastening. The flap shall also be reinforced with 2 mm thick Aluminum Pressed top hat profile of 150 mm in two rows duly pasting with P.U. sealants for provision of locks, blinkers etc., and proper reinforcements shall be given for fixing of locks, stay rods etc., Dust proof door rubber of EPDM quality to be provided for these doors along the edges. These panels shall be pre formed to match the body profile. There should not be any play in hinges.
xix. All flap doors shall be provided with E 2 stay shockers .All flap doors shall be provided with 2 nos. of door locks of VOLVO type flap door lock with indicator in black colour on both sides. FRP/ABS covers in 2 mm thick shall be provided for these locks on inner side of flap door to avoid ingress of dust. The flap door opening shall be parallel to the bus body or minimum 120 degrees from closed position. The flap doors should be in level with the pillar finishers and bottom skirt rail properly.
xx. The battery box, spare wheel carrier, HSD oil tank, Ad Blue Tank and Air tanks etc., i.e., the area with in wheel base should be provided with these flap doors.

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16.9 The front-end fascia consisting of bumper and detachable front grill door (FOP)shall be provided in 5 mm thick FRP profiles with provision for fixing head lights and indicators etc., as per the approved design. Front bumper center piece shall be made detachable. Front grill top piece shall be fitted with linkages and upward lifting mechanism consisting of two handles and two gas springs 350N of approved make and lower grill to be fitted with bolts. There should not be any gap between structural members and front fascia. Front FRP to be pasted with sealant as well as fastened with M6 screws/riveted to the structure. Front FOP shall be in level with the aperture on all sides properly.

16.10 The rear end body shall be as per the Drg.nos.NR23659.16CS23316, NR24455.65CS23216 & NR244555.65CS23116 The rear end body to be covered with 4 mm thick FRP profile in single piece. The luggage booth flap door shall be in 2.5 mm single piece Aluminum sheet with proper reinforcements. The flap door shall be reinforced with 2mm thick Alu. Pressed top hat profile 150mm in two rows. The balancers shall have ball joints at both ends.

16.11 The bottom area of bottom berth / shoe rack upper area on both sides have to be illuminated by providing good quality approved LED strips in suitable Aluminium extrusion in complete length.

16.12 The both sides of the roof above the gang way have to be illuminated by providing good quality approved LED strips in suitable Aluminium extrusion in complete length.

16.13 The FRP profiles developed shall be produced for approval of CME(C&B) before taking up for fabrication.

17.0 ROOF STRUCTURE:

17.1 GI rectangular tubular section roof stick of size 60x40x2mm thickness, contour to body be provided as per drawing. The roof sticks have to be mounted on the Cant rail and fully welded. The curvature of the roof sticks shall be well finished and there should not be any wrinkles. The roof sticks be mounted on each main pillar and in between main pillars having both sides "L" cleats as shown in the drawing.

17.2 The roof sticks have to be joined with minimum 5 rows (one row at the center and two rows on either side) of roof longitudinal in each bay made of 60X40X2mm Gi Tubes. All the above longitudinal must be welded to the respective roof sticks with box type GI gussets.

17.3 Necessary reinforcements of 6mm thick M.S. flats shall be provided in the roof structure for mounting of berth partitions, roof lamps, speakers, AC mountings etc.

17.4 The joint of the roof structure and cant rail be provided with M.S. angle section of size 40X40X3mm thickness to the fully length of the body, on both sides of inside corners as reinforcement.

17.5 One Roof hatch with lid of size 500mmX500mm, EPDM U rubber sealing, and holding mechanism shall be provided in driver cabin above driver seat.

17.6 Two Roof hatches with exhaust fan of MSL or Spheros make shall be provided in saloon area with proper lid, EPDM U rubber sealing and holding mechanism.

17.7 The Interior roof ceiling, upper berth bottoms and center portion of roof between berth brackets (with a width of 610 mm), Driver partition on both sides and side truss panels shall be provided with 3 mm ACP of FR grade in approved shade. Remaining portion i.e., interior roof, all window fixed glass finishers, AC duct bottoms shall be provided with **0.7 PVC coated GI Sheet/ 0.5 mm SS Sheet** and foam Rexene of approved shade and design. The material should conform to IS 15061-2002 in respect of FR grade characteristics and behavior. The joints shall be provided with decorative beading with insert and plastic end caps.

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17.8 The exterior of roof complete shall be in 0.91 mm G.I. sheet full length of body in two pieces (laid longitudinally) and welded. The overlap joint should be on longitudes, welded together from outside at the joint, full length without any blowholes or burning. Roof joints should be water leak proof. The roof sheet shall be tack welded to roof structural members from inside and all tack welds shall be applied with PU sealant after shower test. The roof joints, i.e., centre joint and front & rear doom joints shall be over laid with weather shield strip of approved make in 100 wide and 2 mm thick after shower test by confirming no leakages at any cost.

17.9 WINDOW GLASSES:

Fixed type window glasses shall be of toughened float glasses having clear height of minimum 1000 mm with minimum 50% Visual Light Transmission (VLT). The area from waist to cant rail shall be provided with curved 5.0 mm thick toughened glasses duly bonding with PU sealant of Metal to Glass type. The size of glass shall be 1900x1200 mm (curved length).

17.10 The curved window glasses shall be of float quality, safety bronze tinted glass as per AS:202:71 DEC-2006. The fixing of glasses shall ensure proper sealing and water leak proof. The structural members shall be cleaned thoroughly for dirt &oil before applying sealant. The glasses shall have ceramic coating right round with a width of 50mm.

17.11 Bent type clear toughened float glasses of 5mm thickness shall be pasted with reputed make of highly reliable P.U. UV metal to glass sealant on the cant rail, window rail and side pillars above driver door and entrance door.

17.12 Inside portion of window pillars, berth partition pillars and waist rails be provided with ALP window vertical finisher / ALP waist rail PVC finisher / 0.5mm thick SS sheet.

18.0 FOOT BOARD:

18.1 The footboard structure shall be fabricated to suite in-swing door in M.S. angles 40x40x6 mm, 40x40x3 mm and MS flats 40x6 mm in three steps with minimum tread depth not less than 250 mm and tread height not to exceed 250 mm.

18.2 The step well assembly structure be fabricated by using 40x40x6mm M.S. formed angles, 100 x 50 x 6mm M.S. rolled channel and 40x20x2mm GI tube. Step well step be covered with vinyl mat. The steps raised portion and step-well truss portion be provided with 0.70 mm thickness stainless steel sheet. All the sides of the step- well shall be bolted apart from welding perfectly to the floor structure. aluminum step- edge extrusions shall be provided on the steps.

18.3 Foot board steps shall be provided and illuminated with good quality approved LED strips in approved Aluminium extrusiion throughout the edges on all sides.

18.4 All the edges of Step well shall be provided with ISUZU/SCANIA/AL-SLF beading as per drawing finished with yellow powder coating and PVC insert in yellow color similar to RKS-21 of M/s RK PROFILES Pvt.Ltd.

19.0 CABIN PARTITION:

19.1 There shall be a partition with full width of the body separating the saloon from cabin up-to the roof height and is with single flap door. The partition wall shall be fabricated in GI tubes 40x20x2 mm, GI formed Z section 25X40X25X2 mm and MS flats 25x3 mm and covered with 3 mm ACP sheet of approved make and shade on both sides.

19.2 One maintenance door located on bottom side of the partition by providing hinge arrangement at top side of the door to lift upside i.e., located above the floor trap door on

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gear box. The door shall be finished with ACP sheet of FR grade on both sides and finishers on all edges. One steel tower bolt of 6" size is to be fitted on bottom edge to lock the door.

19.3 On left side of the partition, one full partition door has to be provided and shall be finished with 3 mm ACP of FR grade on both sides and finishers on all edges. The door shall be made sound proof. The door frame shall be provided with valence rubber profiles for proper sealing. The door shall be provided with three heavy duty hinges and one heavy duty Godrej make lock that shall be operatable from inside and outside. The door glass up to waist level shall be clear in 5.0mm thick bonded with P.U sealant to flap frame. The door glass upto waist level shall be fitted in EPDM rubber. Aluminum sheet 1.6mm 'L' finishers shall be provided from inside along the edges of glasses.

19.4 The partition shall be provided with reinforcement for fitment of audio system box. The wiring cables shall be routed through a PVC conduit of 1" dia provided in partition structure. Curtain shall be provided for the partition door at saloon side.

20.0 FRONT WIND SHIELD GLASS, SALOON REAR GLASSES AND WINDOWS:

20.1 The cabin front-end shall be fitted with single piece-curved windscreen glass of size 1680 (Height) X 2735(Width)mm as per the drawing no.CB23WSG138. The windshield glass shall be fitted in a MSL 25X25X3 mm angle frame with EPDM rubber beading of 50 mm as per sketch CB23ERG122. The curved laminated glass shall be of 7.76 mm minimum thickness with 0.76 mm minimum thickness of PVB interlayer and of select float quality, WAVE FREE as per IS: 2553(Part-II) – 1992.The approved brands for glasses are IMPACT and BANGALORE SAFETY. Ceramic coating of suitable width shall be provided on periphery.

20.2 The rear end saloon glass in single piece shall be bonded with P.U. sealant to the rear end FRP profile. The glass shall be of 5.0 mm thick, toughened float quality safety 'bronze' tinted glass as per IS:2553 – 1990 & IS:2835 – 1987. The size of the glass shall be 1950 (Width)X 1035(Height). Ceramic coating of suitable width shall be provided on periphery.

20.3 The driver's door and its opposite entrance door window glasses be provided with clear toughened glasses only.

20.4 Foot board steps shall be provided with approved good quality LED strips throughout the edges on all sides.

20.5 Below cant rail level and below the upper berth, provision be made for fixing the curtain cloth by providing aluminum extrusions hooks.

20.6 The cabin area shall be provided with glasses in 5.0mm thick toughened curved clear glasses on both sides.

20.7 The lettering work in vinyl stickering to be done on the **fixed window glasses** and rear end glass from inside as mentioned below:

" BREAK ANY GLASS IN EMERGENCY FOR EXIT "

In Telugu:

" అత్యవసర సమయంలో ఏ అద్దమునైనను పగులగొట్టుము "

20.8 Approved makes of EPDM rubber and flock channel are Rubber Extrusions & Moulding/ ASP/ALP.

20.9 Approved makes of P.U sealants are Total seal /Sikaflex/3M India/Bostik / Anabond and Henkel.

21.0 PASSENGER ENTRANCE:

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21.1 The passenger entrance cum exit and Stepwell of three to four raised (Trapezoidal) full type has to be provided which has to be properly suit to the pneumatically operated in-swing door. The door can be operated by approved make and fail safe highly reliable pneumatic actuating mechanism i.e., shall have 'open', 'close' and 'manual' stages and shall have provision to open from inside and outside in case of emergency.

21.2 The in-swing type passenger door be provided with 1 No. good quality highly reliable Pneumatic Automatic Door Closure assembly of a reputed make. The assembly consisting of Air Cylinder (Aluminium body) – Double acting cylinder with adjustable cushioning at both ends conforming to IS 6431, 63 mm Dia. Bore, 200 mm stroke (operating pressure of 0.5 to 10 bar), front and rear brackets, Flow control valve, C.K. Connectors, Solenoid valve with relay, Air filter and Flexible Polyurethane tube of 6mm ID x 8 mm OD.

21.3 The step well assembly structure be fabricated by using 40x40x6mm M.S. formed angles, 100 x 50 x 6mm M.S. rolled channel and 40x20x2mm GI tube. Step well step be covered with 10swg aluminum chequered sheet. The steps raised portion and step-well truss portion be provided with 0.70 mm thickness stainless steel sheet. All the sides of the step- well shall be bolted apart from welding perfectly to the floor structure. Aluminum step- edge extrusions shall be provided on the steps.

21.4 The door frame shall be made in rectangle tubes 40 x 20 x 2 mm thick covered with 0.9 mm GI sheet from outside and 0.5 mm SS sheet from inside. Doorframe height shall not be less than 2150 mm. Door frame verticals should be provided with side valence rubbers.

21.5 The in-swing door should have one window at top side with horizontal sliding glasses of 5.0 mm thick toughened clear glasses with locking arrangement and one 5.0 mm thick toughened clear glass pasted to the door frame below the window frame with PU sealant. The door rubbers along the edges shall ensure dust/water leak proof. SS tube of 25mm OD x 2mm shall be provided diagonally.

21.6 The pneumatic door pipes shall be firmly clamped with tags and shall cover with corrugated sleeve, care shall be taken for chaffing of pipes while routing through structure.

21.7 Foot board steps shall be provided with approved good quality LED strips throughout the edges on all sides.

21.8 Foot board is to be illuminated with one LED light assembly by placing at third step vertical portion facing towards door and having stickering on light glass area as **"APSRTC WELCOMES YOU"** which may not to affect the visibility of steps to passenger while boarding or alighting.

21.9 The bottom of the door shall be provided with brushes PVC / Plastic bristle to clean the tread of 1st step.

21.10 One assist rail in stainless steel 25 OD X 1.6 mm thick of 304 grade shall be provided in sunken type on the inner side of in-swing door. One PU handle of min. 400 mm length shall be provided on inner side of in-swing door. One assist rail cum grab rail in stainless steel 32 mm dia x 2 mm of 304 grade shall be provided from floor to cant rail to partition wall.

22.0 EMERGENCY DOOR:

22.1 Emergency door shall be provided at rear end at gangway level.

22.2 One Emergency door extending from saloon raised floor with a height of 1500 mm at rear end shall be provided as per the layout and drawings. The door is to be fixed to the pillar with two heavy duty hinges of 6 mm thick. The door is to be provided with one small bronze tinted glass of 5.0 mm at top side and with one heavy duty lock operable from inside.

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22.3 The location of the emergency door is to be exhibited from inside and outer periphery by providing reflective tape in red colour.

22.4 The door shall be provided with one stainless steel railway type latch of 6 mm thick from inside.

22.5 One emergency hooter has to be provided at inner side top area of the door. It has to meet the latest norms of APMVR/CMVR/AIS:052.

22.6 Red colour LED light has to be provided at Emergency door area inside the saloon.

23.0 DRIVER'S DOOR:

23.1 The driver's door shall be provided on right side from cabin floor level to a height of 1570 mm with a width of 860mm. The door frame in GI rectangle tube 40x20x 2 mm shall be covered with 3 mm ACP of approved FR grade from inside and 0.91 mm G.I. sheet from outside. Door frame should be provided with valence rubber on three sides. The inner face of door aperture shall be provided with side ball type door seal rubber duly providing formed L section in 20 G GI sheet.

23.2 The door shall be fitted with one vertical sliding type window with glasses of 510 mm (H) x 485 mm (w) and another window at bottom of frame with horizontal sliding glasses of size 260mm (W) x 260mm (H).

23.3 The window frame shall be provided with clear toughened sliding glasses with locking arrangement. The door window glasses shall be of 5.0 mm thick toughened safety clear float glasses. The door shall have one heavy-duty door lock of approved MSL make and type with outer handle, one locking latch from inside and dove tail catches. The door shall be fitted with two forged hinges on 'A' pillar with suitable reinforcements.

23.4 All the door openings shall be provided with canopy in 0.91 GI sheets and finished with black powder coating.

23.5 One assist rail of 25 mm dia x 1.6 mm thick in stainless steel of 304 grade and in 2B finish shall be provided on the interior side of driver door with suitable Nylon steel brackets.

24.0 PASSENGER BERTHS:

24.1 Full berth size partitions with approved widths to accommodate 5 rows of berths in five bays as per approved drawings can be fabricated by using GI tubes of size 25x25x2mm for verticals, horizontals and diagonals duly welded to the floor structure, side structure and roof structure. Center to center distance between partitions should be 1900mm.

24.2 Horizontal reinforcement flats of 3mm thickness shall be provided for fitment of light luggage rack cum bottle holder, Socket of Mobile / Laptop charger, Mobile holders and Individual lights.

24.3 A hat section of 100W X30H for fitment of mobile charger Both USB and 5-pin socket shall be provided with switch control at driver, individual laser type LED reading lights with switch has been provided at partition head area of each berth.

24.4 A Cell phone pouch of approved make has to be provided at each berth, on berth partition area.

24.5 Width of RH side berth shall be 1220mm and LH side berth be of 610mm.

24.6 The structure of berths has to be fabricated with M.S. 'L' angle of size 40X40X3 mm located at 416 mm above the cross bearer top level (with belly dicky).

24.7 The height between the berths (bottom of lower berth to bottom of upper berth) and between the upper berth bottom to interior roof ceiling should be 1020mm.

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24.8 M.S. Top hat section of size 20x100x20x2mm in 2 rows for double berth and 1 row for single berth have to be provided horizontally on berth floor structure.

24.9 Shall provide 0.5mm SS sheet at all places of the bottom berths wherever the luggage booth is not provided and are to be provided with 10mm thick BWR plywood conforming to IS 710 / IS 393:1989 of reputed make. Both sides of plywood shall be applied with wood primer.

24.10 Passenger berths are of PU Cushion with flat type (Corona type) of size 1860x600x100mm for each passenger has to be provided. Berth cushions to be covered with good quality Rexene.

24.11 At partition area, individual back pads are to be provided for each berth. An inclined formed section of 0.91mm GI has been provided at 460mm from partition top end at each berth as same as back pad. The dimensions of back pad are 700 H X (400 X 560) W X (140 X 100) T and with as per the Homologation Certificate of the firm which has to be covered with approved shade Rexene.

24.12 One Arm rest with pad has to be provided between back pads at all twin berth areas.

24.13 In twin berth areas, removable type pads have to be provided between the berths.

24.14 A top hat section of 20 X 120 (slant) X 340W X 120 (slant) X 20 of formed GI has been provided with AC Duct at top center area of twin berths and single berths for provision of AC louvers.

24.15 The supports on both ends of the berth provided as support for passengers in gangway side shall be covered properly with approved good quality Rexene to avoid injuries to the passengers.

24.16 The berth details with back light and APSRTC Logo has to be provided at roof top in gangway at each partition to find their berths by the passengers.

24.17 SIX speakers of 4" size of approved make and brand (Five in saloon and one in cabin) with separate switch control for side speakers shall be provided at roof top in saloon gangway area. The speaker fitted in cabin has to be provided with volume control.

24.18 Ladder made out of SS tube of 20 x 20 x 2 mm of width of 300 mm has been provided between the lower and upper berths.

24.19 Grip handle of 250mm long be provided for each compartment to facilitate easy movement of passengers of upper berths.

24.20 E 02 Nos. of Stopper strips of SS pipes with FRP Pads covered with Foam rexene are to be provided equally spaced for the berths towards gangway side.

25.0 Interior themes (Prior approval of the Corporation shall be taken in writing before fitment of the interior Themes):

25.1 Curtains	:	E 2 Sets – E.2 sets, Beige-117 (Pramod Traders)
25.2 Vinyl floor mat	:	2 mm SR Beige.
25.3 Rexene at A/C Duct area	:	Dotted Maroon.
25.4 Back pad center portion	:	Dotted Beige
25.5 Back pad flaps	:	Dotted maroon.
25.6 Berth Cushion	:	Dotted Beige.
25.7 Pin mat	:	Green / Blue.

26.0 **LIGHT LUGGAGE RACK CUM BOTTLE HOLDER:** Light luggage rack cum bottle holder fabricated with sizes of 16OD x 1.6mm SS pipe 350x400mm for single berth and 350x900mm for double berth has to be provided and mounted to the partition at leg area.

27.0 **DRIVER'S SEAT:**

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27.1 The Aesthetically designed pneumatically adjustable heavy duty driver seat of UNO MINDA or any approved source of APSRTC shall be provided. The OE driver seats supplied with chassis shall be returned to the Corporation. The driver seat frame mounting on cabin floor shall match the OE mounting position.

27.2 The seat shall have to and fro, up and down adjustment of 100 mm with reclining back and to be fitted 350 mm away from steering wheel edge when the seat is fully forwarded.

27.3 The height of driver seat bottom shall be 450 mm when measured in fully lowered position.

27.4 There shall be a thigh clearance of 200 to 260mm between steering wheel edge and driver seating position.

27.5 The driver seat shall be so located that the center line of driver seat shall be 705 mm away from the center line of body.

27.6 The driver seat shall be provided with "ELR" type safety belt of M/s. Autoliv or Rane make conforming to AIS: 052.

27.7 One foldable type driver berth shall be provided in cabin by utilizing the space available in the drivers partition above the level of driver's seat. The frame shall be made in GI Square tube 30x30x2 mm with overall size of 1600x480 mm with an extension of 300mm. The rest berth shall be finished with powder coating in black colour. The berth cushion shall be with 50mm P.U. foam mounted on 8 mm plywood and upholstered with 'Raymond Dobby or Sparkle/BMD/RELIANCE make' fabric of approved shade. The driver berth bottom area shall be covered with pre-coated GI sheet of 0.70 mm.

28.0 REAR LUGGAGE BOOTH:

28.1 A luggage booth at rear end shall be provided across the width of the body and also on right side in rear most bay (in 'L' shape) as indicated in the respective drawings. However, the rear luggage booth has to be provided duly giving access flap doors on both LH and RH side of the rear luggage area, in case rear luggage booth door is not provided. Two ISJC 75X40 Channels extending from rear end structure, connected to chassis long members by two ISJC 75X40 Channels placed vertically and welded to web mounting plates of last cross bearer. Remaining booth floor shall be fabricated in MS angles 40x40x3 mm.

28.2 Booth interior vertical sides shall be provided with 0.91 mm GI sheet with embossing and hammer tone paint.

28.3 All flap doors including rear luggage booth door shall be in 2.5 mm thick Alu. Sheets which all are to be provided to accommodate 120^0 openings. Rear luggage booth door has been provided with Prakash type seven lever center Lock and two budget locks provided on two sides with 550N telescopic balancers.

28.4 All luggage booths (both side and rear) floor bottom area including Belly dicky shall be laid with 10 mm compressed chequered plywood in FR grade and Aluminium 5 bar/Diamond chequered plate of 2 mm thick duly bolted with M6x40mm bolts at a pitch of 100 mm to floor structural members with Dust proof rubber of 1.5 mm shall be laid at joints and edges of the cheq. plate to avoid dust/water entry into the booth. Intermediate bolting shall be done with M8 bolts at edges and 75x40 channels at a pitch of 200mm.

28.5 Rear luggage booth flap door shall be provided with two 550N telescopic balancers of approved makes and VOLVO type flap door locks with indicator light type flap door locks on both sides. Booth flap doors shall be provided with door seal rubber to make it dust / water leak proof. The balancers shall have ball joints at both ends.

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28.6 In the Battery box, above the battery, horizontal partition shall be made for tool box up to the saloon floor level. Toolbox shall be provided with 38x38x3 mm M.S. pressed angles, 2mm Aluminium chequered sheet and rubber mat.

29.0 SPAREWHEEL CARRIER:

29.1 One cage type spare wheel carrier shall be provided on LHS behind rear wheels. The OE spare wheel carrier if supplied with the chassis is of cage type, it shall be located as shown in the structural drawing. The carrier shall be mounted on chassis duly providing the vertical and horizontal supports in ISJC 75X40 Channel, gussets.

29.2 If the chassis are not supplied with cage type carrier, the firm shall provide one such spare wheel carrier. Care shall be taken to avoid fouling of spare tyre with any of the chassis units / spares under any circumstances.

29.3 The spare wheel carrier area is to be provided with one flap door similar to side luggage booth. The cage shall be suitable for tubeless tyre of 295/80/22.5.

29.4 One LED light with switch to be provided in spare wheel carrier area.

30.0 BATTERY BOX:

30.1 The battery box under the saloon floor as per the layout drawing on LH side shall be fabricated in MS angle 40x40x6 mm and MS flat 40x6 mm. The batteries shall be mounted on a turning / PUSH and PULL type sliding cradle that shall accommodate two 12V batteries of size 521Lx292Wx248H mm. The cradle shall have bush and pin mounting mechanism on LH side corner and castor wheel of good quality on RH side inner corner for swinging out the cradle. Locking arrangement shall also be provided for cradle to arrest movement while in operation. If any specific recommendations by OEM, the batteries mounting will be continued as per OEM, but it should be accessible for maintenance of batteries

30.2 Paneling of inside walls is to be done with 0.91 mm GI sheet followed by Hammer tone coating and the bottom of the box shall be provided with 12 mm compressed chequered plywood. Complete inner surface is to be over laid with 0.5 mm stainless steel sheet. The bottom of the batteries in cradle shall be provided with 12 mm-compressed plywood and acid resistant rubber mat.

30.3 Batteries shall be provided with suitable clamping, wood packing to prevent vibrations when the vehicle is in operation. One cutout is to be done on longitudinal wall for passage of battery cables and is to be provided with 6 mm balata with an 'X' type cutting. Four rows of full-length battery cables with out joints shall be connected to the battery cut-off switch terminals. The terminals and cables should be firmly clipped in position with cable tie and soldered. One LED light shall be provided in Battery Box for illumination.

30.4 One guard rail of SS 25 X 1.6mm pipe with brackets to be provided at front side to safeguard the batteries.

31.0 The following care shall be taken while fabricating A/C Bus bodies.

31.1 The A/C unit shall be mounted on the vehicle by fabricator as per the guide lines of manufacturer.

31.2 The roof structure shall be fabricated according to the mounting details of A.C. unit manufacturer. Suitable reinforcements in 6mm plate shall be provided at mountings. A/C

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mounting shall ensure dust proof/water leak proof duly sealed with P.U. sealants of approved brands. Additional reinforcement has to be provided in roof structure to withstand weight of A.C. Unit.

31.3 A.C. ducting shall be provided in 0.91 mm G.I. sheet with 6 mm Nitrile foam Insulation with strip type clamps. The approximate cross-sectional area of duct shall be 100 square inches. The duct ends on both sides shall be inter-connected at rear end. Technical support of the AC manufacturer may be taken at the time of fabrication.

31.4 The duct shall be provided with console panel with E 2 twin AC louvers at each twin berth area and E 1 twin AC lovers at each single berth area. The AC louvers are to be provided of VOLVO type of Pacoline make or APSRTC approved sources only.

31.5 AC ducting shall also be provided with six openings with grill covers on each side for even circulation of air.

31.6 AC ducting shall be extended up to driver seat area and attender seat area in cabin to facilitate sufficient cooling in cabin.

31.7 AC Cab Command control panel shall be located on the dash board panel as per the manufacturer's guidelines.

31.8 The routing of compressor hose pipes, condensate drain pipes shall be made concealed and ensure dust/water proof. The compressor mounting area in cabin shall be provided with flap doors on sides and at top to have access to compressor and belts/pulleys.

31.9 The flap door at AC Compressor shall be fabricated with frame and embossed in MS mesh of 1.6 mm thick and to be hinged at top side.

31.10 The air flow rate at any vent shall not be less than 4.5 m/sec.

31.11 No luggage carrier shall be provided in A/C buses.

31.12 Two sets of Curtains of venetian blinds type in approved shade shall be supplied along with bus. Curtain rails (SP-445) shall be provided on both sides at cant level with nylon hooks. A suitable retaining hook of ABS/PVC shall be provided for curtains on each pillar. Hooks or curtain rods

32.0 ELECTRICAL WIRING AND OTHER FITMENTS:

32.1 The earth-return system of wiring should be used. All automotive cables used shall be of approved make and brand conforming to IS: 2465 – 1984 quality covered with PVC sleeve as per IS: 1951-1961. Wherever the cables have to pass through roof and side structures, PVC conduits of ½" dia shall be provided. There shall not be any loose or hanging cables, and if they pass through holes in panels or structural members other than roof and side structures, rubber grommets shall be provided in the holes of such panels and structural members and shall be securely clipped as near as practicable to such rubber grommets to avoid chaffing.

32.2 Wiring shall be provided with suitable connectors for all lighting and audio/video points including additional tapping points for any future requirements. The saloon wiring shall be provided through wire casing fitted along the side wall in hat racks that it shall be easily accessible at all points and there shall not be any need to strip major paneling of body to carry out repairs. Any wiring, which has to run along the chassis frame shall be securely, clipped to ensure that there shall be no chaffing with any of the moving parts. Further care shall be taken to route such wiring in such a way that it is not subjected to splashing of oil, water, mud etc.

32.3 The battery main cable of size 398/0.40 mm shall be provided as required duly using good quality lugs with proper soldering, bolting and insulation etc. There shall be no joint in battery cables.

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32.4 The saloon and cabin areas are to be provided with 5 nos. and 1 no of LED roof light assemblies of approved sources respectively. Out of the 5 roof lights in saloon, 2 lights are to be provided with in-built night lamps of blue colour. This is apart from the LED strips fitted in the roof area on the gang way in full length. The assemblies shall be of approved make and specifications as per the Annexure-III.

32.5 The location of the lights shall be as per the lay out. Suitable tapping plates in GI sheet of 3mm thick to be provided in roof structure for fitment of LED lights. Center hat rack 50 mm height from roof shall be provided with proper reinforcement at roof except ac roof doors. Roof led lights fitted to this hat track in sequence.

32.6 All OE electrical items shall be retained and kept in working condition.

32.7 One Butterfly type Heavy duty wiper machine of 120W capacity 100 N-M with twin Suitable length wiper arms blades of 32" length of CIRT/ARAI approved make shall be provided for front windshield glass below the front waist rail on left side. The mounting bracket (formed 'L' in MS 6 mm plate) shall be welded to the structural members in such a way that it shall not interfere while removing radiator.

32.8 One Dual tone Air horn of Roots/ELGI make shall be provided. In addition to the OE electrical horn, one more electrical horn conforming to type -3 of IS 1884- 1993 shall be provided. The noise levels of these horns should be between 93dBA to 112dBA.

32.9 A 12-pole disc type fuse box with independent fuses designated for every electrical circuit shall be fitted on switch board provided at cant level. The current carrying capacity of a circuit shall be 1.5 times the load current of that electrical circuit. Maximum current carrying capacity of a circuit shall not exceed 15 Amps. The fuses used shall conform to IS-4063 /1982.

32.10 Modular switches and sockets of in approved make and shade as per IS: 9433 –1980, 230Vx5 Amps shall be used for switch board, cell charging points. Switches are to be located on top side of driver door making a cutout in the hylam sheet of inner cabin panel / on Dash board fusible to driver to easy to operate. Non metallic shielding is to be provided in side structure behind the switches to avoid any short circuit. All switches / fuses shall be provided with metallic plate labels for indication.

32.11 Cable ends shall be suitably crimped with lugs/soldered so as to with stand vehicle vibrations. The inter connections shall be made through couplers/ junction boxes / terminal blocks only. Weather proof connectors shall be used for connecting cables which are exposed to atmosphere to avoid water/moisture ingress during use.

32.12 The fabricator shall supply electrical wiring harness diagram of the bus along with the vehicle.

32.13 Four headlights with parking & signal lamps of VOLVO type has to be provided. The OE head lights supplied with the chassis shall be returned back to this office along with the bus. Head lamp assemblies shall be fitted at a distance not more than 400 mm from the extreme outer edge of body and not more than 1200 mm height from the ground.

32.14 Front direction indicator lamps LED type of 2" dia shall be provided below 1500 mm height on the outer edge of body in amber colour. In addition to this, four more direction indicator lamps in amber color shall be provided on the lateral side of the body at wheels and below 1500 mm height from the ground.

32.15 E 1 AMW type indicator light to be provided on both sides at front wheel arch top area.

32.16 Height marker lamps of LED type in white colour 2 no's at front and in red 2 no's at rear shall be provided. The marker lamps shall be above windshield glass at front and above cant level at rear on maximum possible outer edges. Care shall be taken to prevent water entry from these lamps.

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32.17 The tail lamps mounting shall not exceed 1500 mm from ground, 400 mm from the outer edge. The LED type tail lamps of 5" dia , four in red, two in amber and two in white colour shall be provided. Meta Modern type good quality LED tail lamps having Poly-carbonate covers shall be provided.

32.18 Two numbers fog lamps shall be provided in the front at the convenient place in the Bumper.

32.19 Individual Laser type LED lamp with switch and USB charging port with 5 pin has to be provided for each berth.

32.20 Rear number plate shall be provided with one LED type light for illumination or as per Homologation.

32.21 One 5 amps 3-pin sockets and switch along with gang box is to be provided on dash with 24V connections for connecting TIMS.

32.22 One reverse horn/alarm (4 tones) shall be provided with noise level not more than 100 dBA if not supplied with the chassis.

32.23 One Buzzer or electric bell should be provided in the Driver's cabin and bell switch in the saloon nearer to driver partition.

32.24 OE battery cut-off switch supplied with chassis shall be provided with separate fuse control. In case of non-supply of battery cut-off switch along with the chassis, IGSA-552 or part no. LP-134/3 of Lucas India Services Ltd., make shall be fitted in driver's cabin with a label "Battery Cut-off switch". The battery cut-off switch to be located 300mm above the cabin floor on 3mm GI plate provided in side structure.

32.25 PVC conduits of ½" dia are to be provided for routing the cables and non-metallic shielding is to be provided behind the socket in side structure to avoid any short circuit.

32.26 One MCB of approved make with a capacity of 5 amps shall be provided in AC circuit on driver partition in cabin.

32.27 Six speakers of 4" size of Boston (Si-600) or Pioneer (TS 1641 GS) or any approved make and brand speakers (5 provided in saloon and one in cabin) shall be provided. The speaker fitted in cabin has to be provided with separate switch.

32.28 One Pure sine wave type of Power inverter of approved make Amaron / V-guard / Argee / Neetu solar with 2 KVA capacity shall be provided in the driver's cabin. One power switch shall be provided on partition in cabin for tapping power. The inverter is to be fitted on cabin floor beneath the co-driver rest berth with suitable flat form and clamps. Approved make amplifier with USB port is to be provided in Driver cabin.

32.29 One Public Addressing System with mike with holder at right side nearer to driver for easy announcement without difficulty has been provided.

32.30 LED type light assemblies of 12 LED's, 5W capacity of approved make are to be provided for illumination of Battery box, side luggage booths (each two in a booth), spare wheel carrier (one) and in rear luggage booth (each two in a booth).

32.31 Amplifier - Ahuja make DPA- 370 Model and Sony make Digital Media Player of DSX-A100U model shall be provided.

32.32 Three Nos. of Surveillance cameras of approved make with night vision and one rear view camera with requisite connectors and cables shall be provided. One DVR with 15 days recording facility and a CC camera view monitor with 7 ½ X 5 ¼ size which has to show all the four cameras views when vehicle is in front moving also to be provided. One Camera has to be fitted to the A pillar on left side for front view of road, One Camera at driver side top fixed panel focusing towards driver and One Camera for Saloon which has to be fitted to partition to cover front and rear corner seats of both sides and the rearview camera to be fitted at top center of the rear FRP at outside of the body.

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32.33 Monitor with 7 ½ X 5 ¼ size shall be provided in dash board FRP for display of all the four cameras views while vehicle is in front moment.

32.34 Never connect the circuits with twists & knots. Never tap power by slashing the main harness.

32.35 One electric fan of 24V, 8" dia. of REMI make shall be provided in cabin for driver.

33.0 BODY PAINTING AND COLOR SCHEME:

The exterior body to be painted with approved make & brand Polyurethane 2K metallic paints. The body under frame and chassis shall be painted with anti-corrosive, sound deadening and abrasive resistance bitumen based black paint of specified make. The exterior painting process shall consist of carefully cleaning and etching followed by surface leveling with polyester putty application, P.U primer surface coats, finish coat and glaze coat as per the recommendations of paint manufacturer. The quality of painting process and gloss should be of superior class. The bus should be painted in a booth with baking arrangements for superior finish and longer life. The tentative color shades are as follows:

<table>
<tr><th>Shade</th><th colspan="2">Shade Code</th></tr>
<tr><td>Base Colour</td><td colspan="2">Pearl White - MA 014.50 of BASF</td></tr>
<tr><td rowspan="2">BLUE</td><td>DARK BLUE</td><td>Hyundai-U 65501 Sparkle Blue Pearl</td></tr>
<tr><td>LIGHT BLUE</td><td>RAL 5015 Sky Blue</td></tr>
</table>

33.1 Color Scheme shall be as per APSRTC approved scheme. The color scheme may be modified or changed at the time of execution of bus body fabrication as per the orders of Chief Mechanical Engineer (C&B).

33.2 Lettering and Sticker work is to be done as detailed below:

a. APSRTC monogram is to be provided as per SKETCH1516.

b. APSRTC website 'Book Your Tickets online @ www.apsrtconline.in' is to be provided on both sides at side fixed glasses and at rear end FRP in white radium sticker with Times New Roman font in two rows.

c. Front wind screen glass is to be provided with sun control film up to 300 mm from top side edge.

d. 'APSRTC' in white radium sticker with Times New Roman font front in 7" size is to be provided on front wind screen glass on top side.

e. Labeling is to be done with red vinyl sticker for battery box, luggage booth, diesel tank, air cleaner, jack point and spare wheel.

f. Seat nos. as per lay out are to be exhibited in red vinyl sticker with letter size 25Hx6TH on hat rack beading.

g. 'Suswagatham' and 'Happy Journey' are to be provided in vinyl sticker of suitable colour at top side of entrance door and on driver partition respectively.

h. A slogan in Telugu shall be exhibited as follows on the partition wall.

"ఈ బస్సు మనందరిది !
దీనిని పరిశుభ్రంగా ఉంచుదాం !! "

33.3 Spare ladder shall be provided.

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34.0 Fire detection & suppression system (FDSS) in engine compartment and Fire Detection & Alarm System in driver cabin & passenger compartment shall be provided as per AIS-135.

34.1 In the case of vehicles having an internal combustion engine or a combustion heater located either to the front or rear, the engine compartment shall be equipped with a fire alarm system providing the driver with both an acoustic and a visual signal, and activating the hazard warning signal, in the event of sensing either abnormally high temperature or rate of temperature rise, or both in the engine compartment and in each compartment where a combustion heater is located.

34.2 In addition to the fire alarm system, vehicles shall be equipped with a fire suppression system in the engine compartment and each compartment where a combustion heater is located.

34.3 The fire detection & alarm system and the fire detection & suppression system shall be automatically activated through a fire detection system. The detection alarm system shall be designed so as to detect a temperature in the engine compartment, and in each compartment where a combustion heater is located in excess of the temperature occurring during normal operation. There shall not be any false alarm.

34.4 The fire alarm system and the fire suppression system shall be operational irrespective of whether engine has been started and the vehicle's attitude.

34.5 The fire detection & suppression system shall be installed according to the system manufacturer's installation manual.

34.6 An analysis shall be conducted prior to the installation in order to determine the location and direction of suppression agent discharge point(s) (e.g. nozzles, extinguishing agent generators or extinguishing agent discharge tube or other distribution points). Potential fire hazards within the engine compartment and each compartment where a combustion heater is located, shall be identified and discharge point(s) located such that the suppression agent will be distributed to cover the fire hazard when the system activates. The spray pattern and direction of discharge points as well as the throwing distance shall be ensured to cover identified fire hazards. The system shall also be ensured to work properly regardless of the vehicle's altitude, road conditions etc.,

34.7 Fire hazards to be taken into account in the analysis shall at least consist of the following: Components whose surface may reach temperatures above the auto-ignition temperature for fluids, gases or substances that are present within the compartment and electrical components and cables with a current or voltage high enough for an ignition to occur as well as hoses and containers with flammable liquid or gas (in particular if those are pressurized). The analysis shall be fully documented.

34.8 The suppression system shall be scaled from the tested system, based on the total gross volume of the engine and auxiliary heater compartments where the system is to be installed. When measuring the engine compartment and the auxiliary heater compartment, the gross volume of these compartments shall be measured, i.e. the volume of the engine and its components shall not be subtracted.

34.9 The scaling of the system includes the mass of the suppression agent, all discharge points and the mass of the propellant gas container, if applicable. The system pressure shall remain the same as in the tested system. If the system includes a discharge tube for the extinguishing agent, the length of the tube shall be scaled without nozzles. It is acceptable if the suppression system has more extinguishing agent and/or more discharge points

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and/or a longer discharge tube for the extinguishing agent and/or more propellant gas than required according to the scaling models found.

35.0 MISCELLANEOUS FITTINGS TO BE PROVIDED:

35.1 Two Fiber /PU handles of approved make with 100 mm size are to be provided at waist level of cabin front end. Two footsteps on the bumper shall be provided for giving feasibility to clean the front windshield glasses. Footsteps should not protrude outside the bumper.

35.2 Two electrically operated rear view mirrors (RVMs) of convex type conforming AIS: 001 with fiber/ABS covers and suitable brackets, shall be fitted on either side of body at cant level with proper reinforcement. The fitment of the rearview mirrors shall comply the provisions of AIS: 002.The approved brands are Pacoline /Manas /Engine Tech.

35.3 The registration number shall also be painted and exhibited on the driver's partition facing the passenger seats. The registration number shall also be painted on the right and left side of the body as per the CMV Rules, 1989.

35.4 Provision shall be made for easy removal and fitment of air cleaner during the maintenance duly providing flap doors.

35.5 Two Roof hatches with inbuilt exhaust fan of MSL or Spheros or any approved make source of APSRTC shall be provided in saloon area with proper lid, EPDM U rubber sealing and holding mechanism. Two numbers of roof Air ventilators cum emergency roof hatches (522 x 966mm) having inbuilt exhaust fan are to be provided in the Passenger Saloon. Roof Air ventilators to be got approved from CME(C&B).

35.6 One roof Air ventilator of size 19"x15" shall be provided in the Drivers Cabin as shown in the drawing. The lid of cabin roof ventilator shall be of 14 SWG Aluminium sheet. Pull and push type mechanism with gas springs be provided with Grip handle. Ventilator shall be perfectly dustproof by providing dustproof rubber.

35.7 The OE bonnet to be retained if the chassis is supplied with bonnet.

35.8 In the event of any premature failure or improper workmanship, the firm should send technical persons within 72 hours of intimation for body maintenance and repair.

35.9 Two fire extinguishers of B Class type approved make and dry chemical type 5.0 kg capacity conforming to IS: 2171 of 1985 suitable for 'A' 'B & C' class of fires shall be provided with suitable MS clamping arrangement, one in cabin and one under the rear most seat.

35.10 Retractable cable wired pointed glass breaking hammers with suitable clamping and strap are to be provided on every window pillar (10 nos) for breaking glasses in case of emergency.

35.11 Electric buzzer with 6 nos. bell switches of approved type to be provided.

35.12 One roller type Sun Visor of approved source which has to be covered the complete front wind screen glass with proper width shall be provided in driver cabin.

35.13 Rubber mud splashguards of size 560x457 mm for rear and front wheels to be provided. Mud wings shall be fitted with bolt and nuts in order to facilitate for removing and refitting during the maintenance.

35.14 First aid box of size 300x200x100 mm in stainless steel with leather straps and locking arrangement shall be provided in driver's cabin. First aid medicine kit containing the items mentioned under Rule 138(4)(d) of the latest M.V. Rules and MED Lr.Dt.19.04.23 shall be provided in the box.

a. Sterilized dressings or cotton bundles(15-25 gms) ... 2 pcs.
b. Elastic bandage for wounds and burns or roller bandages ... 5 pcs.
c. Betadine ointment Big or a tube of antiseptic cream containing

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	0.5% of cetrimide B.P in a non-greasy base	... 1 pc.
d.	Dettol (plastic Bottle)	... 1 pc.
e.	Neosproin / Nebasulf	... 1 pc.
f.	New sealed blade	... 1 pc.
g.	Burnol ointment	... 1 pc.
h.	Water proof plaster or white adhesive tape	... 1 pc.
i.	Band – Aid flat/round or sterilized elastic plaster	... 4 pcs.

35.15 Colour shades painted on the bus shall be displayed along with RAL numbers and colour codes marked on a sheet of 150x150mm size and location will be communicated during fabrication.

35.16 One footstool of size 450x150mm finished with 12 mm ply, vinyl mat and beading at edges shall be provided in the driver cabin at foot control pedals.

35.17 The entrance door, emergency door and driver's door shall be provided with water drain canopies at cant level in 0.91 mm GI sheet with black powder coated finish.

35.18 One assist rail of 25 mm dia x 1.6 mm thick and 600 mm length in stainless steel of 304 grades and in 2B finish shall be provided on the interior side of 'B' pillar at driver door.

35.19 One assist rail of 32 mm dia x 1.6 mm thick in stainless steel of 304 grade and in 2B finish shall be provided left side of cabin extending from floor to a height of 1500 mm following the side pillar and then horizontally landing on driver partition.

35.20 Suitable Nylon sockets shall be used for fitment of all assist rails.

35.21 LED destination boards of size 1800X 220 mm & 900 X 220 mm one each (as per UBS-II specification) with built in controller and LCD display for front LED destination board with a provision of numbers from 0 to 9 and Up & Down buttons to select service number & route, shall be provided **at front and rear** end of bus with proper tapping & secured clamping and Communication cable to be provided from Front master LED board to rear LED board for display of same route course details in both the boards.

35.22 Tapping of compressed air for windscreen wiper, and air suspension should be taken from port no.24 of system protection valve or auxiliary tank with proper unions, 'T' joints Metallic pipeline of 5.0-mm dia. with copper coated interior shall be used for tapping air. The pipeline shall be firmly clamped in position.

35.23 One attendant seat with collapsible bottom cushion (size: 400x400x50mm), fixed back (size: 400x300mm) and safety belt shall be provided in the cabin. The frame shall be made in SS sq. tube 30x30x1.6 mm. The cushions shall be with 40 mm P.U. foam mounted on 8 mm plywood and upholstered with 'Raymond Dobby/sparkle' fabric of approved shade.

35.24 Retro-Reflective Conspicuity Marking tapes of Diamond grade 50 mm wide conforming to AIS: 90 of approved make shall be bonded to the body sides as per the sketch provided. The cumulative length of tapes provided shall not be less than 80% of length of that side. These tapes shall be white in color at front, yellow on sides and in red at rear of the body.

35.25 An access door shall be provided in front fascia at brake valve and clutch fluid reservoir.

35.26 There should be enough provision in dash to reach the radiator tank for filling coolant. One more access opening shall be enough provision in dash at instrument panel to reach clutch fluid reservoir access door shall be provided at top foot step of passenger foot board for accessibility of fuel feed pump maintenance.

35.27 Driver's cabin shall be suitably ventilated. Below dash structure two Aluminum disc ventilators shall be provided at 'ABC' foot pedals.

35.28 Provision to be provided on front bumper top area on both sides for cleaning wind screen glass. Two Fiber handles of 100 mm size are to be provided at waist level of cabin front end.

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35.29 One SS handle of 200 mm size to be provided on outer side of driver door.

35.30 Head light assemblies should be fitted to a rigid frame welded to front end structure. Head light should not be mounted on front end FRP.

35.31 Provision of two inspection doors with locks and sealing rubber for air suspension bellows attention.

35.32 A power connection has to be provided for the provision of VMU.

35.33 All the other mandatory accessories as per CMVR/APMVR/AIS: 052 shall be provided.

35.34 Turf / Pin type good quality decorative mat of approved make shall be provided for entire length of gang way and cabin floor from step well to partition. The material should be Synthetic Resin, underlay black latex backing with flower buds with leaves of 6 Nos. per Sq. inch and 48 Nos. leaves per Sq. inch and each bud to have 8 leaves. The pile height shall be 14 mm (+/- 2 mm) with base.

35.35 All unutilized Chassis components to be returned at the time of delivery of bus.

35.36 At right side front corner at waist area, one peep window has to be provided.

35.37 Stainless steel sheets, tubes, pipes etc. should be of Jindal /any other make approved by APSRTC only has to be used.

35.38 One TIM holding stand with proper dimensions with 0.91 GI sheet which has to be covered properly and neatly with carpet/rexene has to be placed on dash board nearer to the left hand of driver with easy accessibility.

35.39 A footstool for driver to be provided in Aluminum 5-bar cheq. Sheet 3.00 mm and Indal 2651 used for legs preparation.

35.40 Monitor with 7 ½ X 5 ¼ size shall be provided in dash board FRP for display of all the four cameras views while vehicle is in front moment.

35.41 The fabricator shall fabricate 12M model buses as per their Homologation Certificate. However, they shall adhere to the broad specifications of APSRTC such as belly dickey for 12M models, back pad for berths of sleeper buses and any other requirement specified in these specifications.

35.42 If there are any modifications in specifications are proposed during fabrication, it will be communicated by APSRTC from time to time and to be implemented immediately.

35.43 The ACP sheets used shall be of Metallic type only & prior approval of APSRTC has to be obtained with regard to colours of ACP sheet.

35.1 The materials and source of material used in fabrication can be as per Homologation certification submitted by the firm along with Bid or as per APSRTC approved list.

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SPECIFICATIONS FOR FABRICATION OF INDRA AC SEATER – HIRE BUS BODY TENDER - 2024

1.0 GENERAL DESIGN:

The general design shall be a streamlined body with passenger service door on left hand side (LHS) in front of front wheel with pneumatically operated in-swing door and Luxury type passenger seats with 250mm reclining backrest facing forward in 2X2 pattern.

2.0 REGULATION:

The general appearance, structure, seat layout etc., shall be in accordance with respective drawings. **The bus body design should comply with the provisions of latest CMVR, Bus Body Code AIS: 052 and AIS:135, latest Motor Vehicle Rules, Government of Andhra Pradesh and any other statutory requirement. The coach interiors shall conform to the standard IS- 15061 / 2002.**

2.1 The firms shall possess Bus Body Accreditation Certificate issued by CIRT /ARAI or any other Agency approved by GOI and shall be registered with APSRTC.

3.0 MAIN DIMENSIONS: (ALL DIMENSIONS ARE IN MILLIMETERS)

Sl. NO.	CHASSIS MODEL DESCIPRTION	AL 236" WB	TATA 244"WB	EICHER 244"WB
	Chassis Suspension : Front & Rear Air Suspension with Retarder			
1	Wheelbase	6000	6200	6200
2	Front overhang	2265	2265	2205
3	Rear overhang	Maximum of 60% of WB		
4	Overall length	Maximum of 12000		
5	Overall width	2590		
6	Pillar centre (std)	1524		
7	Waist rail height from Skirt level	1744		
8	Cant rail height from waist level	1280		
9	Interior saloon clear height (Minimum)	2000		
10	Clear aperture of passenger service door (minimum when measured from the edge of door flap)	650		
11	Clear aperture of Driver door	650		
12	Dimensions of Emergency Door	1250X762		
13	Seating capacity	40+1Driver		

4.0 DRAWINGS: The list of drawings to be followed are shown at **ANNEXURE –I.**

5.0 MATERIAL: The fabrication of bus bodies shall be as per the specifications and the material shall be procured from the recommended sources / brands of material as mentioned in **ANNEXURE-II.**

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6.0 CHASSIS POSITIONING:

6.1 All chassis received by the firm for fabrication of bus bodies should be kept safely in a covered area. The chassis should not be kept open to atmosphere with out any protection to avoid damage to chassis and its units due to rain, dust and heat.

6.2 Before commencement of bus body fabrication, all important units of chassis viz. alternator, self-starter, radiator, tyres, batteries, air cleaner, air cleaner indicator, power steering reservoir, fuse boxes, electrical relays, brake pipe lines, filters, clutch reservoir and instrument cluster should be protected by providing suitable covering in addition to disconnecting the wiring connections to vehicle ECU, ABS ECU, Vehicle tracking unit protecting the wiring harness connection ends with proper covering to prevent from damages that may occur due to welding, drilling, cutting, hammering, riveting, falling of metal scrap or dust during the course of fabrication. Driver seat, steering wheel, hand brake valve etc., shall also be protected from any damage or paint spray.

6.3 Chassis number on long members and identification plates provided by the chassis manufacturer shall be properly covered and protected before commencing the fabrication work.

6.4 The Ashok Leyland, Eicher and TATA chassis are supplied with following items as OE fitment.

1. Cabin floor on RH side
2. Bulk head structure (AL)
3. Out riggers on RHS(AL)
4. Anti-sag channel (TATA)
5. Engine bonnet
6. Knitted Driver seat
7. Head lights 24v E2 with relays
8. Front indicators E2
9. Tail Lamps E2
10. Battery cut off switch
11. Wiper motor with twin blades/linkages(Tata/Eicher)
12. Washer tank with pipes(TATA)
13. Reflective warning triangles with stands
14. Wheel stoppers
15. Spare wheel carrier (rope type/cage type)
16. First aid kit
17. Tools as per CMVR
18. Rear view mirrors with brackets (E2 plus 1 small mirror)
19. Electrical horn
20. ELR safety belt E1

7.0 PROTECTIVE TREATMENT:

7.1 All Mild Steel components, including rolled sections except GI tubes and sheets used for fabrication shall be PRE-TREATED WITH COLD PHOSPHATING PROCESS/Three in One Solution to a high quality by dipping and wiping off with a dry cloth to remove all dirt/oil etc. as per IS-3618. After the above process, all components shall be applied immediately (without any time lag) with anti-corrosive Zinc phosphate epoxy primer "Rust-o- Cap" (part no.24570608320) of M/s. Asian Paints or '60 BT PRIME GREY' of M/s. Akzo Nobel, to a thickness of 40 to 50 microns before assembly.

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7.2 After assembly of structure and completing the welding work, all the joints shall be carefully cleaned, ground and applied with Epoxy primer without any time delay and then complete body structure shall be applied with the above anticorrosive paint once again fully.

7.3 After completion of body assembly, bitumen based anti-corrosive, abrasive resistance and sound deadening property coating (Morrai Hydroban / 3M / Sika) of the make as specified in material specifications shall be applied on the under-floor body frame members and chassis.

7.4 All Alu. Components shall be carefully cleaned with thinner. Bi-metallic paint shall be used at joints of dissimilar metals. The interior and exterior panels should be cleaned with thinner and then self-etching primer shall be applied.

8.0 BODY STRUCTURE:

8.1 **GI STRUCTURE:** All principal structural members should be in Galvanized Iron Tubes as per BIS 4923-2017 of grade YST-310.

8.2 **Aluminum components:** All Aluminium extruded sections should be of Alloy designation 64430, 63400 and 65032, condition WP as per IS: 733 – 1983. Aluminium 5-bar chequered plate with 3.0/2.0 mm base thickness shall conform to alloy designation 65032 and condition WP of IS: 737 of 2008. All Aluminium sheets shall conform to alloy designation 19000, condition H2 of IS: 737 of 2008.

8.3 Chart no. CB23CTG132 and Drg.no.CB23AEG112 (sheet 1&2) containing the details of specifications of Aluminum extruded sections and sheets shall be followed.

8.4 **Other GI structural members:** Galvanized steel sheets should be as per grade 175GSM of IS: 277- 2018. Rolled sections should be as per IS - 2062 of 2011. The structural joints shall be by bolting, MIG welding and combination of both. The welding should be full length of joint. After welding, ground to smooth finish to avoid sharp edges and then Epoxy primer to be applied without any time delay. Under any circumstances, arc welding should not be used.

8.5 All bolts used shall be of sizes reckoned in Metric system. The bolts shall be of high tensile hexagonal head bolts of fine thread, conforming to property clause 8.8 of IS: 1367 of 1979. The nuts of approved anti-vibrate type such as Nyloc conforming to IS: 1364 of 1983 shall be used. All bolts nuts and washers should be galvanized. Each bolt and nut shall be provided with a flat washer. A spring washer should accompany every tapped bolt. The approved brands of bolts are TVS/STL/UNBRAKO/IMPERIAL FASTENERS.

9.0 PARTICULARS OF IMPORTANT STRUCTURAL MEMBERS:

All structural members should be in GI steel tubular sections, pressed sections or MS rolled sections as mentioned below:

Sl.no.	Description	Material
1	Cross bearers & runners	Formed GI 3 mm Box 'C' type 50X220X50 mm
2	Anti sag bar	Rolled steel channel ISMC 75x40x6 mm
3	Floor longitudes	GI Pressed inverted 'U' section 25x50x25x3 mm thick
4	Pillars, Stump pillars and horizontal supports	GI Rectangular tubes 60X40X3 mm main pillar & horizontal supports and GI Square tubes 40x40x2 mm for stump pillars
5	Roof sticks	GI Square tubes 40x40x2 mm
6	Roof longitudes	GI Square tubes 40x40x2 mm,

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		Pressed 'Z' section 25X60X25X3
7	Crib rail	MS ANGLE 40X40X3/GI Pressed L in 40x40x2 mm
8	Cant rail	GI Rectangular tubes 60x40x3mm thick
9	Waist rail	GI Rectangular tubes 60x40x3mm thick
10	Gussets for saloon, cabin under frame and roof structure	GI Triangular gussets 75x75x3 mm thick
11	Skirt rail	GI Rectangular tubes 40x20x2mm thick
12	Step edge beading	Indal 5701 section
13	Body side beading	Hindalco SP-6551 section
14	Window sections a) Window guide b) Sweep rubber section	 a) Hindalco 6482 section b) Hindalco 2691 section
15	Hat rack beading	Mercedes Benz Type
16	Flap door stiffener	Hindalco SP-4822 section
17	Flap door hinge	Hindalco SE- 9390, SE- 9389 sections
18	Tapping plates	6 mm thick MS /SS/GI
19	Steel rod for door hinges	6.35 mm dia of EN 430 bright grade

10.0 PRECAUTIONS:

10.1 "NEGATIVE TOLERANCES" are not allowed either for Aluminum Extruded sections or Aluminum sheets and GI sheets/tubes. All welding shall be done with MIG welding process only. Under any circumstances, arc welding shall not be allowed. Welding of Stainless-steel components shall be done with TIG welding process only with same grade SS filler rod.

10.2 The following workmanship must be carefully followed during the fabrication.

i. All castings must be truly formed and free from blow holes.
ii. All bolts and rivets should be well fastened.
iii. Thorough water test shall be carried out before fixing the interior ceiling using pressurized water spray system. The fabricator shall equip water leak test facility conforming to IS: 11865/1982 at the firm for conducting leak test in two stages i.e., before fixing the interior ceiling and before dispatch of vehicle. At all stages the coach shall be water leak proof.
iv. All welded joints must well ground to get a smooth surface finish. All the welded joints shall be applied with epoxy primer anti-corrosive paint immediately without any delay to prevent the corrosion.
v. Sharp corners shall be grounded and made smooth.
vi. Wherever pitch for rivets / bolts is not specified, it shall be 100 mm.
vii. Bolt ends shall protrude at least 2 to 3 threads length above the nuts.
viii. Roof stick, roof longitude, floor longitude and waist rail members shall butt properly at mating joints and shall not have gaps at the joints.
ix. All tapping bolts such as grab rail, handles and assist rail bolts etc., shall be tightened using thread lock adhesive of approved makes.
x. All fixed glasses shall be provided with ceramic coating of suitable width on periphery.

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xi. There shall not be any air pockets, wrinkles in laying vinyl mat and edges of mat are to be hot welded at all the mat joints.

11.0 FIBER REINFORCED PLASTIC (F.R.P.): All the FRP profiles shall be of FR grade and to comply with the provisions of IS: 15061:2002. The thickness of front & rear FRP shall be 4 mm and dash board shall be 3 mm. The FRP profiles developed shall be produced for approval of Chief Mechanical Engineer before taking up for fabrication. The layup of FRP profiles shall be as detailed below:

i. Two coats of ISO UV FR grade Gel coat and surface mat 30
ii. CSM 400 mat layer with ISO FR grade resin
iii. WR 610 mat layer with ISO FR grade resin
iv. CSM 400 mat layer with ISO FR grade resin
v. WR 610 mat layer with ISO FR grade resin
vi. Permitted pigments and additives
vii. Grey primer coat
viii. Suitable reinforcements at all points of fastening
ix. Front bumper reinforcement

12.0 CAB UNDERFRAME STRUCTURE:

12.1 The Ashok Leyland 236" WB chassis will be supplied with OE cab floor, bulk head structure, out riggers, driver seat and engine bonnet. The cab under frame shall be fabricated as per the Drg.I23659.16UF23313-001. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side & LH side of cabin shall be connected in line with the 1 st cross bearer with **ISMC channel 100X50X6mm**. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

12.2 An Anti-sag bar in 3-pieces in ISJC 75x40x6 mm connecting both 1st pillars and chassis frame shall be provided.

12.3 Out riggers in M.S. angles 50x50x6 mm shall be provided connecting 'B' (2nd) pillars to the chassis long members by means of clamps made of M.S flat 50x6 mm.

12.4 The dashboard frame shall be covered with FR- grade FRP mould of 3 mm thick in approved design.

12.5 Flap doors with Auto Hinges, Steel collapsible handles and tower bolts shall be provided at AC Compressor, fuel feed pump, air cleaner, power steering reservoir, instrument panel etc., to facilitate easy maintenance and access.

13.0 BODY FRAME STRUCTURE:

13.1 The bus body frame structure should be fabricated as per the following drawings.
Ashok Leyland 6000 mm (236") WB chassis : I23659.16SL23311-001&I23659.16SR23312-001.

13.2 Cant rail joint shall be provided with box type reinforcement formed by welding of two GI pressed U sections of 17x27x17x2 mm in 300 mm length and to be plug welded on both sides.

13.3 The body structure has to be prepared with GI square and rectangular sections suitably reinforced at stress concentric points for structure.

13.4 All the pillars located at front & rear end, Main pillars, Entrance door pillars and AC mounting pillars shall be provided in GI of 3 mm thick.

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13.5 Additional reinforcement has to be provided in roof structure to withstand weight of A.C. Unit.

13.6 Engine protection guard to be provided in the front-end structure to safe guard the engine incases of front collision.

13.7 FRP mat reinforcement layers have to be provided at rear corner areas and wheel arch top areas for additional strength and to prevent water seepage.

13.8 Fuel oil tank mouth shall be provided with an opening of size 250 mm x 250 mm, flap with suitable auto hinges, collapsible handles and locking arrangement.

13.9 SS/GI tapping plates of 150 mm length in 30x6 mm flat shall be provided wherever necessary for fixing body components such as grab rail, assist rail, partition etc.

13.10 Chassis long members shall not be disturbed (as shown in the respective drawings) while fabricating the rear luggage booth.

13.11 Pillar to waist rail joints shall be provided with plus type gussets, the joints connecting waist rail to diagonals/stump pillar shall be provided with proper gussets.

13.12 Hat racks shall be fabricated as per respective drawings. Hat rack on right side has to be continued up to driver partition.

13.13 AC Ducting shall be provided inside of the Hat rack on both sides of the bus.

13.14 The duct has to be provided in GI sheet covered with approved good quality foam Rexene and providing support brackets at every one meter.

13.15 Further the AC facility has to be provided to the driver and attender also.

13.16 The AC duct shall be provided above the 5-seater from left to right with individual AC louvers.

14.0 CABIN AND BODY MOUNTING:

14.1 The OE Cabin floor and mounting arrangement shall be retained. The remaining portion of cabin floor connecting 1st -cross bearer and OE floor shall be fabricated as per Drg. no. I23659.16UF23313-001. for Ashok Leyland 6000 mm (236").

14.2 The saloon gangway shall be made in line with cabin floor.

14.3 The body should be mounted on the chassis web duly providing 6 mm (inverted pressed "L" type) M.S. plate as per the size shown in the respective drawings over the chassis long members. These "L" plates shall be bolted together at every cross bearer mounting to Long member web with M12 X 50 H.T. bolts at least 4 nos. per plate.

14.4 OE holes on the chassis long members shall only be picked up for mounting this plate. Wherever the holes are not matching holes shall be drilled on the web 40 mm below the top level of long member with prior approval.

14.5 Box type cross bearers formed with two C type GI formed sections of 50X220X50X3 mm completely MIG welded are to be provided. On these Cross bearers, 60X40X3 mm GI tubes of 130 mm length are provided vertically to provide a belly dickey space for luggage in between chassis and body floor. On top of these GI tubes, flooring structure has been fabricated with 40X40X3 mm MS 'L' angular and chequered plywood.

14.6 The C type cross bearers should be fully welded with the structure main pillars and stump pillars on all the four sides.

14.7 These cross bearers are to be inter connected at bearer bottom surface (base plate top) level by using GI Square tubes of size 40 x 40 x 2 mm thickness on both sides along the chassis longitudinal members. At rear wheels, the cross bearers shall be mounted and welded on MS 450X160X6 mm thick base plate. The base plate should be fastened to the chassis with 16 mm dia. "U' bolts of approved make and with 150X6 mm thick base plate welded to the bottom of cross bearer. Spacers made of Aluminum casting shall be placed between bottom flanges of chassis long member and "U" bolts. The "U" bolts are to be made out of EN-15/14B steel as

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per IS 5517-1978 (Tensile strength 80 kg/Sq.mm minimum).The "U" bolts should be galvanized and fitted with galvanized nyloc nuts as per drg.no.CB23UBG114. The length of bolt shall suit the depth of chassis long member and should not project more than 6 mm after tightening the nuts. At rear axle H- portion, along the chassis, longitudinal and cross-wise diagonal 60x40x3mm and 40 x40x3mm GI tubes are to be provided as truss.

14.8 The body mounting must be easily detachable from the chassis during major overhauls/repairs.

14.9 Pillar gussets on four sides of the body shall be provided with 32 mm dia hole to facilitate lifting of the body during major overhauls.

15.0 CABIN AND SALOON FLOOR:

15.1 The cabin and saloon raised floor including five-seater bottom and gangway shall be laid with 12 mm thick polymer impregnated compressed chequered plywood conforming to IS: 3513 (Part-3)-1989. The Plywood should be bolted to the under-frame members with CSK self tapping screws of 6 mm size (for steel application) at a pitch of 200 mm.

15.2 The floor plywood should be overlaid with 2.0 mm thick non-skid safety vinyl mat of FR grade with good quality adhesives of approved brands with minimum joints, without gaps and air bubbles.

15.3 Aluminum step edge beading of Isuzu / Scania / AL-SLF type with insert duly anodized/yellow powder coated shall be provided along the edges of step well, gangway and at rear raised floor.

15.4 The gang way raised floor area edges on both sides has to be illuminated by providing good quality approved LED strips in complete length.

15.5 The FRP mat reinforcement layers shall be provided on wheel arch frames and the wheel arch frames shall be covered with 0.5 mm SS sheet over the FRP layer before laying 12 mm compressed plywood and followed by vinyl mat.

15.6 The height of rear wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

15.7 Trap door of 580 x 540 mm must be provided in cabin flooring above gearbox. One more trap door of size 860 x 520 mm shall be provided in gangway above rear axle for maintenance. Trap doors in floor shall be finished with vinyl mat and Aluminum Fluted strip. Sunken type steel collapsible handles to be provided to lift the trap door.

15.8 On both sides, side luggage booth's structure shall be fabricated with MSL 40X40X6mm, GI 25X40X25X2 mm pressed section and 40x6 mm MS flats.

15.9 The vertical paneling of the booth and finishing of out riggers in side luggage booth is to be done with 0.91 mm GI sheet covered with hammer tone paint.

15.10 SS pipes of OD 25 X 2 mm shall be provided in side luggage booths to provide safety for luggage.

15.11 Flap doors are to be provided at Air bellows area with tapped bolts for easy access of air bellows.

15.12 Separate cut outs are to be provided in side luggage booth area for easy maintenance of EMR unit at top and side areas.

15.13 Plastic caps are to be provided on top of the U Clamp projections in side luggage booth areas.

15.14 A cut out shall be provided for maintenance of DEF tank at back area of right side front wheel.

15.15 A cut out shall be provided with a flap door having air vent lovers at EATS unit area for proper heat dissipation.

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16.0 BODY PANELING:

16.1 Truss Panel: The interior panel from waist to crib to be provided with 3 mm ACP of FR grade/design as per the design and source approved by APSRTC pasted with PU sealants to the structural members.

16.2 The main pillar finishers are to be covered with foam Rexene. The pillar finishers covering vertical and horizontal members should be with ALP window vertical finisher (fixed glass type)/ 0.5mm SS sheet. Plastic buttons and screw caps for metal screws shall be used for fixing finishers on the pillars.

16.3 The mud wings should be in G.I of 0.91mm thick formed to suit the wheel arch and to be welded to transverse angle at wheel arch. While providing mud wings, care shall be taken to avoid damages to air bellows of suspension system. Proper gap shall be maintained between Air bellows & body members.

16.4 Dash cabin vertical portion i.e., front truss panel at pedals and side truss panel from front end to driver door pillar shall be covered with 0.5 mm Stainless Steel sheet of scotch brite finish and 430 grade.

16.5 Thermocole insulation of 40 mm thick of FR grade shall be provided between exterior and interior panels of body side structure between waist rail to floor and roof.

16.6 USB wiring harness for Haritha make crystal model seats to be provided in both sides of saloon and rear side with Alu. Extruded section of INDAL 2735 with suitable connectors.

16.7 Stretch panel:

i. The exterior body from waist to crib level (660mm) to be in 0.91-mm Skin Pass quality GI sheet and shall be laid horizontally in single piece by stretching in a fixture by applying load and then welded rigidly to the rearmost pillar and rear pillar of entrance door and driver door. There should not be any wrinkles or waviness or rattling in the stretch panel after welding.

ii. The stretch panel shall be formed to 'Z' profile on top edge to a depth of 12 mm in roller machine.

iii. The top edge of the stretch panel to be sealed with P.U. sealant to avoid leakage of water to the structure. P.U. sealant shall also be applied on the structural members for bonding the stretch panel to the structure.

iv. Approved brands of P.U. sealants are: Sikaflex, Total seal, 3M, Anabond and Henkel.

16.8 Side Modular panels:

i. The exterior body below stretch panel up to skirt rail shall be in 2.00 mm thick Aluminum Sheet i.e., at front wheels, rear wheels and rear of rear wheels. All flap doors including Spare Wheel Carrier door and rear luggage booth door shall be in 2.5 mm thick Aluminum sheets.

ii. All the wheel arches shall be provided with FRP wheel fenders in 3 mm thick.

iii. The waist rail shall be of GI ERW Tubular section of size 60x40x3mm shall be mounted horizontally between the pillars as per drawing. Box type gussets of size 25 x 50 x 2mm shall be welded at bottom corners of waist rail with side and stump pillars.

iv. One row of GI Tubular rectangular section of size 60x40x3mm be provided on both sides above sole rail as center panel rail for fixing waist (stretched panel) and skirt panels.

v. A top hat formed GI section with AC duct with suitable brackets has to be be provided in GI rectangle tube 40x20x2 mm, 25x12x40x2mm and M.S. flat 40x6 mm shall be welded to the roof sticks duly providing cleats in formed GI.

vi. The interior portion of the A/C duct should be pasted with 6 mm nitrile foam.

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vii. The exterior of hat section bottom shall be welded with 0.91 mm GI sheet duly pasted with 6mm heatlan and over laid with good quality rexene of approved shade and color with good quality adhesive.

viii. Proper reinforcements shall be provided for fitment of A/C louvers at every seat.

ix. E 2 consoles (Louvers) shall be of VOLVO type of PACOLINE or any approved make have to be provided for individual berth.

x. The fixed AC consoles (Louvers) are to be fitted in offset at center hat side edges on both sides.

xi. Above the wheel arches, two rows of GI tubular section of size 40x40x2mm be fully welded from wheel arch bay to front end and at rear wheel arch bays.

xii. The crib rail shall be of GI tube of size 40X40X2 mm. It can be mounted on top of the floor structure on the corner edge of the side pillars right round and it should be welded fully with the side pillars.

xiii. The waist rail finishers have to be provided with ALP waist rail PVC finisher / 0.5 mm SS sheet at all window bays.

xiv. Between waist rail of bottom and crib rail, 40x20x2mm GI Tube truss reinforcement shall be provided diagonally as shown in the Drawing.

xv. The side flap doors shall be fabricated with 2.5 mm thick Aluminum sheet with hinges in Hindalco SE9389 and SE9390 sections and Aluminum pressed top hat profile of 25X25X150X2mm bonded with P.U. sealants of approved make. The hinge sections shall be joined together with a 430 Grade bright grade stainless steel rod of 6.35 mm dia. Flap doors should be reinforced duly pasting the Hindalco SP4822 section with P.U. sealants along the four edges. The hinge at top should be welded to this stiffener before pasting. The Aluminum hinges should be fastened to the bottom side of tube 60x40x3 mm at floor level duly providing tapping plate of GI 3 mm thick with M6 screws. P.U sealant shall also be applied for bonding hinges to the structural members while fastening. The flap shall also be reinforced with 2 mm thick Aluminum Pressed top hat profile of 150 mm in two rows duly pasting with P.U. sealants for provision of locks, blinkers etc., and proper reinforcements shall be given for fixing of locks, stay rods etc., Dust proof door rubber of EPDM quality to be provided for these doors along the edges. These panels shall be pre formed to match the body profile. There should not be any play in hinges.

xvi. All flap doors shall be provided with E 2 stay shockers (550N). All flap doors shall be provided with 2 nos. of door locks of VOLVO type flap door lock with indicator in black colour on both sides. FRP/ABS covers in 2 mm thick shall be provided for these locks on inner side of flap door to avoid ingress of dust. Preferably flap door opening shall be parallel to the bus body or minimum 120 degrees from closed position. The flap doors should be in level with the pillar finishers and bottom skirt rail properly.

xvii. The battery box, spare wheel carrier, HSD oil tank, Ad Blue (DEF) Tank and Air tanks etc., i.e., the area with in wheel base should be provided with these flap doors.

16.9 The frontend fascia consisting of bumper and detachable front grill door (FOP) shall be provided in 4 mm thick FRP profiles with provision for fixing head lights and indicators etc., as per the approved design. Front bumper center piece shall be made detachable. Front grill top piece shall be fitted with linkages and upward lifting mechanism consisting of two handles and two gas springs 350N of approved make and lower grill to be fitted with bolts. There should not any gap between structural members and front fascia. Front FRP to be pasted with sealant as well as fastened with M6 screws/riveted to the structure. Front FOP(grill) shall be in level with the aperture on all sides properly.

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16.10 The rear end body shall be as per the Drg.nos. I23659.16CS23316, I24455.65CS23216 & I24455.65CS23116. The rear end body to be covered with 4 mm thick FRP profile in single piece. The luggage booth flap door shall be in 2.5 mm single piece Aluminum sheet with proper reinforcements. The flap door shall be reinforced with 2mm thick Alu. Pressed top hat profile 150mm in two rows, Prakash type seven lever center Lock and two budget locks provided on two sides and two pneumatic balancers of approved make in 675 mm length and 550N capacities. The balancers shall have ball joints at both ends.

16.11 The FRP profiles developed shall be produced for approval of CME(C&B) before taking up for fabrication.

16.12 The Interior roof ceiling at center portion of roof between hat rack brackets (with a width of 610 mm), Driver partition on both sides and side truss panels shall be provided with 3 mm ACP of FR grade in approved shade. Remaining portion i.e., interior roof at both side areas, all window fixed glass finishers, hat rack bottoms shall be provided with 0.5mm SS sheet covered with foam Rexene of approved shade, design and color pasted with good quality adhesive. The material should conform to IS 15061-2002 in respect of FR grade characteristics and behavior. The joints shall be provided with decorative beading with insert and plastic end caps. The waist rail area has to be provided with ALP waist rail PVC finisher in all window bays.

16.13 The exterior of roof complete shall be in 0.91 mm G.I. sheet full length of body in two pieces (laid longitudinally) in single joint and welded. The welding joint area should be visible throughout the roof length before interior paneling. The overlap joint should be on longitudes, welded together from outside at the joint, full length without any blowholes or burning. Roof joints should be water leak proof. The roof sheet shall be tack welded to roof structural members from inside and all tack welds shall be applied with PU sealant after shower test. The roof joints, i.e., centre joint and front & rear doom joints shall be over laid with weather shield strip of approved make in 100 mm wide and 2 mm thick after shower test.

16.14 The hat rack with AC duct with suitable brackets shall be provided in GI rectangle tube 40x20x2 mm, top hat section 25x12x40x2mm and M.S. flat 40x6 mm shall be welded to the roof sticks duly providing cleats in formed GI. Water proof plywood of MR Grade in 8 mm shall be laid longitudinally on top side of hat rack. The bottom side of hatrack shall be welded with 0.91 mm GI sheet duly pasted with 6 mm heatlan and cladded with 3 mm carpet /approved shade of Rexene. Proper reinforcements shall be provided for fitment of A/C louvers at every twin seats. The interior portion of the A/C duct should be pasted with 6 mm nitrile foam.

16.15 The interior width shall not be less than 460 mm. Roof ceiling to hat rack clear opening shall be 250 mm. The exterior of hat rack bottom shall be welded with 0.91 mm GI sheet and over laid with good quality Rexene of approved shade and color with good quality adhesive.

16.16 The interior of the hat rack shall be provided with reinforcement of formed 'U' section of 1.6 mm of GI sheet and covered with 3mm carpet.

16.17 AC Duct with consoles (Louvers) shall be VOLVO type (with individual reading lamp with switches) of PACOLINE or approved sources have to be provided for individual row of seats.

16.18 Hat rack ends are to be provided with hat rack beading of Mercedes Benz type profile having LED strip and grab handle at its edge area. Free A/C ventilation slots shall be punched in the hat rack beading.

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16.19 Center hat rack 50 mm height from roof shall be provided with proper reinforcement at roof except ac roof doors and roof led lights fitted to this hat track.

16.20 The fixed AC consoles (Louvers) are to be fitted in offset to each other on both sides hat racks and are to be fitted at 20 mm below of hat rack top edge.

17.0 FOOT BOARD:

17.1 The footboard structure shall be fabricated to suite in-swing door in M.S. angles 40x40x6 mm, 40x40x3 mm and MS flats 40x6 mm in four steps with minimum tread depth not less than 250 mm and tread height not to exceed 250 mm.

17.2 The step well structure on both sides up to dash level and riser portion shall be covered with 0.91 mm GI sheet over laid with 0.5 mm stainless steel sheet of 430 grade and scotch brite finish. The tread portion shall be provided with 12 mm compressed chequered plywood bolted to structural members and overlaid with 2 mm vinyl mat and bolted to structural members.

17.3 Foot board steps shall be provided and illuminated with good quality approved LED strips in approved Aluminium extrusiion throughout the edges on all sides.

17.4 All the edges of Step well shall be provided with ISUZU/SCANIA/AL-SLF beading as per drawing finished with yellow powder coating and PVC insert in yellow color similar to RKS-21 of M/s RK PROFILES Pvt.Ltd.

18.0 CABIN PARTITION:

18.1 There shall be a full partition separating the saloon from cabin with single flap door. The partition wall shall be fabricated in GI tubes 40x20x2 mm, GI formed Z section 25X40X25X2mm and MS flats 25x3 mm and covered with 3 mm ACP of FR grade sheet of approved make and shade on both sides.

18.2 The partition shall be provided with one maintenance door, hinged at top side, above the floor trap door on gear box. The partition door shall be finished with 3 mm ACP of FR grade on both sides and finishers on all edges. The door frame shall be provided with valence rubber profiles for proper sealing. The door shall be provided with three heavy duty hinges and one heavy duty Godrej make lock that shall be operatable from inside and outside. The door glass up to waist level shall be clear in 5.0mm thick bonded with P.U sealant to flap frame. The door glass upto waist level shall be fitted in EPDM rubber. Aluminum sheet 1.6mm 'L' finishers shall be provided from inside along the edges of glasses.

18.3 One steel tower bolt of 6" size is to be fitted on bottom edge to lock the partition door.

18.4 The partition shall be provided with mounting bracket/arrangement of required size in GI sheet 3mm thick to be welded with GI 40X20X2 mm GI tube for fitment of LED TV of 32" size on saloon side. The front side of LED TV shall be surrounded with 0.91 mm GI sheet duly cladded with approved shade of Rexene and provision for accessibility of DVD cables and pen drive shall be provided at cabin side. One sliding window in Indal 6482 with 5.0 mm toughened clear glass shutters of 260 x260 mm is to be provided on partition at suitable location. The wiring cables for TV shall be routed through a PVC conduit of 1" dia provided in partition structure.

18.5 Provision shall be made at partition to charge two cell phones at a time. One sunken type pouch with steel lining and wood beading on periphery is to be provided on partition with modular 5 pin sockets and switches.

19.0 FRONT WIND SHIELD GLASS, SALOON REAR GLASSES AND WINDOWS:

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19.1 The cabin front-end shall be fitted with single piece-curved windscreen glass of size 1680 (Height)X 2735(Width)mm as per the drawing no. CB23WSG138. The windshield glass shall be fitted in a MSL 25X25X3 mm angle frame with EPDM rubber beading of 50 mm as per sketch CB23ERG122. The curved laminated glass shall be of 7.76 mm minimum thickness with 0.76 mm minimum thickness of PVB interlayer and of select float quality, WAVE FREE as per IS: 2553(Part-II) – 1992.The approved brands for glasses are IMPACT and BANGALORE SAFETY. Ceramic coating of suitable width shall be provided on periphery.

19.2 The rear end saloon glass in single piece shall be bonded with P.U. sealant to the rear end FRP profile. The glass shall be of 5.0 mm thick, toughened float quality safety 'grey/light green/bronze' tinted glass as per AS:202:71 DEC-2006. The size of the glass shall be 1950 (Width) X 1035 (Height). Ceramic coating of suitable width shall be provided on periphery.

19.3 Fixed type window glasses shall be of light grey/light green/bronze toughened safety float glasses having clear height of minimum 1000 mm with minimum 50% Visual Light Transmission (VLT). The area from waist to cant rail shall be provided with curved 5.0 mm thick bronze tinted toughened glasses duly bonding with PU sealant of Metal to Glass type. For a standard bay of 1524mm the size of glass shall be 1518x1000 mm (curved length). The curved window glasses shall be of float quality, safety bronze tinted glass as per AS:202:71 DEC-2006. The fixing of glasses shall ensure proper sealing and water leak proof. The structural members shall be cleaned thoroughly for dirt &oil before applying sealant. The glasses shall have ceramic coating right round with a width of 50mm.

19.4 The driver's door and its opposite entrance door window glasses be provided with clear toughened glasses only.

19.5 Bent type clear toughened float glasses of 5mm thickness shall be pasted with reputed make of highly reliable P.U. UV metal to glass sealant on the cant rail, window rail and side pillars above driver and entrance door.

19.6 The cabin area shall be provided with fixed glasses in 5.0mm thick toughened curved clear glasses on both sides at A pillar.

19.7 The lettering work in vinyl stickering to be done on the fixed window glasses and rear end glass from inside as mentioned below:

" BREAK THE GLASS IN EMERGENCY FOR EXIT "

In Telugu:

" అత్యవసర పరిస్థితిలో ఈ అద్దమును పగులగొట్టుము"

19.8 Approved makes of EPDM rubber and flock channel are Rubber Extrusions & Moulding/ ASP/ALP.

19.9 Approved makes of P.U sealants are Total seal /Sikaflex/3M India/Bostik / Anabond and Henkel.

19.10 Inside portion of window pillars and waist rails be provided with finishers of ALP window vertical finisher (Fixed Glass Type) / ALP waist rail PVC finisher / 0.5 mm SS sheet.

20.0 PASSENGER ENTRANCE:

20.1 The passenger entrance cum exit and Stepwell of three to four raised (Trapezoidal) full type has to be provided which has to be properly suit to the pneumatically operated in-swing door. The door can be operated by approved make and fail safe highly reliable pneumatic actuating

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mechanism i.e., shall have 'open', 'close' and 'manual' stages and shall have provision to open from inside and outside in case of emergency.

20.2 The swing type passenger door be provided with 1 No. good quality highly reliable Pneumatic Automatic Door Closure assembly of a reputed make. The assembly consisting of Air Cylinder (Aluminium body) – Double acting cylinder with adjustable cushioning at both ends conforming to IS 6431,63/50 mm Dia Bore, 200 mm stroke (operating pressure of 0.5 to 10 bar), front and rear brackets, Flow control valve, C.K. Connectors, Solenoid valve with relay, Air filter and Flexible Polyurethane tube of 6mm ID x 8 mm OD.

20.3 The step well assembly structure be fabricated by using 40x40x6mm M.S. formed angles, 100 x 50 x 6mm M.S. rolled channel and 40x20x2mm GI tube. Step well step be covered with 10swg aluminum chequered sheet. The steps raised portion and step-well truss portion be provided with 0.80 mm thickness stainless steel sheet. All the sides of the step- well shall be bolted apart from welding perfectly to the floor structure. Aluminum step- edge extrusions shall be provided on the steps.

20.4 The door frame shall be made in rectangle tubes 40x20x2 mm thick covered with 0.91 mm G.I. sheet from outside and 0.5 mm SS sheet from inside. Doorframe height shall not be less than 2150 mm. Door frame verticals should be provided with side valence rubbers. The in-swing door should have one window at top side with horizontal sliding glasses of 5.0 mm thick toughened bronze tinted glasses and one 5.0 mm thick toughened bronze tinted glass pasted to the door frame below the window frame with PU sealant. The door rubbers along the edges shall ensure dust/water leak proof.

20.5 Pneumatic cylinder shall be fitted at lower side of the door at inside of the front left side structure with proper reinforcement.

20.6 The pneumatic door pipes shall be firmly clamped with tags and shall cover with corrugated sleeve, care shall be taken for chaffing of pipes while routing through structure.

20.7 Foot board is to be illuminated with one LED light assembly by placing at third step vertical portion facing towards door and having stickering on light glass area as **"APSRTC WELCOMES YOU"** which may not to affect the visibility of steps to passenger while boarding or alighting.

20.8 The bottom of the door shall be provided with brushes PVC / Plastic bristle to clean the tread of 1st step.

20.9 One assist rail in stainless steel 25 OD X 1.6 mm thick of 304 grade shall be provided in sunken type on the inner side of in-swing door. One PU handle of min. 400 mm length shall be provided on inner side of in-swing door. One assist rail cum grab rail in stainless steel 32 mm dia x 2 mm of 304 grade shall be provided from floor to cant rail to partition wall.

20.10 Interior Themes (Prior approval of the Corporation shall be taken in writing before fitment of the interior Themes):

Foam Rexene	:	Dotted Polka Blue with Foam.
Curtains	:	E 2 Sets – Dark Maroon -122 & Blue -133 (Pramod Traders)
Vinyl floor mat	:	2 mm E.C. Gray Vinyl 511 / SR Breeze.
Hat rack inner area	:	3 mm Carpet.
Pin mat	:	Green / Blue.

21.0 EMERGENCY DOOR:

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21.1 One Emergency door extending from saloon raised floor with a height of 1250 mm and width 762 mm on right side shall be provided as per the layout and drawings. The door is to be fixed to the pillar with two heavy duty bend hinges of 6 mm thick.

21.2 The door is to be provided with one bronze tinted curved glass of 5.0 mm above waist level and one heavy duty lock operable from inside. The location of the emergency door is to be exhibited from inside and outer periphery by providing reflective tape in red colour. The door shall be provided with one stainless steel railway type latch of 6 mm thick from inside.

21.3 One emergency hooter has to be provided at inner side top area of the door. The Emergency Door size shall be 1250X 762 mm. It has to be met the latest norms of APMVR/CMVR/AIS:052.

21.4 Red colour LED light has to be provided at Emergency door area inside the saloon.

22.0 DRIVER'S DOOR:

22.1 The driver's door shall be provided from cabin floor level with dimensions of 1570X860 mm. The door frame in GI rectangle tube 40x20x 2 mm shall be covered 3 mm ACP of approved FR grade from inside and 0.91 mm G.I. sheet from outside. Door frame should be provided with valence rubber on three sides. The inner face of door aperture shall be provided with side ball type door seal rubber duly providing formed L section in 20 G GI sheet.

22.2 The door shall be fitted with one vertical sliding type window with glasses of 510 mm(H)x485 mm(w) and another window at bottom of frame with horizontal sliding glasses of size 260mm (W) x 260mm (H).

22.3 The door glasses shall be of 5.0 mm thick toughened safety clear float glasses. The door shall have one heavy-duty door lock of approved MSL make and type with outer handle, one locking latch from inside and dove tail catches. The door shall be fitted with two forged hinges on 'A' pillar with suitable reinforcements.

22.4 All the door openings shall be provided with canopy in 0.91 GI sheets and finished with black powder coating.

22.5 One assist rail of 25 mm dia x 1.6 mm thick in stainless steel of 304 grade and in 2B finish shall be provided on the interior side of driver door with suitable Nylon steel brackets.

23.0 PASSENGER SEATS:

23.1 The seat layout plan and arrangement shall be as per the respective Drg.nos. I24453.6GL19321-001.

23.2 **SEATS:** Luxury type passenger seats with reclining back shall be fitted in the bus with M10X1.0 H.T. fasteners, flat washers and anti-vibrate type nyloc nuts. It should ensure that the seat leg mountings rest on floor longitudes.

23.3 Seat numbers in red letters on 2mm thick milky white acrylic sheet of size 65x50mm shall be provided on intermediate rail. The aisle and window seat numbers shall be indicated clearly as per seat lay out

23.4 Seat Belts are to be provided for foremost front row of seats and the middle seat of rear most row.

23.5 The seats are to be fitted with proper uniform pitch as per the drawing and to facilitate rear 5 seat has to be fitted with provision of complete inclination for back rests of both corner seats.

23.6 The fabricators shall supply E1 additional set of head rest covers of same size & material along with bus.

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23.7 USB wiring harness for crystal model passenger seats has to be provided in both sides of saloon and at rear area with Alu. Extruded section of INDAL 2735 with suitable connectors at each seat as per seat layout for proper connection.

24.0 DRIVER'S SEAT:

24.1 The Aesthetically designed pneumatically adjustable heavy duty driver seat of UNO MINDA /any approved source make shall be provided. The driver seat frame mounting on cabin floor shall match the OE mounting position.

24.2 The seat shall have to and fro, up and down adjustment of 100 mm with reclining back and to be fitted 350 mm away from steering wheel edge when the seat is fully forwarded.

24.3 The height of driver seat bottom shall be 450 mm when measured in fully lowered position.

24.4 There shall be a thigh clearance of 200 to 260mm between steering wheel edge and driver seating position.

24.5 The driver seat shall be so located that the center line of driver seat shall be 705 mm away from the center line of body.

24.6 The driver seat shall be provided with "ELR" type safety belt of M/s. Autoliv or Rane make conforming to AIS : 052.

24.7 One foldable type driver berth shall be provided in cabin by utilizing the space available between the driver's partition and above the level of driver's seat. The frame shall be made in GI Square tube 30x30x2 mm with overall size of 1600x480 mm with an extension of 300mm. The rest berth shall be finished with powder coating in black colour. The berth cushion shall be with 50mm P.U. foam mounted on 8 mm plywood and upholstered with 'Raymond Dobby or Sparkle/BMD/RELIANCE make' fabric of approved shade. The driver berth bottom area shall be covered with pre-coated GI sheet of 0.70 mm.

24.8 The OE driver seats supplied with chassis shall be returned to the Corporation.

25.0 REAR LUGGAGE BOOTH:

25.1 A luggage booth at rear end shall be provided across the width of the body and also on right side in rear most bay (in 'L' shape) as indicated in the respective drawings. Two ISJC 75X40 Channels extending from rear end structure, connected to chassis long members by two ISJC 75X40 Channels placed vertically and welded to web mounting plates of last cross bearer.

25.2 Remaining booth floor shall be fabricated in MS angles 40x40x3 mm. The booth top frame work shall be with floor riser in GI Sheet 2.0 mm thick 'Z' section and 280 mm height on last cross bearer and 4 nos. of GI formed 'U' section longitudes of 25x75x25 in 3 mm thick.

25.3 Two rows of same formed sections shall be provided in transverse direction to support the five seat assembly leg mountings and bolting.

25.4 Booth interior vertical sides shall be provided with 0.91 mm GI sheet with embossing and hammer tone paint. Top side frame except five-seater bottom, is to be provide with 0.91 mm GI sheet.

25.5 All flap doors including rear luggage booth door shall be in 2.5 mm thick Alu. Sheets which all are to be provided to accommodate 120^0 opening. Rear luggage booth door has been provided with Prakash type seven lever center Lock and two budget locks provided on two sides with 550N telescopic balancers.

25.6 All luggage booths (both side and rear) floor bottom area including Belly Dicky shall be laid with 12 mm compressed chequered plywood in FR grade and Aluminium 5 bar/Diamond

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chequered plate of 2 mm thick duly bolted with M6x40mm bolts at a pitch of 100 mm to floor structural members with Dust proof rubber of 1.5 mm shall be laid at joints and edges of the cheq. plate to avoid dust/water entry into the booth. Intermediate bolting shall be done with M8 bolts at edges and 75x40 channels at a pitch of 200mm

25.7 The floor cheq. plate shall be joggled at edges and provided on 75x45 channels at a pitch of 200 mm. Booth flap door shall be provided with two 675 nos. mm length, 550N telescopic balancers of approved makes / VOLVO type flap door locks with indicator light type flap door locks on both sides. Booth flap doors shall be provided with door seal rubber to make it dust / water leak proof. The balancers shall have ball joints at both ends.

26.0 SPAREWHEEL CARRIER:

26.1 One cage type spare wheel carrier shall be provided on LHS behind rear wheels. The OE spare wheel carrier if supplied with the chassis is of cage type, it shall be located as shown in the structural drawing. The carrier shall be mounted on chassis duly providing the vertical and horizontal supports in ISJC 75X40 Channel, gussets.

26.2 If the chassis are not supplied with cage type carrier, the firm shall provide one such spare wheel carrier. Care shall be taken to avoid fouling of spare tyre with any of the chassis units / spares under any circumstances.

26.3 The spare wheel carrier area is to be provided with one flap door similar to side luggage booth. The cage shall be suitable for 295/80/22.5 tube less tyre.

26.4 One LED light with switch to be provided in spare wheel carrier area.

27.0 BATTERY BOX:

27.1 The battery box under the saloon floor as per the layout drawing on LH side shall be fabricated in MS angle 40x40x6 mm and MS flat 40x6 mm. The batteries shall be mounted on a turning / PUSH and PULL type cradle that shall accommodate two 12V batteries of requisite size. The cradle shall have bush and pin mounting mechanism on LH side corner and castor wheel of good quality on RH side inner corner for swinging out the cradle. Locking arrangement shall also be provided for cradle to arrest movement while in operation. **If any specific recommendations by OEM, the batteries mounting will be continued as per OEM, but arrangement shall be made accessible for maintenance of batteries**

27.2 Paneling of inside walls is to be done with 0.91 mm GI sheet followed by Hammer tone coating and the bottom of the box shall be provided with 12 mm compressed chequered plywood. Complete inner surface is to be over laid with 0.5 mm stainless steel sheet. The bottom of the batteries in cradle shall be provided with 12 mm-compressed plywood and acid resistant rubber mat.

27.3 Batteries shall be provided with suitable clamping, wood packing to prevent vibrations when the vehicle is in operation. One cutout is to be done on longitudinal wall for passage of battery cables and is to be provided with 6 mm balata with an 'X' type cutting. Four rows of full-length battery cables with out joints shall be connected to the battery cut-off switch terminals. The terminals and cables should be firmly clipped in position with cable tie and soldered.

27.4 One LED light shall be provided in Battery Box for illumination.

27.5 One guard rail of SS 25 X 1.6mm pipe with brackets to be provided at front side to safeguard them.

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28.0 ELECTRICAL WIRING AND OTHER FITMENTS:

28.1 The earth-return system of wiring should be used. All automotive cables used shall be of approved make and brand conforming to IS: 2465 – 1984 quality covered with PVC sleeve as per IS: 1951-1961. Wherever the cables have to pass through roof and side structures, PVC conduits of ½" dia shall be provided. There shall not be any loose or hanging cables, and if they pass through holes in panels or structural members other than roof and side structures, rubber grommets shall be provided in the holes of such panels and structural members and shall be securely clipped as near as practicable to such rubber grommets to avoid chaffing.

28.2 Wiring shall be provided with suitable connectors for all lighting and audio/video points including additional tapping points for any future requirements. The saloon wiring shall be provided through wire casing fitted along the side wall in hat racks that it shall be easily accessible at all points and there shall not be any need to strip major paneling of body to carry out repairs. Any wiring, which has to run along the chassis frame shall be securely, clipped to ensure that there shall be no chaffing with any of the moving parts. Further care shall be taken to route such wiring in such a way that it is not subjected to splashing of oil, water, mud etc.

28.3 The battery main cable of size 398/0.40 mm shall be provided as required duly using good quality lugs with proper soldering, bolting and insulation etc. There shall be no joint in battery cables.

28.4 The saloon lights shall be provided with full length LED lighting in Aluminium extrusion with diffused glasses of suitable length with built in night lamps of blue color, apart from LED roof light assemblies (round) 6 nos. and 1 no respectively. Out of the 6 roof lights in saloon, 2 lights are to be provided with in-built night lamps of blue colour. The assemblies shall be of approved make and specifications.

28.5 The location of the lights shall be as per the lay out. Suitable tapping plates in GI sheet of 3mm thick to be provided in roof structure for fitment of LED lights.

28.6 Center hat rack 50 mm height from roof shall be provided with proper reinforcement at roof except AC roof doors.

28.7 All OE electrical items shall be retained and kept in working condition.

28.8 One Butterfly type Heavy duty wiper machine of 120W capacity 100 N-M with twin Suitable length wiper arms blades of 32" length of CIRT/ARAI approved make shall be provided for front windshield glass below the front waist rail on left side. The mounting bracket (formed 'L' in MS 6 mm plate) shall be welded to the structural members in such a way that it shall not interfere while removing radiator.

28.9 One Dual tone Air horn of Roots/ELGI make shall be provided. In addition to the OE electrical horn, one more electrical horn conforming to type -3 of IS 1884- 1993 shall be provided. The noise levels of these horns should be between 93dBA to 112dBA.

28.10 A 12-pole disc type fuse box with independent fuses designated for every electrical circuit shall be fitted on switch board provided at cant level. The current carrying capacity of a circuit shall be 1.5 times the load current of that electrical circuit. Maximum current carrying capacity of a circuit shall not exceed 15 Amps. The fuses used shall conform to IS-4063 /1982.

28.11 Modular switches and sockets of in approved make and shade as per IS: 9433 –1980, 230Vx5 Amps shall be used for switch board, cell charging points. Switches are to be located on top side of driver door making a cutout in the hylam sheet of inner cabin panel / on Dash board fusible to driver to easy to operate. Non metallic shielding is to be provided in side structure

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behind the switches to avoid any short circuit. All switches / fuses shall be provided with metallic plate labels for indication.

28.12 Cable ends shall be suitably crimped/soldered with lugs so as to with stand vehicle vibrations. The inter connections shall be made through couplers/ junction boxes / terminal blocks only. Weather proof connectors shall be used for connecting cables which are exposed to atmosphere to avoid water/moisture ingress during use.

28.13 Four headlights with parking & signal lamps of VOLVO type have to be provided. The OE head lights supplied with the chassis shall be returned back along with the bus. Head lamp assemblies shall be fitted at a distance not more than 400 mm from the extreme outer edge of body and not more than 1200 mm height from the ground.

28.14 Front direction indicator lamps LED type of 2" dia shall be provided below 1500 mm height on the outer edge of body in amber colour. In addition to this, four more direction indicator lamps in amber color shall be provided on the lateral side of the body at wheels and below 1500 mm height from the ground.

28.15 E 1 AMW type indicator light to be provided on both sides at front wheel arch top area.

28.16 Height marker lamps of LED type in white colour 2 no's at front and in red 2 no's at rear shall be provided. The marker lamps shall be above windshield glass at front and above cant level at rear on maximum possible outer edges. Care shall be taken to prevent water entry from these lamps.

28.17 The tail lamps mounting shall not exceed 1500 mm from ground, 400 mm from the outer edge. The LED type tail lamps of 5" dia, two in red, one in amber and one in white colour shall be provided on both sides. The red colour lights shall have individual circuits for parking and brake lights.

28.18 Two fog lamps shall be provided in front bumper.

28.19 Rear number plate shall be provided with one LED type light for illumination or as per Homologation.

28.20 One 5 amps 3-pin sockets and switch along with gang box is to be provided on dash with 24V connections for connecting TIMS.

28.21 One reverse horn/alarm (4 tones) shall be provided with noise level not more than 100 dBA if not supplied with the chassis.

28.22 OE battery cut-off switch supplied with chassis shall be provided with separate fuse control. In case of non-supply of battery cut-off switch along with the chassis, IGSA-552 or part no. LP-134/3 of Lucas India Services Ltd., make shall be fitted in driver's cabin with a label "Battery Cut-off switch". The battery cut-off switch to be located 300mm above the cabin floor on 3mm GI plate provided in side structure.

28.23 PVC conduits of ½" dia are to be provided for routing the cables and non-metallic shielding is to be provided behind the socket in side structure to avoid any short circuit.

28.24 One MCB of approved make with a capacity of 5 amps shall be provided in AC circuit on driver partition in cabin.

28.25 LED Reading lamp/speaker console panels with AC louver of approved design and make shall be provided at every twin seat.

28.26 One LED TV in 32" size of make LG/SAMSUNG/SONY or any approved make of APSRTC shall be provided in driver cabin facing saloon.

28.27 One Pure sine wave type of Power inverter of approved make Amaron/V-guard/Argee/Neetu solar with 1 KVA capacity shall be provided in the driver's cabin. One power switch shall be provided on partition in cabin for tapping power for TV. The inverter is to be fitted on cabin

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floor beneath the co-driver rest berth with suitable plot form and clamps. Approved make amplifier with USB port is to be provided in Driver cabin.

28.28 SIX speakers of 4" size of approved make and brand (Five in saloon hat racks on both sides and one in cabin) with individual FRP boxes with separate switch control for LH/RH side speakers shall be provided. The speaker fitted in cabin has to be provided with volume control.

28.29 One Public Addressing System with mike with holder at right side nearer to driver for easy announcement without difficulty has been provided.

28.30 LED type light assemblies of 12 leads, 5W capacity of approved make are to be provided for illumination of Battery box, side luggage booths (each two in a booth), spare wheel carrier (one) and in rear luggage booth (each two in a booth).

28.31 Three Nos. of Surveillance cameras of approved make with night vision and one rear view camera with requisite connectors and cables shall be provided. One DVR with 15 days recording facility and a CC camera view monitor with 7 ½ X 5 ¼ size which has to show all the four cameras views when vehicle is in front moving also to be provided. One Camera has to be fitted to the A pillar on left side for front view of road, One Camera at driver side top fixed panel focusing towards driver & passenger entrance area and One Camera for Saloon which has to be fitted to partition to cover front and rear corner seats of both sides and the rearview camera to be fitted at top center of the rear FRP at outside of the body.

28.32 Monitor with 7 ½ X 5 ¼ size shall be provided in dash board FRP for display of all the four cameras views while vehicle is in front moment.

28.33 Never connect the circuits with twists & knots. Never tap power by slashing the main harness.

28.34 One electric fan of 24V, 8" dia. of REMI make shall be provided in cabin for driver.

29.0 BODY PAINTING AND COLOR SCHEME:

The exterior body to be painted with approved make & brand Polyurethane 2K metallic paints. The body under frame and chassis shall be painted with anti-corrosive, sound deadening and abrasive resistance bitumen based black paint of specified make. The exterior painting process shall consist of carefully cleaning and etching followed by surface leveling with polyester putty application, P.U primer surface coats, finish coat and glaze coat as per the recommendations of paint manufacturer. The quality of painting process and gloss should be of superior class. The bus should be painted in a booth with baking arrangements for superior finish and longer life.
Tentative approved metallic paint shades

Shade	Make & Shade Codes	
	Dupont	BASF(Salcomix)
Base Colour	Pearl White - MA 014.50 of BASF	
GREY	MM 498 light	628 Grigio Ghisa Met.
	MM 448 Thick	284/A Grigio Tenebroso Met.

29.1 Color Scheme shall be as per APSRTC approved scheme. The color scheme may be modified or changed at the time of execution of bus body fabrication as per the orders of Chief Mechanical Engineer (C&B).

29.2 Lettering and Sticker work is to be done as detailed below:

i. APSRTC monogram is to be provided as per SKETCH1516.

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ii. APSRTC website 'Book Your Tickets online "@ www.apsrtconline.in" is to be provided on both sides at side fixed glasses and at rear end FRP in white radium sticker with Times New Roman font in two rows.
iii. Front wind screen glass is to be provided with sun control film up to 300 mm from top side edge.
iv. 'APSRTC' in white radium sticker with Times New Roman font front in 7" size is to be provided on front wind screen glass on top side.
v. Labeling is to be done with red vinyl sticker for battery box, luggage booth, diesel tank, air cleaner, jack point and spare wheel.
vi. Seat nos. as per lay out are to be exhibited in red vinyl sticker with letter size 25Hx6TH on hat rack beading.
vii. 'Suswagatham' and 'Happy Journey' are to be provided in vinyl sticker of suitable colour at top side of entrance door and on driver partition respectively.
viii. A slogan in Telugu shall be exhibited as follows on the partition wall.

"ఈ బస్సు మనందరిది !
దీనిని పరిశుభ్రంగా వుంచుదాం !! "

29.3 Spare ladder shall be provided

30.0 The following care shall be taken while fabricating A/C Bus bodies.

30.1 The A/C unit shall be mounted on the vehicle by fabricator as per the guide lines of AC manufacturer.

30.2 The roof structure shall be fabricated according to the mounting details of A.C. unit manufacturer. Suitable reinforcements in 6mm plate shall be provided at mountings. A/C mounting shall ensure dust proof/water leak proof duly sealed with P.U. sealants of approved brands. Additional reinforcement has to be provided in roof structure to withstand weight of A.C. Unit.

30.3 A.C. ducting shall be provided in 0.91 mm G.I. sheet with 6 mm Nitrile foam Insulation with strip type clamps. The approximate cross-sectional area of duct shall be 100 square inches. The duct ends on both sides shall be inter-connected at rear end. Technical support of the AC manufacturer may be taken at the time of fabrication.

30.4 The duct shall be provided with console panel with twin AC louvers at each twin seat. E 2 consoles (Louvers) shall be of VOLVO type of PACOLINE or any approved make have to be provided for individual berth.

30.5 AC ducting shall also be provided with six openings with grill covers on each side for even circulation of air.

30.6 AC ducting shall be extended up to driver seat area and attender seat area in cabin to facilitate sufficient cooling in cabin.

30.7 AC Cab Command control panel shall be located on the dash board panel as per the manufacturer's guidelines.

30.8 The routing of compressor hose pipes, condensate drain pipes shall be made concealed and ensure dust/water proof. The compressor mounting area in cabin shall be provided with flap doors on sides and at top to have access to compressor and belts/pulleys.

30.9 The flap door at AC Compressor shall be fabricated with frame and embossed in MS mesh of 1.6 mm thick and to be hinged at top side.

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30.10 The air flow rate at any vent shall not be less than 4.5 m/sec.

30.11 No luggage carrier shall be provided in A/C buses. Spare ladder shall be provided same as in non-A/C buses.

30.12 Two sets of Curtains of venetian blinds type in approved shade shall be supplied along with bus. Curtain rails (SP-445) shall be provided on both sides at cant level with nylon hooks. A suitable retaining hook of ABS/PVC shall be provided for curtains on each pillar.

31.0 Fire detection & suppression system (FDSS) in engine compartment and Fire Detection & Alarm System in driver cabin & passenger compartment shall be provided as per AIS-135.

31.1 In the case of vehicles having an internal combustion engine or a combustion heater located either to the front or rear, the engine compartment shall be equipped with a fire alarm system providing the driver with both an acoustic and a visual signal, and activating the hazard warning signal, in the event of sensing either abnormally high temperature or rate of temperature rise, or both in the engine compartment and in each compartment where a combustion heater is located.

31.2 In addition to the fire alarm system, vehicles shall be equipped with a fire suppression system in the engine compartment and each compartment where a combustion heater is located.

31.3 The fire detection & alarm system and the fire detection & suppression system shall be automatically activated through a fire detection system. The detection alarm system shall be designed so as to detect a temperature in the engine compartment, and in each compartment where a combustion heater is located in excess of the temperature occurring during normal operation. There shall not be any false alarm.

31.4 The fire alarm system and the fire suppression system shall be operational irrespective of whether engine has been started and the vehicle's attitude.

31.5 The fire detection & suppression system shall be installed according to the system manufacturer's installation manual.

31.6 An analysis shall be conducted prior to the installation in order to determine the location and direction of suppression agent discharge point(s) (e.g. nozzles, extinguishing agent generators or extinguishing agent discharge tube or other distribution points). Potential fire hazards within the engine compartment and each compartment where a combustion heater is located, shall be identified and discharge point(s) located such that the suppression agent will be distributed to cover the fire hazard when the system activates. The spray pattern and direction of discharge points as well as the throwing distance shall be ensured to cover identified fire hazards. The system shall also be ensured to work properly regardless of the vehicle's altitude, road conditions etc.,

31.7 Fire hazards to be taken into account in the analysis shall at least consist of the following: Components whose surface may reach temperatures above the auto-ignition temperature for fluids, gases or substances that are present within the compartment and electrical components and cables with a current or voltage high enough for an ignition to occur as well as hoses and containers with flammable liquid or gas (in particular if those are pressurized). The analysis shall be fully documented.

31.8 The suppression system shall be scaled from the tested system, based on the total gross volume of the engine and auxiliary heater compartments where the system is to be installed. When measuring the engine compartment and the auxiliary heater compartment,

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the gross volume of these compartments shall be measured, i.e. the volume of the engine and its components shall not be subtracted.

31.9 The scaling of the system includes the mass of the suppression agent, all discharge points and the mass of the propellant gas container, if applicable. The system pressure shall remain the same as in the tested system. If the system includes a discharge tube for the extinguishing agent, the length of the tube shall be scaled without nozzles. It is acceptable if the suppression system has more extinguishing agent and/or more discharge points and/or a longer discharge tube for the extinguishing agent and/or more propellant gas than required according to the scaling models found.

32.0 MISCELLANEOUS FITTINGS TO BE PROVIDED:

32.1 Two Fiber /PU handles of approved make with 100 mm size are to be provided at waist level of cabin front end. Two footsteps on the bumper shall be provided for giving feasibility to clean the front windshield glasses. Footsteps should not protrude outside the bumper.

32.2 Two electrically operated rear view mirrors (RVMs) of convex type of PACOLINE or any approved sources conforming AIS: 001 with fiber/ABS covers and suitable brackets, shall be fitted on either side of body at cant level with proper reinforcement. The fitment of the rearview mirrors shall comply the provisions of AIS: 002.The approved brands are Pacoline /Manas /Engine Tech.

32.3 The registration number shall also be painted and exhibited on the driver's partition facing the passenger seats. The registration number shall also be painted on the right and left side of the body as per the CMV Rules, 1989.

32.4 Provision shall be made for easy removal and fitment of air cleaner during the maintenance duly providing flap doors.

32.5 Two Roof hatches with inbuilt exhaust fan of MSL or Spheros or any approved make source of APSRTC make shall be provided in saloon area with proper lid, EPDM U rubber sealing and holding mechanism. Two numbers of roof Air ventilators cum emergency roof hatches (522 x 966mm) having inbuilt exhaust fan are to be provided in the Passenger Saloon. Roof Air ventilators to be got approved from CME(C&B).

32.6 One roof Air ventilator of size 19"x15" shall be provided in the Drivers Cabin as shown in the drawing. The lid of cabin roof ventilator shall be of 14 SWG Aluminium sheet. Pull and push type mechanism with gas springs be provided with Grip handle. Ventilator shall be perfectly dustproof by providing dustproof rubber.

32.7 The OE bonnet to be retained if the chassis is supplied with bonnet.

32.8 There should not be any leakage of hot air in to the driver cabin from engine bonnet, gear lever boot or floor. The bonnet shall be so designed to ensure free flow of air from radiator fan to downwards.

32.9 In the event of any premature failure or improper workmanship, the firm should send technical persons within 72 hours of intimation for body maintenance and repair.

32.10 Two fire extinguishers of B Class type approved make and dry chemical type 5.0 kg capacity conforming to IS: 2171 of 1985 suitable for 'A' 'B & C' class of fires shall be provided with suitable MS clamping arrangement, one in cabin and one under the rear most seat.

32.11 Retractable cable wired pointed glass breaking hammers with suitable clamping and strap are to be provided on every window pillar (10 nos) for breaking glasses in case of emergency.

32.12 Electric buzzer with 6 nos. bell switches of approved type to be provided.

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and/or a longer discharge tube for the extinguishing agent and/or more propellant gas than required according to the scaling models found.

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35.10 Retractable cable wired pointed glass breaking hammers with suitable clamping and strap are to be provided on every window pillar (10 nos) for breaking glasses in case of emergency.

35.11 Electric buzzer with 6 nos. bell switches of approved type to be provided.

35.12 One roller type Sun Visor of approved source which has to be covered the complete front wind screen glass with proper width shall be provided in driver cabin.

35.13 Rubber mud splashguards of size 560x457 mm for rear and front wheels to be provided. Mud wings shall be fitted with bolt and nuts in order to facilitate for removing and refitting during the maintenance.

35.14 First aid box of size 300x200x100 mm in stainless steel with leather straps and locking arrangement shall be provided in driver's cabin. First aid medicine kit containing the items mentioned under Rule 138(4)(d) of the latest M.V. Rules and MED Lr.Dt.19.04.23 shall be provided in the box.

a. Sterilized dressings or cotton bundles(15-25 gms) ... 2 pcs.
b. Elastic bandage for wounds and burns or roller bandages ... 5 pcs.
c. Betadine ointment Big or a tube of antiseptic cream containing

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	0.5% of cetrimide B.P in a non-greasy base	... 1 pc.
d.	Dettol (plastic Bottle)	... 1 pc.
e.	Neosproin / Nebasulf	... 1 pc.
f.	New sealed blade	... 1 pc.
g.	Burnol ointment	... 1 pc.
h.	Water proof plaster or white adhesive tape	... 1 pc.
i.	Band – Aid flat/round or sterilized elastic plaster	... 4 pcs.

35.15 Colour shades painted on the bus shall be displayed along with RAL numbers and colour codes marked on a sheet of 150x150mm size and location will be communicated during fabrication.

35.16 One footstool of size 450x150mm finished with 12 mm ply, vinyl mat and beading at edges shall be provided in the driver cabin at foot control pedals.

35.17 The entrance door, emergency door and driver's door shall be provided with water drain canopies at cant level in 0.91 mm GI sheet with black powder coated finish.

35.18 One assist rail of 25 mm dia x 1.6 mm thick and 600 mm length in stainless steel of 304 grades and in 2B finish shall be provided on the interior side of 'B' pillar at driver door.

35.19 One assist rail of 32 mm dia x 1.6 mm thick in stainless steel of 304 grade and in 2B finish shall be provided left side of cabin extending from floor to a height of 1500 mm following the side pillar and then horizontally landing on driver partition.

35.20 Suitable Nylon sockets shall be used for fitment of all assist rails.

35.21 LED destination boards of size 1800X 220 mm & 900 X 220 mm one each (as per UBS-II specification) with built in controller and LCD display for front LED destination board with a provision of numbers from 0 to 9 and Up & Down buttons to select service number & route, shall be provided **at front and rear** end of bus with proper tapping & secured clamping and Communication cable to be provided from Front master LED board to rear LED board for display of same route course details in both the boards.

35.22 Tapping of compressed air for windscreen wiper, and air suspension should be taken from port no.24 of system protection valve or auxiliary tank with proper unions, 'T' joints Metallic pipeline of 5.0-mm dia. with copper coated interior shall be used for tapping air. The pipeline shall be firmly clamped in position.

35.23 One attendant seat with collapsible bottom cushion (size: 400x400x50mm), fixed back (size: 400x300mm) and safety belt shall be provided in the cabin. The frame shall be made in SS sq. tube 30x30x1.6 mm. The cushions shall be with 40 mm P.U. foam mounted on 8 mm plywood and upholstered with 'Raymond Dobby/sparkle' fabric of approved shade.

35.24 Retro-Reflective Conspicuity Marking tapes of Diamond grade 50 mm wide conforming to AIS: 90 of approved make shall be bonded to the body sides as per the sketch provided. The cumulative length of tapes provided shall not be less than 80% of length of that side. These tapes shall be white in color at front, yellow on sides and in red at rear of the body.

35.25 An access door shall be provided in front fascia at brake valve and clutch fluid reservoir.

35.26 There should be enough provision in dash to reach the radiator tank for filling coolant. One more access opening shall be enough provision in dash at instrument panel to reach clutch fluid reservoir access door shall be provided at top foot step of passenger foot board for accessibility of fuel feed pump maintenance.

35.27 Driver's cabin shall be suitably ventilated. Below dash structure two Aluminum disc ventilators shall be provided at 'ABC' foot pedals.

35.28 Provision to be provided on front bumper top area on both sides for cleaning wind screen glass. Two Fiber handles of 100 mm size are to be provided at waist level of cabin front end.

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32.43 The ACP sheets used shall be of Metallic type only & prior approval of APSRTC has to be obtained with regard to colours of ACP sheet.

32.44 The materials and source of material used in fabrication can be as per Homologation certification submitted by the firm along with Bid or as per APSRTC approved list.

Dy CM ECC & B

SPECIFICATIONS FOR FABRICATION OF STAR LINER NON-AC SLEEPER – HIRE BUS BODY TENDER-2024

1.0 GENERAL DESIGN:

The general design shall be a streamlined body with passenger service door on left hand side (LHS) in front of front wheel with pneumatically operated in-swing door and passenger berths facing forward in 2X1 pattern at upper and lower areas.

2.0 REGULATION:

The general appearance, structure, berth layout etc., shall be in accordance with respective drawings. **The bus body design should comply with the provisions of latest CMVR, Bus Body Code AIS:052 along with AIS: 119, latest Motor Vehicle Rules, Government of Andhra Pradesh and any other statutory requirement. The coach interiors shall conform to the standard IS- 15061 / 2002.**

2.1 The firms shall possess Bus Body Accreditation Certificate issued by CIRT /ARAI or any other Agency approved by GOI and shall be registered with APSRTC.

3.0 MAIN DIMENSIONS: (ALL DIMENSIONS ARE IN MILLIMETERS**)**

SL NO	CHASSIS DESCIPRTION	AL 236" WB	TATA 244"WB	EICHER 244"WB
	Chassis Suspension : Front & Rear Air Suspension with out Retarder			
1	Wheelbase	6000	6200	6200
2	Front overhang	2265	2265	2205
2	Rear overhang	Should be limited to 60%		
3	Overall length	Should be limited to 12000		
4	Overall width max	2600		
5	Pillar centers (std)	1900		
6	Waist rail height from Skirt level	1762		
7	Cant rail height from waist level	1478		
8	Interior saloon clear height (Maximum) after finishing	2240		
9	Clear aperture of passenger service door (minimum)	Min 650		
10	Clear aperture of Driver door	Min 650		
11	Berth capacity	30(15U+15L) Berth		

4.0 DRAWINGS: The list of drawings to be followed are shown at **ANNEXURE –I**.

5.0 MATERIAL: The fabrication of bus bodies shall be as per the specifications and the material shall be procured from the recommended sources / brands of material as mentioned in **ANNEXURE-II**.

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6.0 CHASSIS POSITIONING:

6.1 All chassis received by the firm for fabrication of bus bodies should be kept safely in a covered area. The chassis should not be kept open to atmosphere with out any protection to avoid damage to chassis and its units due to rain, dust and heat.

6.2 Before commencement of bus body fabrication all important units of chassis viz. alternator, self-starter, radiator, tyres, batteries, air cleaner, air cleaner indicator, power steering reservoir, fuse boxes, electrical relays, brake pipe lines, filters, clutch reservoir and meter cluster should be protected by providing suitable covering in addition to disconnecting the wiring connections to vehicle ECU, ABS ECU, Vehicle tracking unit protecting the wiring harness connection ends with proper covering to prevent from damages that may occur due to welding, drilling, cutting, hammering, riveting, falling of metal scrap or dust during the course of fabrication. Driver seat, steering wheel, hand brake valve etc., shall also be protected from any damage or paint spray.

6.3 Chassis number on long members and identification plates provided by the chassis manufacturer shall be properly covered and protected before commencing the fabrication work.

6.4 The Ashok Leyland/TATA/EICHER chassis are being supplied with following items as OE fitment.

1. Cabin floor on RH side
2. Bulk head structure (AL)
3. Out riggers on RHS(AL)
4. Anti-sag channel (TATA)
5. Engine bonnet
6. Knitted Driver seat
7. Head lights 24v E2 with relays
8. Front indicators E2
9. Tail Lamps E2
10. Battery cut off switch
11. Wiper motor with twin blades/linkages(Tata/Eicher)
12. Washer tank with pipes(TATA)
13. Reflective warning triangles with stands
14. Wheel stoppers
15. Spare wheel carrier (rope type/cage type)
16. First aid kit
17. Tools as per CMVR
18. Rear view mirrors with brackets (E2 plus 1 small mirror)
19. Electrical horn
20. ELR safety belt E1

7.0 PROTECTIVE TREATMENT:

7.1 All Mild Steel components, including rolled sections except GI tubes and sheets used for fabrication shall be PRE-TREATED WITH COLD PHOSPHATING PROCESS/Three in One Solution to a high quality by dipping and wiping off with a dry cloth to remove all dirt/oil etc. as per IS-3618. After the above process, all components shall be applied immediately (without any time lag) with anti-corrosive Zinc phosphate epoxy primer "Rust-o- Cap" (part no.24570608320) of M/s. Asian Paints or '60 BT PRIME GREY' of M/s. Akzo Nobel, to a thickness of 40 to 50 microns before assembly.

7.2 After assembly of structure and completing the welding work, all the joints shall be carefully cleaned, ground and applied with Epoxy primer without any time delay and then complete body structure shall be applied with the above anticorrosive paint once again fully.

7.3 After completion of body assembly, bitumen based anti-corrosive, abrasive resistance and sound deadening property coating (Morrai Hydroban/3M/Sika) of the make as specified in material specifications shall be applied on the under-floor body frame members and chassis.

7.4 All Alu. Components shall be carefully cleaned with thinner. Bi-metallic paint shall be used at joints of dissimilar metals. The interior and exterior panels should be cleaned with thinner and then self-etching primer shall be applied.

8.0 BODY STRUCTURE:

8.1 **GI STRUCTURE:** All principal structural members should be in Galvanized Iron Tubes as per BIS 4923-2017 of grade YST-310.

8.2 **Aluminum components:** All Aluminum extruded sections should be of Alloy designation 64430, 63400 and 65032, condition WP as per IS: 733 – 1983. All Aluminum sheets shall conform to alloy designation 19000, condition H2 of IS: 737 of 2008. All aluminium chq.sheets shall confirm to BIS:737:2008,alloy designation 65032,Temper WP.

8.3 Chart no. CB23CTG132 and Drg.no. CB23AEG112 (sheet 1&2) containing the details of specifications of Aluminum extruded sections and sheets shall be followed.

8.4 **GI&MS Steel structural members:** Galvanized steel sheets should be as per grade 175GSM of IS: 277- 2018. Rolled sections should be as per IS - 2062 of 2011. The structural joints shall be by bolting, MIG welding and combination of both. The welding should be full length of joints. After welding, slag to be removed and ground to smooth finish to avoid sharp edges and then Epoxy primer to be applied without any time delay.

8.5 All bolts used shall be of sizes reckoned in Metric system. The bolts shall be of high tensile hexagonal head bolts of fine thread, conforming to property clause 8.8 of IS: 1367 of 1979. The nuts of approved anti-vibrate type such as Nyloc conforming to IS: 1364 of 1983 shall be used. All bolts, nuts and washers should be galvanized. Each bolt and nut shall be provided with a flat washer. A spring washer should accompany every tapped bolt. The approved brands of bolts are TVS / STL / UNBRAKO/ IMPERIAL FASTENERS/ KFL/HFL only.

9.0 PARTICULARS OF IMPORTANT STRUCTURAL MEMBERS:

All structural members should be in GI steel tubular sections, pressed sections or MS rolled sections as mentioned below:

Sl. no.	Description	Material
1	Cross bearers & runners	Formed GI 3 mm Box 'C' type 50X175X50 mm
2	Anti sag bar	Rolled steel channel ISJC 75x40x6 mm
3	Floor longitudes	GI Pressed inverted 'U' section 25x50x25x3 mm thick
4	Pillars, Stump pillars and horizontal supports	GI Rectangular tubes 60X40X3 mm main pillar & horizontal supports and GI Square tubes 40x40x2 mm for stump pillars
5	Roof sticks	GI rectangular tubes 60x40x2mm
6	Roof longitudes	GI rectangular tubes 60x40x2mm

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7	Crib rail	GI Pressed L in 40x40x2 mm
8	Cant rail	GI Rectangular tubes 60x40x3mm
9	Sole bar	GI Rectangular tube 60x40x3 mm
10	Waist rail	GI Rectangular tubes 60x40x3mm
11	Gussets for saloon, cabin under frame and roof structure	GI Triangular gussets 75x75x3 mm thick
12	Skirt rail	GI Rectangular tubes 40x20x2mm thick
13	Step edge beading	Indal 5701 section
14	Body side beading	Hindalco SP-6551 section
15	Window sections a) Window guide b) Sweep rubber section	 a) Hindalco 6482 section b) Hindalco 2691 section
16	Flap door stiffener	Hindalco SP-4822 section
17	Flap door hinge	Hindalco SE- 9390, SE- 9389 sections
18	MS Tapping plates	6 mm thick
19	Steel rod for door hinges	6.35 mm dia of EN 430 bright grade

10.0 PRECAUTIONS:

10.1 "NEGATIVE TOLERANCES" are not allowed either for Aluminum Extruded sections or Aluminum sheets and GI sheets/tubes.

10.2 All welding shall be done with MIG welding process only. Under any circumstances, arc welding shall not be allowed. Welding of Stainless-steel components shall be done with TIG welding process only with same grade SS filler rod.

10.3 The following workmanship must be carefully followed during the fabrication.

i. All castings must be truly formed and free from blow holes.
ii. All bolts and rivets should be well fastened.
iii. Thorough water test shall be carried out before fixing the interior ceiling using pressurized water spray system. The fabricator shall equip water leak test facility conforming to IS: 11865/1982 at the firm for conducting leak test in two stages i.e., before fixing the interior ceiling and before dispatch of vehicle. At all stages the coach shall be water leak proof.
iv. All welded joints must well ground to get a smooth surface finish. All the welded joints shall be applied with epoxy primer anti-corrosive paint immediately without any delay to prevent the corrosion.
v. Sharp corners shall be grounded and made smooth.
vi. Wherever pitch for rivets / bolts is not specified, it shall be 100 mm.
vii. Bolt ends shall protrude at least 2 to 3 threads length above the nuts
viii. Roof stick, roof longitude, floor longitude and waist rail members shall butt properly at mating joints and shall not have gaps at the joints.
ix. All tapping bolts such as grab rail, handles and assist rail bolts etc., shall be tightened using thread lock adhesive of approved makes.

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x. All fixed glasses shall be provided with ceramic coating of suitable width on periphery.

xi. There shall not be any air pockets, wrinkles in laying vinyl mat and edges of mat are to be hot welded at all the mat joints.

11.0 FIBER REINFORCED PLASTIC (F.R.P.): All the FRP profiles shall be of FR grade and to comply with the provisions of IS: 15061:2002. The thickness of front & rear FRP shall be 4 mm and dash board shall be 3 mm. The FRP profiles developed shall be produced for approval of Chief Mechanical Engineer before taking up for fabrication. The layup of FRP profiles shall be as detailed below:

a) Two coats of ISO UV FR grade Gel coat and surface mat 30
b) CSM 400 mat layer with ISO FR grade resin
c) WR 610 mat layer with ISO FR grade resin
d) CSM 400 mat layer with ISO FR grade resin
e) WR 610 mat layer with ISO FR grade resin
f) Permitted pigments and additives
g) Grey primer coat
h) Suitable reinforcements at all points of fastening
i) Front bumper reinforcement

12.0 CAB UNDERFRAME STRUCTURE:

12.1 The Ashok Leyland 236" WB chassis will be supplied with OE cab floor, bulk head structure, out riggers, driver seat and engine bonnet. The cab under frame shall be fabricated as per the Drg. NSC23659.16UF23313. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side & LH side of cabin shall be connected in line with the 1 st cross bearer with **ISMC channel 100X50X6mm**. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

12.2 An Anti-sag bar in 3-pieces in ISJC 75x40x6 mm connecting both 1st pillars and chassis frame shall be provided.

12.3 Out riggers in M.S. angles 50x50x6 mm shall be provided connecting 'B' (2nd) pillars to the chassis long members by means of clamps made of M.S flat 50x6 mm.

12.4 The dashboard frame shall be covered **with FR- grade FRP mould of 5 mm thick in approved** design.

12.5 Monitor with 7½ X 5¼ size shall be provided in dash board FRP for display of all the four cameras views while vehicle is in front moment.

12.6 Flap doors with Auto Hinges, Steel collapsible handles and tower bolts shall be provided at fuel feed pump, air cleaner, power steering reservoir, instrument panel etc., to facilitate easy maintenance and access.

13.0 BODY FRAME STRUCTURE:

13.1 The bus body frame structure should be fabricated as per the following drawings.
Ashok Leyland 6000 mm (236") WB chassis : NSC23659.16SL23311and NSC23659.16SR23312

13.2 Cant rail joint shall be provided with box type reinforcement formed by welding of two GI pressed U sections of 17x27x17x2 mm in 300 mm length and to be plug welded on both sides.

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13.3 The body structure has to be prepared with GI square and rectangular sections suitably reinforced at stress concentric points for structure.

13.4 All the pillars located at front & rear end, Main pillars, Entrance door pillars and shall be provided in GI of 3 mm thick.

13.5 Engine protection guard to be provided in the front-end structure to safe guard the engine in case of front collision.

13.6 FRP mat reinforcement layers have to be provided at rear corner areas and wheel arch top areas for additional strength and to prevent water seepage.

13.7 1st pillars on both sides are to be formed to match the shape of front wind screen glass profile.

13.8 Pillar to waist rail joints shall be provided with plus type gussets, the joints connecting waist rail to diagonals/stump pillar shall be provided with proper gussets.

13.9 Fuel oil tank mouth shall be provided with an opening of size 250 mm x 250 mm, flap with suitable auto hinges, collapsible handles and locking arrangement.

13.10 MS tapping plates of 150 mm length in 30x3 mm flat shall be provided wherever necessary for fixing body components such as grab rail, assist rail, partition etc.

13.11 Chassis long members shall not be disturbed (as shown in the respective drawings) while fabricating the rear luggage booth.

13.12 Pillar to waist rail joints shall be provided with plus type gussets, the joints connecting waist rail to diagonals/stump pillar shall be provided with proper gussets.

13.13 Emergency door shall be provided at rear end at gangway level.

14.0 CABIN AND BODY MOUNTING:

14.1 The OE Cabin floor and mounting arrangement shall be retained. The remaining portion of cabin floor connecting 1st -cross bearer and OE floor shall be fabricated as per Drg.no. NSC23659.16UF23313for Ashok Leyland 6000 mm (236").

14.2 The saloon gangway shall be made in line with cabin floor.

14.3 The body should be mounted on the chassis web duly providing 6 mm (inverted pressed "L" type) 150 X 150 X 6 MM M.S. plate as per the size shown in the respective drawings over the chassis long members. These "L" plates shall be bolted together at every cross bearer mounting to long member web with M12 X 50 H.T. bolts at least 4 nos. per plate.

14.4 OE holes on the chassis long members shall only be picked up for mounting this plate. Wherever the holes are not matching holes shall be drilled on the web 40 mm below the top level of long member with prior approval.

14.5 Box type cross bearers formed with two C type GI formed sections of 50X175X50X3 mm completely MIG welded are to be provided. On these Cross bearers, **60X40X3 mm GI tubes of 170 mm length** are provided vertically to provide a belly dickey space for luggage in between chassis and body floor. On top of these GI tubes, flooring structure has been fabricated with 40X40X3 mm MS 'L' angular and chequered plywood.

14.6 The C type cross bearers should be fully welded with the structure main pillars and stump pillars on all the four sides.

14.7 These cross bearers are to be inter connected at bearer bottom surface (base plate top) level by using GI Square tubes of size 40 x 40 x 2 mm thickness on both sides along the chassis longitudinal members. The base plate should be fastened to the chassis with 16 mm dia. "U' bolts of approved make and with 150X6 mm thick base plate welded to the bottom of cross bearer wherever L plate not possible.

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14.8 Spacers made of Aluminum casting shall be placed between bottom flanges of chassis long member and "U" bolts. The "U" bolts are to be made out of EN-15/14B steel as per IS 5517-1978 (Tensile strength 80 kg/Sq.mm minimum). The "U" bolts should be galvanized and fitted with galvanized nyloc nuts as per drg.no.CB23UBG114. The length of bolt shall suit the depth of chassis long member and should not project more than 6 mm after tightening the nuts.

14.9 At rear axle H- portion, along the chassis, longitudinal and cross-wise diagonal 60x40x3mm and 40 x40x2mm GI tubes are to be provided as truss.

14.10 The body mounting must be easily detachable from the chassis during major overhauls/repairs.

15.0 CABIN AND SALOON FLOOR:

15.1 The cabin and saloon floor and gangway shall be laid with 12 mm thick polymer impregnated compressed chequered plywood conforming to IS: 3513 (Part-3)-1989 and shall provide 0.5mm SS sheet at all places of the bottom berths wherever the luggage booth is not provided. The Plywood should be bolted to the under-frame members with CSK self-tapping screws of 6 mm size (for steel application) at a pitch of 200 mm.

15.2 The floor plywood should be overlaid with 2.0 mm thick non-skid safety vinyl mat of FR grade with good quality adhesives of approved brands with minimum joints, without gaps and air bubbles.

15.3 Aluminum step edge beading of Isuzu / Scania / AL-SLF type with insert duly anodized/yellow powder coated shall be provided along the edges of step well, gangway and at rear area. Aluminum 'L' beading duly anodized / powder coated shall be provided along the edges of vinyl mat in luggage booths. The flooring shall be made dust proof.

15.4 FRP mat reinforcement layers have to be provided at rear corner areas & wheel arch top areas for additional strength and to avoid dust and water entry into saloon.

15.5 At wheel arch areas, FRP layer shall be formed over 0.9 mm GI sheet before laying 12 mm compressed plywood and followed by vinyl mat.

15.6 The height of rear wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

15.7 Trap door of 580 x 540 mm must be provided in cabin flooring above gearbox. One more trap door of size 860 x 520 mm shall be provided in gangway above rear axle for maintenance. Trap doors in floor shall be finished with vinyl mat and Aluminum Fluted strip. Sunken type steel collapsible handles to be provided to lift the trap door.

15.8 On both sides, side luggage booth's structure shall be fabricated with MSL 40X40X6mm, GI 25X40X25X2 mm pressed section and 40x6 mm MS flats.

15.9 The vertical panelling of the booth and finishing of out riggers in side luggage booth is to be done with 0.91 mm GI sheet covered with hammer tone paint.

15.10 SS tube of OD 25 X 2 mm thick shall be provided in side luggage booth to ensure safety for luggage.

15.11 Flap doors which are to be provided at Air bellows area with tapped bolts for easy access of air bellows.

15.12 Removable doors are to be provided in side luggage booth area for easy maintenance of EMR unit at top and side areas.

15.13 Separate cut outs are to be provided in side luggage booth area for easy maintenance of EMR unit at top and side areas.

15.14 Plastic caps are to be provided on top of the U Clamp projections in side luggage booth areas.

15.15 A cut out shall be provided with a flap door for maintenance of DEF tank at right side back area of front wheel.

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15.16 A cut out shall be provided with a flap door having air vent lovers at EATS unit area for proper heat dissipation.

16.0 BODY PANELING:

16.1 Truss Panel: The interior panel from waist to crib to be provided with 3 mm ACP of FR grade as per the design and source approved by APSRTC pasted with PU sealants to the structural members.

16.2 All pillar finishers covering vertical and horizontal members should be in ALP window vertical finisher / **0.5mm SS sheet.** Plastic buttons and screw caps for metal screws shall be used for fixing finishers on the pillars.

16.3 The mud wings should be in G.I of 0.91mm thick formed to suit the wheel arch and to be welded to transverse angle at wheel arch. While providing mud wings, care shall be taken to avoid damages to air bellows of suspension system. Proper gap shall be maintained between Air bellows & body members.

16.4 Cabin vertical portion i.e., front truss panel at pedals and side truss panel from front end to driver door pillar shall be covered with 0.5 mm Stainless Steel sheet of scotch brite finish and 430 grade.

16.5 Thermocole insulation of 40 mm thick of FR grade shall be provided between exterior and interior panels of body side structure between waist rail to floor and roof.

16.6 USB and 5 pin socket wiring harness to be provided in both sides of saloon and rear side with PVC Conduit Pipes with suitable connectors.

16.7 Stretch panel:

i. The exterior body from waist to crib level (660 mm) to be in 0.91-mm Skin Pass quality GI sheet and shall be laid horizontally in single piece by stretching in a fixture by applying load and then welded rigidly to the rear most pillar and rear pillar of entrance door and driver door. There should not be any wrinkles or waviness or rattling in the stretch panel after welding.

ii. The stretch panel shall be formed to 'Z' profile on top edge to a depth of 12 mm in roller machine.

iii. The top edge of the stretch panel to be sealed with P.U. sealant to avoid leakage of water to the structure. P.U. sealant shall also be applied on the structural members for bonding the stretch panel to the structure.

iv. Approved brands of P.U. sealants are: Sikaflex, Total seal, 3M, Anabond and Henkel.

16.8 Side Modular panels:

i. The exterior body below stretch panel up to skirt rail shall be in 2.00 mm thick Aluminum Sheet i.e., at front wheels, rear wheels and rear of rear wheels. All flap doors including Spare Wheel Carrier door and rear luggage booth door shall be in 2.5 mm thick Aluminum sheets.

ii. All the wheel arches shall be provided with FRP wheel fenders in 3 mm thick.

iii. The waist rail of bottom windows shall be of GI Tubular section of size 60x40x3mm shall be mounted horizontally between the pillars as per drawing.

iv. Box type gussets of size 25 x 50 x 2mm shall be welded at bottom corners of waist rail with side and stump pillars.

v. The rail above the bottom windows shall be of GI Tubular section of size 40x40x2mm thickness, as shown in the drawing.

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vi. The area between bottom row of windows and top row of windows shall be closed with GI sheet of 0.91mm thick on both sides duly covering with approved foam Rexene on inside with a height of 318 mm.

vii. The waist rail of top windows shall be of GI Tubular section of size 40x40x2mm shall be mounted horizontally between the pillars as per drawing.

viii. The top rail of top windows which is also Cant rail shall be of GI Tubular section of size 60X40X3mm thickness, as shown in the drawing. The cant rail shall be mounted on top of the side pillars and welded fully.

ix. Above the wheel arches, two rows of GI tubular section of size 40x40x2mm be fully welded from wheel arch bay to front end and at rear wheel arch bays.

x. The crib rail shall be of GI Pressed L in 40x40x2 mm. It can be mounted on top of the floor structure on the corner edge of the side pillars right round and it should be welded fully with the side pillars.

xi. The skirt rail shall be of GI tubular square section of size 40x20x2mm on both sides and welded to the side pillars bottom right round.

xii. Between waist rail and crib rail , 40x20x2mm GI Tube truss reinforcement shall be provided diagonally as shown in the Drawing.

xiii. The waist rail areas are to be provided with ALP window PVC finishers / 0.5 mm SS sheet at all window bay areas properly.

xiv. Below cant rail level and below the upper berth, provision be made for fixing the curtain cloth by providing aluminum extrusions hooks.

xv. The side flap doors shall be fabricated with 2.5 mm thick Aluminum sheet with hinges in Hindalco SE 9389 and SE 9390 sections and Aluminum pressed top hat profile of 25X25X150X2mm bonded with P.U. sealants of approved make. The hinge sections shall be joined together with a 430 Grade bright grade stainless steel rod of 6.35 mm dia. Flap doors should be reinforced duly pasting the Hindalco SP4822 section with P.U. sealants along the four edges. The hinge at top should be welded to this stiffener before pasting. The Aluminum hinges should be fastened to the bottom side of tube 60x40x3 mm at floor level duly providing tapping plate of GI 3 mm thick with M6 screws. P.U sealant shall also be applied for bonding hinges to the structural members while fastening. The flap shall also be reinforced with 2 mm thick Aluminum Pressed top hat profile of 150 mm in two rows duly pasting with P.U. sealants for provision of locks, blinkers etc., and proper reinforcements shall be given for fixing of locks, stay rods etc., Dust proof door rubber of EPDM quality to be provided for these doors along the edges. These panels shall be pre formed to match the body profile. There should not be any play in hinges.

xvi. All flap doors shall be provided with E 2 550N stay shockers .All flap doors shall be provided with 2 nos. of door locks of VOLVO type flap door lock with indicator in black colour on both sides. FRP/ABS covers in 2 mm thick shall be provided for these locks on inner side of flap door to avoid ingress of dust. Preferably flap door opening shall be parallel to the bus body or minimum 120 degrees from closed position. The flap doors should be in level with the pillar finishers and bottom skirt rail properly.

xvii. The battery box, spare wheel carrier, HSD oil tank, Ad Blue Tank and Air tanks etc., i.e., the area with in wheel base should be provided with these flap doors.

16.9 The front-end fascia consisting of bumper and detachable front grill door (FOP) shall be provided in 5 mm thick FRP profiles with provision for fixing head lights and indicators etc., as per the approved design. Front bumper center piece shall be made detachable. Front grill top piece shall be fitted with linkages and upward lifting mechanism consisting of two handles and two gas springs 350N of approved make and lower grill to be fitted with bolts. There should

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not any gap between structural members and front fascia. Front FRP to be pasted with sealant as well as fastened with M6 screws/riveted to the structure. Front FOP shall be in level with the aperture on all sides properly.

16.10 The rear end body shall be as per the Drg.nos. NSC23659.16CS23316, NSC24455.65CS23216 & NSC244555.65CS23116 The rear end body to be covered with 4 mm thick FRP profile in single piece. The luggage booth flap door shall be in 2.5 mm single piece Aluminum sheet with proper reinforcements, The flap door shall be reinforced with 2mm thick Alu. Pressed top hat profile 150mm in two rows, Prakash type seven lever center Lock and two budget locks provided on two sides and two pneumatic balancers of approved make in 675 mm length and 550N capacities. The balancers shall have ball joints at both ends.

16.11 The FRP profiles developed shall be produced for approval of CME(C&B) before taking up for fabrication.

17.0 ROOF STRUCTURE:

17.1 GI rectangular tubular section roof stick of size 60x40x2mm thickness, contour to body be provided as per drawing. The roof sticks be mounted on the Cant rail and fully welded. The curvature of the roof sticks shall be well finished and there should not be any wrinkles. The roof sticks be mounted on each main pillar and in between main pillars having both sides "L" cleats as shown in the drawing.

17.2 The roof sticks shall be joined with minimum 5 rows (one row at the center and two rows on either side) of roof longitudes in each bay are 60X40X2 mm thickness. All the above longitudes must be welded to the respective roof sticks with box type GI gussets.

17.3 Necessary reinforcements of 6mm thick M.S. flats / sheet be provided in the roof structure for mounting of berth partitions, roof lamps, speakers etc.

17.4 The joint of the roof structure and cant rail be provided with M.S. angle section of size 40X40X3mm thickness to the fully length of the body, on both sides of inside corners as reinforcement.

17.5 One Roof hatch with lid of size 500mmX500mm, EPDM U rubber sealing, and holding mechanism shall be provided in driver cabin above driver seat.

17.6 Two Roof hatches with exhaust fan of MSL or Spheros make shall be provided in saloon area with proper lid, EPDM U rubber sealing and holding mechanism.

17.7 The Interior roof ceiling, upper berth bottoms and center portion of roof between berth brackets (with a width of 610 mm), Driver partition on both sides and side truss panels shall be provided with 3 mm ACP of FR grade in approved shade. Remaining portion i.e., interior roof, all window finishers shall be provided with **0.7PVC coated GI sheet / 0.5mm SS sheet**. and foam type Rexene of approved shade and design. The material should conform to IS 15061-2002 in respect of FR grade characteristics and behavior. The joints shall be provided with decorative beading with insert and plastic end caps.

17.8 The exterior of complete roof shall be in 0.91 mm G.I. skin pass sheet full length of body in two pieces (laid longitudinally) and welded. The overlap joint should be on longitudes, welded together from outside at the joint, full length without any blowholes or burning has to be visible throughout the length before fitment of interior paneling. Roof joints should be water leak proof. The roof sheet shall be tack welded to roof structural members from inside and all tack welds shall be applied with PU sealant after shower test. The roof joints, i.e., centre joint and front & rear doom joints shall be over laid with weather shield strip of approved make in 100 mm wide and 2 mm thick after shower testby confirming no leakages at any cost.

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18.0 WINDOW FRAME AND GLASSES:

18.1 **WINDOW FRAME:** Both bottom and top side windows shall be of unit construction in the form of bent frame to match the profile contour of the side structure so that the whole window frame assembly can be easily fixed on to the body by using rubber packing and fasteners rigidly. The window frame should be black powder coated. Aluminum extrusion "E" section of aluminum extrusion indal 6482 or its equivalent be used with inner flocked rubber channel.

18.2 The window frame corner joints be welded and at corners aluminum 'L' cleats be riveted. The window frame shall be fixed with 2 nos. of ¼" CSK machine screws on each side and 3 nos. on top so as to cover the respective pillars. Below the window frame, before fitment of frame, 18 SWG aluminum "z" Section be provided at waist rail level by using P.U. sealant. The window frame at bottom be provided with slot holes at sides and center to drain-out the water. Spacer packing of Balata packing/rubber to be provided below window frames to provide passage to drain out water.

18.3 **WINDOW GLASSES:** Good quality and reputed make bent Safety toughened **gray** tinted float glasses of 5 mm thickness conforming to IS-2553 (Part-2) - 1992, be provided to the windows. Both the sliding glasses shall be provided with latest design metallic window locks. The over lapping be at least 50mm. For both inside and outside glasses, "H" extrusion with good quality EPDM sweep rubber shall be provided for removing dust and are should be water- proof. The driver's door and its opposite entrance door window glasses be provided with clear toughened glasses only. Standard size of window glass shall be 525 x 930 x 5 mm.

18.4 Bent type clear toughened float glasses of 5mm thickness shall be pasted with reputed make of highly reliable P.U. UV metal to glass sealant on the cant rail, window rail and side pillars above driver and entrance door.

18.5 Inside portion of window pillars, berth partition pillars and waist rails be provided with ALP window vertical finisher / ALP waist rail PVC finisher / 0.5mm thick SS sheet. Below cant rail level and below the upper berth, provision be made for fixing the curtain cloth by providing SS pipe which has to be provided as detachable with clamp.

18.6 The bottom area of bottom berth / shoe rack upper area on both sides have to be illuminated by providing good quality approved LED strips in suitable Aluminium extrusion in complete length.

18.7 The both sides of the roof above the gang way have to be illuminated by providing good quality approved LED strips in suitable Aluminium extrusion in complete length.

19.0 FOOT BOARD:

19.1 The footboard structure shall be fabricated to suite in-swing door in M.S. angles 40x40x6 mm, 40x40x3 mm and MS flats 40x6 mm in three steps with minimum tread depth not less than 250 mm and tread height not to exceed 250 mm.

19.2 The step well assembly structure be fabricated by using 40x40x6mm M.S. formed angles, 100 x 50 x 6mm M.S. rolled channel and 40x20x2mm GI tube. Step well step be covered with vinyl mat. The steps raised portion and step-well truss portion be provided with 0.70 mm thickness stainless steel sheet. All the sides of the step- well shall be bolted apart from welding perfectly to the floor structure. Aluminium step- edge extrusions shall be provided on the steps.

19.3 Foot board steps shall be provided and illuminated with good quality approved LED strips in approved Aluminium extrusiion throughout the edges on all sides.

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19.4 All the edges of Step well shall be provided with ISUZU/SCANIA/AL-SLF beading as per drawing finished with yellow powder coating and PVC insert in yellow color similar to RKS-21 of M/s RK PROFILES Pvt.Ltd.

20.0 CABIN PARTITION:

20.1 There shall be a partition with full width of the body separating the saloon from cabin up-to the roof height and is with single flap door. The partition wall shall be fabricated in GI tubes 40x20x2 mm, GI formed Z section 25X40X25X2 mm and MS flats 25x3 mm and covered with 3 mm ACP sheet of approved make and shade on both sides.

20.2 One maintenance door located on bottom side of the partition by providing hinge arrangement at top side of the door to lift upside i.e., located above the floor trap door on gear box. The door shall be finished with ACP sheet of FR grade on both sides and finishers on all edges. One steel tower bolt of 6" size is to be fitted on bottom edge to lock the door.

20.3 On left side of the partition, one full partition door has to be provided and shall be finished with 3 mm ACP of FR grade on both sides and finishers on all edges. The door shall be made sound proof. The door frame shall be provided with valence rubber profiles for proper sealing. The door shall be provided with three heavy duty hinges and one heavy duty Godrej make lock that shall be operatable from inside and outside. The door glass up to waist level shall be clear in 5.0mm thick bonded with P.U sealant to flap frame. The door glass upto waist level shall be fitted in EPDM rubber. Aluminum sheet 1.6mm 'L' finishers shall be provided from inside along the edges of glasses.

20.4 The partition shall be provided with reinforcement for fitment of audio system box. The wiring cables shall be routed through a PVC conduit of 1" dia provided in partition structure. Curtain shall be provided for the partition door at saloon side.

21.0 FRONT WIND SHIELD GLASS, SALOON REAR GLASSES AND WINDOWS:

21.1 The cabin front-end shall be fitted with single piece-curved windscreen glass of size 1680 (Height)X 2735(Width)mm as per the drawing no. CB18WSG138. The windshield glass shall be fitted in a MSL 25X25X3 mm angle frame with EPDM rubber beading of 50 mm as per sketch CB18ERG122. The curved laminated glass shall be of 7.76 mm minimum thickness with 0.76 mm minimum thickness of PVB interlayer and of select float quality, WAVE FREE as per IS: 2553(Part-II) – 1992.The approved brands for glasses are IMPACT and BANGALORE SAFETY. Ceramic coating of suitable width shall be provided on periphery.

21.2 The rear end saloon glass in single piece shall be bonded with P.U. sealant to the rear end FRP profile. The glass shall be of 5.0 mm thick, toughened float quality safety 'bronze' tinted glass as per IS:2553 – 1990 & IS:2835 – 1987. The size of the glass shall be 1950 (Width)X 1035(Height). Ceramic coating of suitable width shall be provided on periphery.

21.3 The cabin area shall be provided with glasses in 5.0mm thick toughened curved clear glasses on both sides.

21.4 The driver's door and its opposite entrance door window glasses be provided with clear toughened glasses only.

21.5 Inside portion of window pillars, berth partition pillars and waist rails be provided with finishers of ALP window vertical finisher (Fixed Glass Type) / ALP waist rail PVC finisher / 0.5mm thick SS sheet.

21.6 Below cant rail level and below the upper berth, provision be made for fixing the curtain cloth by providing aluminum extrusions hooks.

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21.7 The lettering work in vinyl stickering to be done on the rear end glass from inside as mentioned below:

" BREAK ANY GLASS IN EMERGENCY FOR EXIT "

In Telugu:

" అత్యవసర సమయంలో ఏ అద్దమునైనను పగులగొట్టుము"

21.8 Approved makes of EPDM rubber and flock channel are Rubber Extrusions & Moulding / ASP/ALP.

21.9 Approved makes of P.U sealants are Total seal /Sikaflex/3M India/Bostik / Anabond and Henkel.

22.0 PASSENGER ENTRANCE:

22.1 The passenger entrance cum exit and three to four raised (Trapezoidal) full type step well has to be provided shall suit to the pneumatically operated in-swing door. The door can be operated by approved make and fail safe highly reliable pneumatic actuating mechanism i.e., shall have 'open', 'close' and 'manual' stages and shall have provision to open from inside and outside in case of emergency.

22.2 The in-swing door be provided with 1 No. good quality highly reliable approved make Pneumatic Automatic Door Closure assembly of a reputed make. The assembly consisting of Air Cylinder (Aluminium body) – Double acting cylinder with adjustable cushioning at both ends conforming to IS 6431, 63 mm dia Bore, 200 mm stroke (operating pressure of 0.5 to 10 bar), front and rear brackets, Flow control valve, C.K. Connectors, Solenoid valve with relay, Air filter and Flexible Polyurethane tube of 6mm ID x 8 mm OD.

22.3 The step well assembly structure be fabricated by using 40x40x6mm M.S. formed angles, 100 x 50 x 6mm M.S. rolled channel and 40x20x2mm GI tube. Step well step be covered with 10swg aluminum chequered sheet. The steps raised portion and step-well truss portion be provided with 0.70 mm thickness stainless steel sheet. All the sides of the step- well shall be bolted apart from welding perfectly to the floor structure. Aluminum step- edge extrusions shall be provided on the steps.

22.4 The door frame shall be made in rectangle tubes 40 x 20 x 2 mm thick covered with 0.9mm GI Sheet from outside and 0.5 mm SS sheet from inside. Doorframe height shall not be less than 2150 mm. Door frame verticals should be provided with side valence rubbers.

22.5 The in-swing door should have one window at top side with horizontal sliding glasses of 5.0 mm thick toughened clear glasses with locking arrangement and one 5.0 mm thick toughened bronze tinted glass pasted to the door frame below the window frame with PU sealant. The door rubbers along the edges shall ensure dust/water leak proof. SS tube of 25mm OD x 2mm shall be provided diagonally.

22.6 The pneumatic door pipes shall be firmly clamped with tags and shall cover with corrugated sleeve, care shall be taken for chaffing of pipes while routing through structure.

22.7 Foot board is to be illuminated with one LED light assembly by placing at third step vertical portion facing towards door and having stickering on light glass area as **"APSRTC WELCOMES YOU"** which may not to affect the visibility of steps to passenger while boarding or alighting.

22.8 Foot board steps shall be provided with approved good quality LED strips throughout the edges on all sides.

22.9 The bottom of the door shall be provided with brushes PVC / Plastic bristle to clean the tread of 1st step.

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22.10 One assist rail in stainless steel 25 OD X 1.6 mm thick of 304 grade shall be provided in sunken type on the inner side of in-swing door. One PU handle of min. 400 mm length shall be provided on inner side of in-swing door. One assist rail cum grab rail in stainless steel 32 mm dia x 2 mm of 304 grade shall be provided from floor to cant rail to partition wall.

23.0 EMERGENCY DOOR:

23.1 Emergency door shall be provided at rear end at gangway level.

23.2 One Emergency door extending from saloon raised floor with a height of 1500 mm at rear end shall be provided as per the layout and drawings. The door is to be fixed to the pillar with two heavy duty hinges of 6 mm thick. The door is to be provided with one small grey tinted glass of 5.0 mm at top side and with one heavy duty lock operable from inside.

23.3 The location of the emergency door is to be exhibited from inside and outer periphery by providing reflective tape in red colour. The door shall be provided with one stainless steel railway type latch of 6 mm thick from inside.

23.4 The door shall be provided with one stainless steel railway type latch of 6 mm thick from inside.

23.5 One emergency hooter has to be provided at inner side top area of the door. It has to meet the latest norms of APMVR/CMVR/AIS:052.

23.6 Red colour LED light has to be provided at Emergency door area inside the saloon.

24.0 DRIVER DOOR:

24.1 The driver door shall be provided on right side from cabin floor level to a height of 1570 mm with a width of 860mm. The door frame in GI rectangle tube 40x20x 2 mm shall be covered 3 mm ACP of approved FR grade from inside and 0.91 mm G.I. sheet from outside. Door frame should be provided with valence rubber on three sides. The inner face of door aperture shall be provided with side ball type door seal rubber duly providing formed L section in 20 G GI sheet.

24.2 The door shall be fitted with one vertical sliding type window with glasses of 510 mm (H) x 485 mm (w) and another window at bottom of frame with horizontal sliding glasses of size 260mm (W) x 260mm (H).

24.3 The window frame shall be provided with clear toughened sliding glasses with locking arrangement. The door window glasses shall be of 5.0 mm thick toughened safety clear float glasses. The door shall have one heavy-duty door lock of approved MSL make and type with outer handle, one locking latch from inside and dove tail catches. The door shall be fitted with two forged hinges on 'A' pillar with suitable reinforcements.

24.4 All the door openings shall be provided with canopy in 0.91 GI sheets and finished with black powder coating.

24.5 One assist rail of 25 mm dia x 1.6 mm thick in stainless steel of 304 grade and in 2B finish shall be provided on the interior side of driver door with suitable Nylon steel brackets.

25.0 PASSENGER BERTHS:

25.1 Full berth size partitions with approved widths to accommodate 5 rows of berths in five bays as per approved drawings can be fabricated by using GI tubes of size 25x25x2mm for verticals, horizontals and diagonals duly welded to the floor structure, side structure and roof structure. Center to center distance between partitions should be 1900mm.

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25.2 Horizontal reinforcement flats of 3mm thickness shall be provided for fitment of light luggage rack cum bottle holder, Socket of Mobile / Laptop charger, Mobile holders and Individual lights.

25.3 A hat section of 100W X30H for fitment of mobile charger both USB and 5-pin socket shall be provided with switch control at driver individual laser type LED reading lights with switch has been provided at partition head area of each berth.

25.4 A Cell phone pouch of approved make has to be provided at each berth on berth partition area.

25.5 Width of RH side berth shall be 1220mm and LH side berth be of 610mm.

25.6 The structure of berths has to be fabricated with M.S. 'L' angle of size 40X40X3mm located at 416 mm above the cross bearer top level (with belly dicky).

25.7 The height between the berths (bottom of lower berth to bottom of upper berth) and between the upper berth bottom to interior roof ceiling should be 1020mm.

25.8 The area between upper berth top and bottom edges and interior of side window frame and also at lower berth top and bottom edges and interior of side window frame has been illuminated with approved good quality LED strips throughout interior body length on both sides.

25.9 M.S. Top hat section of size 20x100x20x2mm in 2 rows for double berth and 1 row for single berth have to be provided horizontally on berth structure.

25.10 Bottom of all lower berths be provided with 10mm thick BWR plywood conforming to IS 710 / IS 393:1989 of reputed make. Lower berths bottom area will be provided with 0.5mm SS sheet wherever luggage booths are not provided. Both sides of plywood shall be applied with wood primer.

25.11 Passenger berths are of PU Cushion with flat type (Corona type) of size 1860x600x100mm for each passenger has to be provided. Berth cushions to be covered with good quality Rexene.

25.12 At partition area, individual back pads are to be provided for each berth. An inclined formed section of 0.91mm GI has been provided at 460mm from partition top end at each berth as same as back pad. The dimensions of back pad are 700 H X (400 X 560) W X (140 X 100) T and with cushion as per the Homologation Certificate of the firm which has to be covered with approved shade Rexene.

25.13 One Arm rest with pad has to be provided between back pads at all twin berth areas.

25.14 In twin berth areas, removable type pads have to be provided between the berths.

25.15 The supports on both ends of the berth provided as support for passengers in gangway side shall be covered properly with approved good quality Rexene to avoid injuries to the passengers.

25.16 The berth details with back light and APSRTC Logo has to be provided at roof top in gangway at each partition to find their berths by the passengers.

25.17 SIX speakers of 4" size of approved make and brand (Five in saloon and one in cabin) shall be provided in gangway at roof top in saloon gangway area. The speaker fitted in cabin has to be provided with volume control.

25.18 Ladder made out of SS tube of 20 x 20 x 2 mm of width of 300 mm has been provided between the lower and upper berths.

25.19 Grip handle of 250mm long be provided for each compartment to facilitate easy movement of passengers of upper berths.

25.20 E 02 Nos. of Stopper strips of SS pipes with FRP Pads covered with Foam rexene are to be provided equally spaced for the berths towards gangway side.

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25.21 One row of window guard rail of stainless-steel tube in 304 grade and 2B finish of 20mm OD x 1.6 mm thick as per IS: 6913-1992 has to be provided at a height of 120mm above waist level for both upper and lower berths at inside of windows on both sides of the vehicle. The pipes shall be bolted to the pillars with intermediate support brackets, end sockets and M6 bolts. Tapping plates in M.S. flat 30x3 mm x 125-mm long shall be provided on pillar for fitment of guard rails.

26.0 Interior themes (Prior approval of the Corporation shall be taken in writing before fitment of the interior Themes):

26.1	Curtains	:	E 2 Sets – E.2 sets, Beige-117 (Pramod Traders)
26.2	Vinyl floor mat	:	2 mm SR Beige.
26.3	Back pad center portion	:	Dotted Beige
26.4	Back pad flaps	:	Dotted maroon.
26.5	Berth Cushion	:	Dotted Beige.
26.6	Pin mat	:	Green / Blue.

27.0 LIGHT LUGGAGE RACK CUM BOTTLE HOLDER: Light luggage rack cum bottle holder fabricated with sizes of 16 OD x 1.6mm SS pipe 350x400mm for single berth and 350x900mm for double berth be provided and mounted to the partition at leg area.

28.0 DRIVER'S SEAT: The Aesthetically designed pneumatically adjustable heavy duty driver seat of UNO MINDA make or any approved source of APSRTC shall be provided. The OE Air assisted bellow type driver seats supplied with chassis shall be returned to the Corporation. The driver seat frame mounting on cabin floor shall match the OE mounting position.

28.1 The seat shall have to and fro, up and down adjustment of 100 mm with reclining back and to be fitted 350 mm away from steering wheel edge when the seat is fully forwarded.

28.2 The height of driver seat bottom shall be 450 mm when measured in fully lowered position.

28.3 There shall be a thigh clearance of 200 to 260mm between steering wheel edge and driver seating position.

28.4 The driver seat shall be so located that the center line of driver seat shall be 705 mm away from the center line of body.

28.5 The driver seat shall be provided with "ELR" type safety belt of M/s. Autoliv or Rane make conforming to AIS : 052.

28.6 One foldable type driver berth shall be provided in cabin by utilizing the space available in the driver partition above the level of driver's seat. The frame shall be made in GI Square tube 30x30x2 mm with overall size of 1600x480 mm with an extension of 300mm. The rest berth shall be finished with powder coating in black colour. The berth cushion shall be with 50mm P.U. foam mounted on 8 mm plywood and upholstered with 'Raymond Dobby or Sparkle/BMD/RELIANCE make' fabric of approved shade. The driver berth bottom area shall be covered with pre-coated GI sheet of 0.70 mm.

29.0 REAR LUGGAGE BOOTH:

29.1 A luggage booth at rear end shall be provided across the width of the body and also on right side in rear most bay (in 'L' shape) as indicated in the respective drawings. However, the rear luggage booth has to be provided duly giving access flap doors on both LH and RH side of the rear luggage area, in case rear luggage booth door is not provided. Two ISMC 75X40 Channels extending from rear end structure, connected to chassis long members by two ISMC

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75X40 Channels placed vertically and welded to web mounting plates of last cross bearer. Remaining booth floor shall be fabricated in MS angles 40x40x3 mm.

29.2 Booth interior vertical sides shall be provided with 0.91 mm GI sheet with hammer tone paint.

29.3 All flap doors including rear luggage booth door shall be in 2.5 mm thick Alu. Sheets which all are to be provided to accommodate 120^0 openings. Rear luggage booth door has been provided with Prakash type seven lever center Lock and two budget locks provided on two sides with 550N telescopic balancers.

29.4 All luggage booths (both side and rear) floor bottom area including Belly Dicky shall be laid with 12 mm compressed chequered plywood in FR grade and Aluminium 5 bar/Diamond chequered plate of 2 mm thick duly bolted with M6x40mm bolts at a pitch of 100 mm to floor structural members with Dust proof rubber of 1.5 mm shall be laid at joints and edges of the cheq.plate to avoid dust/water entry into the booth. Intermediate bolting shall be done with M8 bolts at edges and 75x40 channels at a pitch of 200mm.

29.5 Booth flap door shall be provided with two, 550N telescopic balancers of approved makes / VOLVO type flap door locks with indicator light type flap door locks on both sides. Booth flap doors shall be provided with door seal rubber to make it dust / water leak proof. The balancers shall have ball joints at both ends.

29.6 In the Battery box, above the battery, horizontal partition shall be made for tool box up to the saloon floor level. Toolbox shall be provided with 38x38x3 mm M.S. pressed angles, 16 SWG Aluminium chequered sheet and rubber mat.

30.0 SPAREWHEEL CARRIER:

30.1 One cage type spare wheel carrier shall be provided on LHS behind rear wheels. The OE spare wheel carrier if supplied with the chassis is of cage type, it shall be located as shown in the structural drawing. The carrier shall be mounted on chassis duly providing the vertical and horizontal supports in ISJC 75X40 Channel, gussets.

30.2 If the chassis are not supplied with cage type carrier, the firm shall provide one such spare wheel carrier. Care shall be taken to avoid fouling of spare tyre with any of the chassis units / spares under any circumstances.

30.3 The spare wheel carrier area is to be provided with one flap door similar to side luggage booth. The cage shall be suitable for 295/80/22.5 tube less tyre.

30.4 One LED light with switch to be provided in spare wheel carrier area.

31.0 BATTERY BOX:

31.1 The battery box under the saloon floor as per the layout drawing on LH side shall be fabricated in MS angle 40x40x6 mm and MS flat 40x6 mm. The batteries shall be mounted on a turning / PUSH and PULL type Cradle that shall accommodate two 12V batteries.

31.2 Paneling of inside walls is to be done with 0.91 mm GI sheet followed by Hammer tone coating and the bottom of the box shall be provided with 12 mm compressed chequered plywood. Complete inner surface is to be over laid with 0.5 mm stainless steel sheet. The bottom of the batteries in cradle shall be provided with 12 mm-compressed plywood and acid resistant rubber mat.

31.3 Batteries shall be provided with suitable clamping, wood packing to prevent vibrations when the vehicle is in operation. One cutout is to be done on longitudinal wall for passage of battery cables and is to be provided with 6 mm balata with an 'X' type cutting. Four rows of full-length battery cables without joints shall be connected to the battery cut-off switch terminals. The

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terminals and cables should be firmly clipped in position with cable tie and soldered. One LED light shall be provided in Battery Box for illumination. If any specific recommendations by OEM, the batteries mounting will be continued as per OEM, but it should be accessible for maintenance of batteries

31.4 One guard rail of SS 25 X 1.6mm pipe with brackets to be provided at front side to safeguard them.

32.0 ELECTRICAL WIRING AND OTHER FITMENTS:

32.1 The earth-return system of wiring should be used. All automotive cables used shall be of approved make and brand conforming to IS: 2465 – 1984 quality covered with PVC sleeve as per IS: 1951-1961. Wherever the cables have to pass through roof and side structures, PVC conduits of ½" dia shall be provided. There shall not be any loose or hanging cables, and if they pass through holes in panels or structural members other than roof and side structures, rubber grommets shall be provided in the holes of such panels and structural members and shall be securely clipped as near as practicable to such rubber grommets to avoid chaffing.

32.2 Wiring shall be provided with suitable connectors for all lighting and audio points including additional tapping points for any future requirements. The saloon wiring shall be provided through wire casing fitted along the side wall that it shall be easily accessible at all points and there shall not be any need to strip major paneling of body to carry out repairs. Any wiring, which has to run along the chassis frame shall be securely, clipped to ensure that there shall be no chaffing with any of the moving parts. Further care shall be taken to route such wiring in such a way that it is not subjected to splashing of oil, water, mud etc.

32.3 The battery main cable of size 398/0.40 mm shall be provided as required duly using good quality lugs with proper soldering, bolting and insulation etc. There shall be no joint in battery cables.

32.4 The saloon and cabin areas are to be provided with 5 nos. and 1 no of LED roof light assemblies of approved sources respectively. Out of the 5 roof lights in saloon, 2 lights are to be provided with in-built night lamps of blue colour. This is apart from the LED strips in suitable Aluminium extrusion fitted in the roof area on the gang way in full length. The assemblies shall be of approved make and specifications.

32.5 The location of the roof lights shall be as per the lay out. Suitable tapping plates in GI of 3mm thick to be provided in roof structure for fitment of LED lights. Center hat with 50 mm height from roof shall be provided with proper reinforcement in roof

32.6 All OE electrical items shall be retained and kept in working condition.

32.7 One Butterfly type Heavy duty wiper machine of 120W capacity 100 N-M with twin Suitable length wiper arms blades of 32" length of CIRT/ARAI approved make shall be provided for front windshield glass below the front waist rail on left side. The mounting bracket (formed 'L' in MS 6 mm plate) shall be welded to the structural members in such a way that it shall not interfere while removing radiator.

32.8 One Dual tone Air horn of Roots/ELGI make shall be provided. In addition to the OE electrical horn, one more electrical horn conforming to type -3 of IS 1884- 1993 shall be provided. The noise levels of these horns should be between 93dBA to 112dBA.

32.9 A 12-pole disc type fuse box with independent fuses designated for every electrical circuit shall be fitted on switch board provided at cant level. The current carrying capacity of a circuit shall be 1.5 times the load current of that electrical circuit. Maximum current carrying capacity of a circuit shall not exceed 15 Amps. The fuses used shall conform to IS-4063 /1982.

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32.10 Modular switches and sockets of in approved make and shade as per IS: 9433 –1980, 230Vx5 Amps shall be used for switch board, cell charging points. Switches are to be located on top side of driver door making a cutout in the hylam sheet of inner cabin panel / on Dash board fusible to driver to easy to operate. Non metallic shielding is to be provided in side structure behind the switches to avoid any short circuit. All switches / fuses shall be provided with metallic plate labels for indication.

32.11 Cable ends shall be suitably crimped with lugs/soldered so as to with stand vehicle vibrations. The inter connections shall be made through couplers/ junction boxes / terminal blocks only. Weather proof connectors shall be used for connecting cables which are exposed to atmosphere to avoid water/moisture ingress during use.

32.12 The fabricator shall supply electrical wiring harness diagram of the bus along with the vehicle.

32.13 Four headlights with parking & signal lamps of VOLVO type have to be provided. The OE head lights supplied with the chassis shall be returned back to this office along with the bus. Head lamp assemblies shall be fitted at a distance not more than 400 mm from the extreme outer edge of body and not more than 1200 mm height from the ground.

32.14 Front direction indicator lamps LED type of 2" dia shall be provided below 1500 mm height on the outer edge of body in amber colour. In addition to this, four more direction indicator lamps in amber color shall be provided on the lateral side of the body at wheels and below 1500 mm height from the ground.

32.15 E 1 AMW type indicator light to be provided on both sides at front wheel arch top area.

32.16 Height marker lamps of LED type in white colour 2 no's at front and in red 2 no's at rear shall be provided. The marker lamps shall be above windshield glass at front and above cant level at rear on maximum possible outer edges. Care shall be taken to prevent water entry from these lamps.

32.17 The tail lamps mounting shall not exceed 1500 mm from ground, 400 mm from the outer edge. The LED type tail lamps of 5" dia, two in red, one in amber and one in white colour on both sides shall be provided. Modern type good quality LED tail lamps having Poly-carbonate covers shall be provided.

32.18 Two numbers fog lamps shall be provided in the front at the convenient place in the Bumper.

32.19 Rear number plate shall be provided with one LED type light for illumination or as per Homologation.

32.20 One 5 amps 3-pin sockets and switch along with gang box is to be provided on dash with 24V connections for connecting TIMS.

32.21 One reverse horn/alarm (4 tones) shall be provided with noise level not more than 100 dBA if not supplied with the chassis.

32.22 One Buzzer or electric bell should be provided in the Driver's cabin and bell switch in the saloon nearer to driver partition.

32.23 OE battery cut-off switch supplied with chassis shall be provided with separate fuse control. In case of non-supply of battery cut-off switch along with the chassis, IGSA-552 or part no. LP-134/3 of Lucas India Services Ltd., make shall be fitted in driver's cabin with a label "Battery Cut-off switch". The battery cut-off switch to be located 300mm above the cabin floor on 3mm GI plate provided in side structure.

32.24 PVC conduits of ½" dia are to be provided for routing the cables and non-metallic shielding is to be provided behind the socket in side structure to avoid any short circuit.

32.25 One MCB of approved make with a capacity of 5 amps shall be provided in AC circuit on driver partition in cabin.

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32.26 Six speakers of 4" size of Boston (Si-600) or Pioneer (TS 1641 GS) or any approved make and brand speakers (5 provided in saloon and one in cabin) shall be provided. The speaker fitted in cabin has to be provided with separate switch.

32.27 One Pure sine wave type of Power inverter of approved make Amaron/V-guard/Argee/Neetu solar with 2 KVA capacity shall be provided in the driver's cabin. One power switch shall be provided on partition in cabin for tapping power. The inverter is to be fitted on cabin floor beneath the co-driver rest berth with suitable flat form and clamps. Approved make amplifier with USB port is to be provided in Driver cabin.

32.28 One Public Addressing System with announcing mike with holder at right side nearer to driver for easy announcement without difficulty has been provided.

32.29 LED type light assemblies of approved make are to be provided for illumination of Battery box, side luggage booths (two nos. in each booth), spare wheel carrier (one) and two nos. in rear luggage booth.

32.30 Amplifier-Ahuja make DPA- 370 Model and Sony make Digital Media Player of DSX-A100U model shall be provided.

32.31 Three Nos. of Surveillance cameras of approved make with night vision and one rear view camera with requisite connectors and cables shall be provided. One DVR with 15 days recording facility and a CC camera view monitor with 7 ½ X 5 ¼ size which has to show all the four cameras' views even the vehicle is in front moving direction. One Camera has to be fitted to the A pillar on left side for front view of road, One Camera at driver side top fixed panel focusing towards driver & passenger entrance area and One Camera for Saloon which has to be fitted to driver partition facing towards saloon to cover front and rear corner of saloon both sides and the rear-view camera to be fitted at top center of the rear FRP at outside of the body.

32.32 Never connect the circuits with twists & knots. Never tap power by slashing the main harness.

32.33 One electric fan of 24V, 8" dia. of REMI make shall be provided in cabin for driver.

33.0 BODY PAINTING AND COLOR SCHEME: The exterior body to be painted with approved make & brand Polyurethane 2K Metallic paints. The body under frame and chassis shall be painted with anti-corrosive, sound deadening and abrasive resistance bitumen based black paint of specified make. The exterior painting process shall consist of carefully cleaning and etching followed by surface leveling with polyester putty application, P.U primer surface coats, finish coat and glaze coat as per the recommendations of paint manufacturer. The quality of painting process and gloss should be of superior class. The bus should be painted in a booth with baking arrangements for superior finish and longer life. Approved metallic PU paints of ASIAN PPG, BASF (Wuerth), Dupont (Axalta), AKZO-NOBEL, Berger Rock and Nippon company makes.

33.1 Color Scheme shall be as per APSRTC approved scheme. The color scheme may be modified or changed at the time of execution of bus body fabrication as per the orders of Chief Mechanical Engineer (C&B).

33.2 The tentative Colour Scheme Photograph, Graphic details with coordinates and Font name & Font size for the brand name "STAR LINER" and Tag line "Sleep Travel And Relax" are enclosed herewith. The brand name & tagline shall be of radium sticker on both left and right side & rear side of the bus. The ML Codes for the approved Colour Scheme are furnished below:

Colour Name	Blue	Crystal white
RGB Decimal Code	2511101210	248i255:253

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HEX Code	#19AAD2	#FBFFFD

33.3 Lettering and Sticker work is to be done as detailed below:

a) APSRTC monogram is to be provided as per SKETCH1516.

b) APSRTC website 'Book Your Tickets online' @ www.apsrtconline.in' is to be provided on both sides at centre partition between top and bottom windows and at rear end FRP in white radium sticker with Times New Roman font in two rows.

c) Front wind screen glass is to be provided with sun control film up to 300 mm from top side edge.

d) 'APSRTC' in white radium sticker with Times New Roman font front in 7" size is to be provided on front wind screen glass on top side.

e) Labeling is to be done with red vinyl sticker for battery box, luggage booth, diesel tank, air cleaner, jack point and spare wheel.

f) 'Suswagatham' and 'Happy Journey' are to be provided in vinyl sticker of suitable colour at top side of entrance door and on driver partition respectively.

g) A slogan in Telugu shall be exhibited as follows on the partition wall.

"ఈ బస్సు మనందరిది !
దీనిని పరిశుభ్రంగా ఉంచుదాం !! "

33.4 Spare ladder shall be provided in non-A/C buses.

33.5 Two sets of Curtains of venetian blinds type in approved shade shall be supplied along with bus. Curtain rails (SP-445) shall be provided on both sides at cant level with nylon hooks. A suitable retaining hook of ABS/PVC shall be provided for curtains on each pillar.

34.0 Fire detection & suppression system (FDSS) in engine compartment and Fire Detection & Alarm System in driver cabin & passenger compartment shall be provided as per AIS-135.

34.1 In the case of vehicles having an internal combustion engine or a combustion heater located either to the front or rear, the engine compartment shall be equipped with a fire alarm system providing the driver with both an acoustic and a visual signal, and activating the hazard warning signal, in the event of sensing either abnormally high temperature or rate of temperature rise, or both in the engine compartment and in each compartment where a combustion heater is located.

34.2 In addition to the fire alarm system, vehicles shall be equipped with a fire suppression system in the engine compartment and each compartment where a combustion heater is located.

34.3 The fire alarm system and the fire suppression system shall be automatically activated through a fire detection system. The detection alarm system shall be designed so as to detect a temperature in the engine compartment, and in each compartment where a combustion heater is located in excess of the temperature occurring during normal operation. There shall not be any false alarm.

34.4 The fire detection & alarm system and the fire detection & suppression system shall be operational irrespective of whether engine has been started and the vehicle's attitude.

34.5 The fire detection & suppression system shall be installed according to the system manufacturer's installation manual.

34.6 An analysis shall be conducted prior to the installation in order to determine the location and direction of suppression agent discharge point(s) (e.g. nozzles, extinguishing agent

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generators or extinguishing agent discharge tube or other distribution points). Potential fire hazards within the engine compartment and each compartment where a combustion heater is located, shall be identified and discharge point(s) located such that the suppression agent will be distributed to cover the fire hazard when the system activates. The spray pattern and direction of discharge points as well as the throwing distance shall be ensured to cover identified fire hazards. The system shall also be ensured to work properly regardless of the vehicle's altitude, road conditions etc.

34.7 Fire hazards to be taken into account in the analysis shall at least consist of the following: Components whose surface may reach temperatures above the auto-ignition temperature for fluids, gases or substances that are present within the compartment and electrical components and cables with a current or voltage high enough for an ignition to occur as well as hoses and containers with flammable liquid or gas (in particular if those are pressurized). The analysis shall be fully documented.

34.8 The suppression system shall be scaled from the tested system, based on the total gross volume of the engine and auxiliary heater compartments where the system is to be installed. When measuring the engine compartment and the auxiliary heater compartment, the gross volume of these compartments shall be measured, i.e. the volume of the engine and its components shall not be subtracted.

34.9 The scaling of the system includes the mass of the suppression agent, all discharge points and the mass of the propellant gas container, if applicable. The system pressure shall remain the same as in the tested system. If the system includes a discharge tube for the extinguishing agent, the length of the tube shall be scaled without nozzles. It is acceptable if the suppression system has more extinguishing agent and/or more discharge points and/or a longer discharge tube for the extinguishing agent and/or more propellant gas than required according to the scaling models found.

35.0 MISCELLANEOUS FITTINGS TO BE PROVIDED:

35.1 Two Fiber /PU handles of approved make with 100 mm size are to be provided at waist level of cabin front end. Two footsteps on the bumper shall be provided for giving feasibility to clean the front windshield glasses. Footsteps should not protrude outside the bumper.

35.2 Two electrically operated rear view mirrors (RVMs) of convex type conforming AIS: 001 with fiber/ABS covers and suitable brackets, shall be fitted on either side of body at cant level with proper reinforcement. The fitment of the rearview mirrors shall comply the provisions of AIS: 002.The approved brands are Pacoline /Manas /Engine Tech.

35.3 The registration number shall also be painted and exhibited on the driver's partition facing the passenger berths. The registration number shall also be painted on the right and left side of the body as per the CMV Rules, 1989.

35.4 Provision shall be made for easy removal and fitment of air cleaner during the maintenance duly providing flap doors.

35.5 Two Roof hatches with inbuilt exhaust fan of MSL or Spheros or any approved make source of APSRTC make shall be provided in saloon area with proper lid, EPDM U rubber sealing and holding mechanism. Two numbers of roof Air ventilators cum emergency roof hatches (522 x 966mm) having inbuilt exhaust fan are to be provided in the Passenger Saloon. Roof Air ventilators to be got approved from CME(C&B).

35.6 One roof Air ventilator of size 19"x15" shall be provided in the Drivers Cabin as shown in the drawing. The lid of cabin roof ventilator shall be of 14 SWG Aluminium sheet. Pull and push

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type mechanism with gas springs be provided with Grip handle. Ventilator shall be perfectly dustproof by providing dustproof rubber.

35.7 The OE bonnet to be retained if the chassis is supplied with bonnet.

35.8 In the event of any premature failure or improper workmanship, the firm should send technical persons within 72 hours of intimation for body maintenance and repair.

35.9 Two fire extinguishers of B Class type approved make and dry chemical type 5.0 kg capacity conforming to IS: 2171 of 1985 suitable for 'A' 'B & C' class of fires shall be provided with suitable MS clamping arrangement, one in cabin and one under the rear most seat.

35.10 Electric buzzer with 6 nos. bell switches of approved type to be provided.

35.11 One roller type Sun Visor of approved source which has to be covered the complete front wind screen glass with proper width shall be provided in driver cabin.

35.12 Rubber mud splashguards of size 560x457 mm for rear and front wheels to be provided. Mud wings shall be fitted with bolt and nuts in order to facilitate for removing and refitting during the maintenance.

35.13 First aid box of size 300x200x100 mm in stainless steel with leather straps and locking arrangement shall be provided in driver's cabin. First aid medicine kit containing the items mentioned under Rule 138(4)(d) of the latest M.V. Rules and MED Lr.Dt.19.04.23 shall be provided in the box.

a.	Sterilized dressings or cotton bundles(15-25 gms)	... 2 pcs.
b.	Elastic bandage for wounds and burns or roller bandages	... 5 pcs.
c.	Betadine ointment Big or a tube of antiseptic cream containing 0.5% of cetrimide B.P in a non-greasy base	... 1 pc.
d.	Dettol (plastic Bottle)	... 1 pc.
e.	Neosproin / Nebasulf	... 1 pc.
f.	New sealed blade	... 1 pc.
g.	Burnol ointment	... 1 pc.
h.	Water proof plaster or white adhesive tape	... 1 pc.
i.	Band – Aid flat/round or sterilized elastic plaster	... 4 pcs.

35.14 Colour shades painted on the bus shall be displayed along with RAL numbers and colour codes marked on a sheet of 150x150mm size and location will be communicated during fabrication.

35.15 One footstool of size 450x150mm finished with 12 mm ply, vinyl mat and beading at edges shall be provided in the driver cabin at foot control pedals.

35.16 The entrance door, emergency door and driver's door shall be provided with water drain canopies at cant level in 0.91 mm GI sheet with black powder coated finish.

35.17 One assist rail of 25 mm dia x 1.6 mm thick and 600 mm length in stainless steel of 304 grades and in 2B finish shall be provided on the interior side of 'B' pillar at driver door.

35.18 One assist rail of 32 mm dia x 1.6 mm thick in stainless steel of 304 grade and in 2B finish shall be provided left side of cabin extending from floor to a height of 1500 mm following the side pillar and then horizontally landing on driver partition.

35.19 Suitable Nylon sockets shall be used for fitment of all assist rails.

35.20 LED destination boards of size 1800X 220 mm & 900 X 220 mm one each (as per UBS-II specification) with built in controller and LCD display for front LED destination board with a provision of numbers from 0 to 9 and Up & Down buttons to select service number & route shall be provided at front and rear end of bus with proper tapping & secured clamping and

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Communication cable to be provided from Front master LED board to rear LED board for display of same route course details in both the boards.

35.21 Tapping of compressed air for windscreen wiper, and air suspension should be taken from port no.24 of system protection valve or auxiliary tank with proper unions, 'T' joints Metallic pipeline of 5.0-mm dia. with copper coated interior shall be used for tapping air. The pipeline shall be firmly clamped in position.

35.22 One attendant seat with collapsible bottom cushion (size: 400x400x50mm), fixed back (size: 400x300mm) and safety belt shall be provided in the cabin. The frame shall be made in SS sq. tube 30x30x1.6 mm. The cushions shall be with 40 mm P.U. foam mounted on 8 mm plywood and upholstered with 'Raymond Dobby/sparkle' fabric of approved shade.

35.23 Retro-Reflective Conspicuity Marking tapes of Diamond grade 50 mm wide conforming to AIS: 90 of approved make shall be bonded to the body sides as per the sketch provided. The cumulative length of tapes provided shall not be less than 80% of length of that side. These tapes shall be white in color at front, yellow on sides and in red at rear of the body.

35.24 An access door shall be provided in front fascia at brake valve and clutch fluid reservoir.

35.25 There should be enough provision in dash to reach the radiator tank for filling coolant. One more access opening shall be enough provision in dash at instrument panel to reach clutch fluid reservoir access door shall be provided at top foot step of passenger foot board for accessibility of fuel feed pump maintenance.

35.26 Driver's cabin shall be suitably ventilated. Below dash structure two Aluminum disc ventilators shall be provided at 'ABC' foot pedals.

35.27 Provision to be provided on front bumper top area on both sides for cleaning wind screen glass.

35.28 One SS handle of 200 mm size to be provided on outer side of driver door.

35.29 Head light assemblies should be fitted to a rigid frame welded to front end structure. Head light should not be mounted on front end FRP.

35.30 Provision of two inspection doors with locks and sealing rubber for air suspension bellows attention.

35.31 A power connection has to be provided for the provision of VMU.

35.32 All the other mandatory accessories as per CMVR/APMVR/AIS:052 shall be provided.

35.33 Turf / Pin type good quality decorative mat of approved make shall be provided for entire length of gang way and cabin floor from step well to partition. The material should be Synthetic Resin, underlay black latex backing with flower buds with leaves of 6 Nos. per Sq. inch and 48 Nos. leaves per Sq. inch and each bud to have 8 leaves. The pile height shall be 14 mm (+/- 2 mm) with base.

35.34 All unutilized Chassis components to be returned at the time of delivery of bus.

35.35 At right side front corner at waist area, one peep window has to be provided.

35.36 Stainless steel sheets, tubes, pipes etc. should be of Jindal /any other make approved by APSRTC only has to be used.

35.37 One TIM holding stand with proper dimensions with 0.91 GI sheet which has to be covered properly and neatly with carpet/rexene has to be placed on dash board nearer to the left hand of driver with easy accessibility.

35.38 A footstool for driver to be provided in 3.0 mm Aluminum 5 - bar cheq. Sheet with Indal 2651 used for legs.

35.39 Monitor with 7 ½ X 5 ¼ size shall be provided in dash board FRP for display of all the four cameras views while vehicle is in front moment.

35.40 The fabricator shall fabricate 12M model buses as per their Homologation Certificate. However, they shall adhere to the broad specifications of APSRTC such as belly dickey for

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12M models, back pad for berths of sleeper buses and any other requirement specified in these specifications.

35.41 If there are any modifications in specifications are proposed during fabrication, it will be communicated by APSRTC from time to time and to be implemented immediately.

35.42 The ACP sheets used shall be of Metallic type only & prior approval of APSRTC has to be obtained with regard to colours of ACP sheet.

35.1 The materials and source of material used in fabrication can be as per Homologation certification submitted by the firm along with Bid or as per APSRTC approved list.

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SPECIFICATIONS FOR SUPER LUXURY BUS BODIES (40 SEATER) ON 244"/236" WB CHASSIS - HIRE BUS TENDER - 2024

1.0 GENERAL DESIGN:

The general design shall be a streamlined body with Passenger service door on LH side in front of front wheel with pneumatically operated in-swing door/Jack Knife door and Luxury Passenger Seats with 250mm reclining back facing forward in 2X2 pattern.

2.0 REGULATION:

The general appearance, structure, seat layout etc., shall be in accordance with respective drawings. **The bus body design should comply with the provisions of latest Central Motor Vehicle Rules, Bus Body code AIS:052, Andhra Pradesh Motor Vehicle Rules and any other statutory requirement that may come in to force during execution of fabrication work order. The coach interior shall meet the standard of IS: 15061-2002 or latest amended one.**

2.1 The fabrication firms must possess Bus Body Accreditation Certificate issued by CIRT/ARAI/or any other Agency approved by GOI.

3.0 MAIN DIMENSIONS: (ALL DIMENSIONS ARE IN MILLIMETERS**)**

SL NO	CHASSIS MODEL DESCIPRTION	AL 236" WB	TATA 244" WB	EICHER 244" WB
	Chassis Suspension : Front & Rear Air Suspension			
1	Wheelbase	6000	6200	6200
2	Rear overhang max 60% of WB	Max 60% of WB		
3	Front overhang	2450	2350	2400
4	Overall length	Max 12000 mm		
5	Overall width	2590		
6	Pillar centre (std)	1524		
7	Waist rail height from Skirt level	1550		
8	Cant rail height from waist level	1108		
9	Interior saloon clear height (Minimum)	2020		
10	Clear aperture of passenger service door (min. when measured from the edge of door flap)	650		
11	Clear aperture of Driver door	650		
12	Clear Aperture of Emergency Door	1250X762		
13	Seating capacity	40+1 Driver		

4.0 DRAWINGS: The list of drawings is to be followed are shown at **ANNEXURE– I**.

5.0 MATERIAL: The fabrication of bus bodies shall be as per the specifications and the material shall be procured from the recommended sources/brands of material as mentioned in **ANNEXURE-II**.

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6.0 CHASSIS POSITIONING:

6.1 The firm shall take care of all the chassis and its aggregates to avoid damage due to rain, dust and heat.

6.2 Before commencement of bus body fabrication all important units of chassis viz. Alternator, self-starter, radiator, tyres, batteries, air cleaner, air cleaner indicator, power steering reservoir, fuse boxes, electrical relays, ECU, EDC, accelerator Pedal ,brake pipe lines, filters, clutch reservoir and Instrument cluster should be protected by providing suitable covering and also wiring connections to Vehicle ECU, ABS ECU, Vehicle tracking Unit shall be disconnected and the Wiring harness connector ends should be protected to prevent from damages that may happened due to welding, drilling, cutting, hammering, riveting, falling of metal scrap or dust during the course of fabrication. Driver seat, steering wheel, hand brake valve etc., shall also be protected from any damage or paint spray.

6.3 Chassis number on long members and identification plates provided by the chassis manufacturer shall be properly covered and protected before commencing the fabrication work.

6.4 The Ashok Leyland, Eicher and TATA chassis are supplied with following items as OE fitment.

1. Cabin floor on RH side
2. Bulk head structure (AL)
3. Out riggers on RHS(AL)
4. Anti-sag channel (TATA)
5. Engine bonnet
6. Knitted Driver seat
7. Head lights 24v E2 with relays
8. Front indicators E2
9. Tail Lamps E2
10. Battery cut off switch
11. Wiper motor with twin blades/linkages (Tata/Eicher)
12. Washer tank with pipes (TATA)
13. Reflective warning triangles with stands
14. Wheel stoppers
15. Spare wheel carrier (rope type/cage type)
16. First aid kit
17. Tools as per CMVR
18. Rear view mirrors with brackets (E2 plus 1 small mirror)
19. Electrical horn
20. ELR safety belt E1

7.0 PROTECTIVE TREATMENT:

7.1 All Mild Steel components, including rolled sections except GI tubes and sheets used for fabrication shall be PRE-TREATED WITH COLD PHOSPHATING PROCESS/Three in One Solution to a high quality by dipping and wiping off with a dry cloth to remove all dirt/oil etc. as per IS-3618. After the above process, all components shall be applied immediately (without any time lag) with anti-corrosive Zinc phosphate epoxy primer "Rust-o- Cap" (part no.24570608320) of M/s. Asian Paints or *'60 BT PRIME GREY'* of M/s. Akzo Nobel, to a thickness of 40 to 50 microns before assembly.

7.2 After assembly of structure and completing the welding work, all the joints shall be carefully cleaned, ground and applied with Epoxy primer without any time delay and

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then complete body structure shall be applied with the above anticorrosive paint once again fully.

7.3 After completion of body assembly, bitumen based anti-corrosive, abrasive resistance and sound deadening property coating (Morrai Hydroban / 3M / Sika) of the make as specified in material specifications shall be applied on the under-floor body frame members and chassis.

7.4 All Alu. Components shall be carefully cleaned with thinner. Bi-metallic paint shall be used at joints of dissimilar metals. The interior and exterior panels should be cleaned with thinner and then self-etching primer shall be applied.

8.0 BODY STRUCTURE:

8.1 **GI STRUCTURE:** All principal structural members should be in Galvanized Iron Tubes as per BIS 4923-2017 of grade YST-310.

8.2 **Aluminium:** All Aluminium extruded sections should be of Alloy designation 64430, 63400 and 65032, condition WP as per IS: 733 – 1983. Aluminium 5-bar chequered plate with 3.0/2.0 mm base thickness shall conform to alloy designation 65032 and condition WP of IS: 737 of 2008. All Aluminium sheets shall conform to alloy designation 19000, condition H2 of IS: 737 of 2008.

8.3 Chart no. CB22CTG132 and Drg.no. CB22AEG112 (sheet 1&2) containing the details of specifications of Aluminium extruded sections and sheets to be used, shall be followed.

8.4 **GI & Mild Steel structural members:** Galvanized steel sheets should be as per grade 175GSM of IS: 277- 2018. Rolled sections should be as per IS - 2062 of 2011. The structural joints shall be by bolting, MIG welding and combination of both. The welding should be full length of joint. After welding, ground to smooth finish to avoid sharp edges and then Epoxy primer to be applied without any time delay. Under any circumstances, arc welding should not be used.

8.5 All bolts used shall be of sizes reckoned in Metric system. The bolts shall be of high tensile hexagonal head bolts of fine thread, conforming to property clause 8.8 of IS: 1367 of 1979. The nuts of approved anti-vibrate type such as Nyloc conforming to IS: 1364 of 1983 shall be used. All bolts, nuts and washers should be galvanized. Each bolt and nut shall be provided with a flat washer. A spring washer should accompany every tapped bolt. The approved brands of bolts are TVS/STL/UNBRAKO/IMPERIAL FASTENERS.

9.0 PARTICULARS OF IMPORTANT STRUCTURAL MEMBERS:

All structural members should be in GI tubular sections, pressed sections or rolled sections as mentioned below:

Sl.no.	Description	Material
1	Cross bearers & runners	Rolled steel channel ISMC 100x50x6 mm
2	Anti sag bar	Rolled steel channel ISJC 75x40x6 mm
3	Floor longitudes	Pressed inverted 'U' section 25x50x25X3mm GI (05 Rows)
4	Pillars, Stump pillars and horizontal supports	GI rectangular tubes 60x40x3 mm and GI Square tubes 40x40x2 mm
5	Roof sticks	GI square tubes 40x40x2 mm
6	Roof longitudes	GI square tubes 40x40x2 mm
7	Crib rail	GI 60x40x3 mm
8	Cant rail	GI rectangular tubes 60x40x3mm thick

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9	Waist rail	GI rectangular tubes 60x40x3 mm thick
10	Intermediate rail	GI square tubes 40x40x2 mm thick
11	Gussets for saloon, cabin under frame and roof structure	GI Triangular formed gussets 40x40x2 mm thick
12	Skirt rail	GI rectangular tubes 40x20x2mm thick
13	Step edge beading	Indal 5701 section
14	Body side beading	Hindalco SP-6551 section
15	Window sections a) Window guide b) Sweep rubber section	a) Hindalco 6482 section b) 'T' section c) 'F' section d) Hindalco 2691 section
16	Hat rack beading	Mercedes Benz type (drawing attached)
17	Flap door stiffener	Hindalco SP-4822 section
18	Flap door hinge	Hindalco SE- 9390, SE- 9389 sections
19	Steel rod for flap door hinges	6.35mm dia of EN 430 bright grade
20	Tapping plates	6 mm thick MS Flat/SS/GI

10.0 PRECAUTIONS:

10.1 "NEGATIVE TOLERANCES" are not allowed either for Alu. Extruded sections or Aluminium sheets and also for GI sheets/tubes.

10.2 All welding shall be done with **MIG** welding process only. Under any circumstances, arc welding shall not be allowed. Welding of Stainless-steel components shall be done with **TIG** welding process only with same grade SS filler rod.

10.3 The following workmanship must be carefully followed during the fabrication.

i. All castings must be truly formed and free from blow holes.

ii. All bolts and rivets should be well fastened.

iii. Thorough water test shall be carried out before fixing the interior ceiling using pressurized water spray system. The fabricator shall equip water leak test facility conforming to IS: 11865-1982 at the firm, for conducting leak test in two stages i.e., before fixing the interior ceiling and before dispatch of vehicle. At all stages the coach shall be water leak proof.

iv. All welded joints must be chipped and well ground to get a smooth surface finish. All the welded joints shall be applied with Epoxy primer anti-corrosive paint immediately without any time delay to prevent the start of corrosion.

v. Sharp corners shall be grounded and made smooth.

vi. Wherever pitch for rivets / bolts is not specified, it shall be 100 mm.

vii. Bolt ends shall protrude at least 2 to 3 threads length above the nuts.

viii. Roof stick, roof longitude, floor longitude and waist rail members shall butt properly at mating joints and shall not have gaps at the joints.

ix. All tapping bolts such as grab rail, handles and assist rail bolts etc., shall be tightened by using thread lock adhesive of approved makes.

x. All fixed glasses shall be provided with ceramic coating of suitable width on periphery.

xi. There shall not be any air pockets, wrinkles in laying vinyl and edges of mat are to be hot welded at all the mat joints.

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11.0 FIBER REINFORCED PLASTIC (F.R.P.):

All the FRP profiles shall be of Fire-Retardant grade and to comply with the provisions of IS:15061 – 2002 or latest. The layup of FRP profiles shall be as detailed below:

a. Two coats of ISO UV FR grade Gel coat and surface mat 30
b. CSM 420 mat layer with ISO FR grade resin
c. WR 610 mat layer with ISO FR grade resin
d. CSM 420 mat layer with ISO FR grade resin
e. WR 610 mat layer with ISO FR grade resin
f. Permitted pigments and additives
g. Grey primer coat
h. Suitable reinforcements at all points of fastening
i. Front bumper reinforcement

12.0 CAB UNDER FRAME STRUCTURE:

12.1 The Ashok Leyland 236" WB chassis will be supplied with OE cab floor, bulk head structure, out riggers, driver seat and engine bonnet. The cab under frame shall be fabricated as per the Drg.S23660UF22118. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor. The OE floor on RH Side & LH side of cabin shall be connected in line with the 1st cross bearer with an **ISJC channel 75X40X6mm**. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

12.2 For TATA 244" WB chassis bulkhead should be cut to suite the dash structure. The remaining portion of cabin floor shall be retained and fabricated as per the Drg.no. S4455.64UF22318. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor. The OE floor on RH Side & LH side of cabin shall be connected in line with the 1st cross bearer with an **ISJC channel 75X40X6 mm**. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

12.3 The Eicher 244" WB chassis will be supplied without FES, cab floor, out riggers, driver seat, engine bonnet and bulk head structure. The cab under frame shall be fabricated as per the Drg.no.S4454.8460UF22218. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor. The OE floor on RH Side & LH side of cabin shall be connected in line with the 1st cross bearer with an **ISJC channel 75X40X6 mm**. The height of wheel arch box from the floor level shall be 160 mm minimum from top surface of the tyre.

12.4 In all AL and EICHER buses, an Anti-sag bar in 3-pieces in ISJC 75x40x6 mm connecting both A pillars and chassis frame shall be provided. In TATA buses the OE anti-sag bar ends shall be connected to 'A' pillars on both sides duly making suitable changes.

12.5 Out riggers in M.S. angles 50x50x6 mm shall be provided connecting 'B' (2nd) pillars to the chassis long members by means of clamps made of M.S flat 50x6 mm.

12.6 The dashboard frame shall be covered with suitably designed and contoured FR- grade FRP mould of 3 mm thick of approved.

12.7 Flap doors with suitable auto hinges, steel collapsible handles and tower bolts shall be provided at air cleaner, power steering reservoir, Radiator, instrument panel etc., to facilitate easy maintenance and access.

13.0 BODY FRAME STRUCTURE:

The bus body frame structure should be fabricated as per the following drawings.

Ashok Leyland 6000 mm (236") WB chassis – S3660SL22116 and S3660SR22117

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TATA 6200 mm (244") WB chassis –S4455.64SL22316 and S4455.64SR22317
Eicher 6200 mm (244") WB chassis – S4454.84SL22216 and S4454.84SR22217

13.1 Cant rail joint shall be provided with box type reinforcement formed by welding of two GI pressed U sections of 17x27x17x2 mm in 300 mm length and to be plug welded on both sides.

13.2 Engine protection guard to be provided in the front-end structure to safe guard the engine in case of front collision.

13.3 FRP mat reinforcement layers have to be provided at rear corner areas and wheel arch top areas for additional strength and to prevent water seepage.

13.4 1st pillars on both sides are to be formed to match the shape of front wind screen glass profile.

13.5 Pillar to waist rail joints shall be provided with plus type gussets, the joints connecting waist rail to diagonals/stump pillar shall be provided with proper gussets.

13.6 Fuel tank mouth shall be provided with an opening of size 250 mm x 250 mm, flap with suitable auto hinges, collapsible handles and locking arrangement.

13.7 MS tapping plates of 30x6 mm flat of 200 mm length shall be provided wherever necessary for fixing body components such as grab rail, assist rail, Driver partition, windows and hat racks on both sides etc.

13.8 Chassis long member cutting is not allowed and they shall be retained as supplied by the manufacturer as shown in the respective drawings while fabricating the rear luggage booth.

13.9 Hat racks to be fabricated as per respective drawings on both sides in saloon. Hat rack on right side is to be fabricated up to driver partition.

13.10 One Luggage booth has to be provided at right side rear end back of rear tyres area which is inter connected with rear luggage booth. No separate door is required.

14.0 CABIN AND BODY MOUNTING:

14.1 The OE Cabin floor and mounting arrangement shall be retained. The remaining portion of cabin floor connecting 1st - cross bearer and OE floor shall be fabricated as per Drg.no. S3660UF22118 for Ashok Leyland 6000 mm (236"), S4455.64UF22318 for TATA 6200 mm (244") WB and S4454.84UF22218 for Eicher 6200 mm (244") WB chassis. The saloon gangway shall be made in line with cabin floor.

14.2 The body should be mounted on the chassis web duly providing 6 mm (inverted pressed "L" type) MS plate as per the size shown in the respective drawings over the chassis long members. These "L" plates shall be bolted together at every cross bearer mounting to long member web with M12 x 50 H.T. bolts at least 4 nos. per plate. OE holes on the chassis long members shall only be picked up for mounting this plate. Wherever the holes are not matching, holes shall be drilled on the web 40 mm below the top level of long member with prior approval of APSRTC.

14.3 Over these plates, cross bearers in ISMC 100x50x6 mm channels shall be provided as per the respective drawings. At rear wheels, the cross bearers shall be fastened with 16 mm dia. "U' bolts of approved make and with 150mm x 6 mm thick base plate welded to the bottom of cross bearer. Spacers made of Alu. casting shall be placed between bottom flanges of chassis long member and "U" bolts. The "U" bolts are to be made out of EN-15/14B steel as per IS 5517-1978 (Tensile strength 80 kg/Sq.mm minimum). The "U" bolts should be galvanized and fitted with galvanized nyloc nuts as per drg.no. CB22UBG114. The length of bolt shall suit the depth of chassis long member and should not project more than 6 mm after tightening the nuts.

14.4 The body mounting must be easily detachable from the chassis during major overhauls.

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14.5 Pillar gussets on four sides of the body shall be provided with 32 mm dia hole to facilitate lifting of the body during major overhauls.

15.0 CABIN AND SALOON FLOOR:

15.1 The cabin and saloon floor shall be laid with 12 mm thick polymer impregnated compressed chequered plywood of BWR & FR grade conforming to IS: 3513 (Part-3)-1989. The Plywood should be bolted to the under-frame members with CSK self tapping screws of 6 mm size (for steel application) at a pitch of 200 mm.

15.2 The floor plywood should be overlaid with 2.0 mm thick non-skid safety vinyl mat of approved make and design as per IS-3462 of 1986 with good quality adhesives of approved brands with minimum joints, without gaps and air bubbles. The edges of the vinyl mat shall be welded with hot air welding process.

15.3 Alu. step edge beading of Isuzu type with insert shall be provided along the edges of step well, gangway and at rear raised floor.

15.4 Aluminium 'L' beading shall be provided along the edges of vinyl mat. The flooring shall be made dust proof. Vinyl mat shall be provided as single piece at single seat area. There should not be place joint at gangway front area at saloon entrance.

15.5 The wheel arch frames shall be covered with 0.5 mm stainless steel sheet overlaid by FRP mat layer before laying 12 mm compressed plywood and Vinyl mat.

15.6 The height of rear wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

15.7 Trap door of 580 x 520 mm must be provided in cabin flooring above gearbox. One more trap door of size 860 X 520 mm shall be provided in gangway above rear axle for maintenance. Trap doors in floor shall be finished with vinyl mat and Alu. Fluted strip. Sunken type steel collapsible handles to be provided to lift the trap door.

15.8 On both sides, side luggage booth's structure shall be fabricated with MSL 40X40X6 mm GI 25X40X25X2 mm pressed section and 40x6 mm MS flats.

15.9 Side luggage booth floor shall be provided with 2 mm Alu. Chequered sheet.

15.10 One trap door on rear transverse wall (facing air bellows) shall be provided with 2 mm Alu. Sheet with Southco locks and sealing rubber in between Alu. Chequered sheet and bottom structure.

15.11 The vertical panelling of the booth and finishing of out riggers in side luggage booth is to be done with 0.91 mm GI sheet with hammer tone paint.

15.12 In TATA and EICHER vehicles, an inspection cover with frame size 250x250 mm to be provided in under frame with tapped bolts above fuel tank suction pipe.

15.13 The floor longitudes should be in five rows excluding crib rails. They should be arranged in such a way that the seat legs are fixed on the floor longitudes. Floor longitudes shall be provided wherever necessary for floor plate joints.

15.14 Dust proof rubber packing of 2 mm of EPDM quality shall be provided at the joints and ends of chequered sheet to avoid entry of water/ dust in to the luggage booths from the joints.

15.15 Trap door of 580x 520 mm size must be provided in cabin flooring above gearbox with proper sealing and M6 tapping bolts.

15.16 Four drain holes of 25-mm diameter shall be provided in saloon flooring corners below seat frames, provided with bottom extension of 75 mm length ERW pipe for draining of water while washing.

15.17 A cut out shall be provided with flap door for maintenance of DEF tank at right side back area of front wheel.

15.18 A cut out shall be provided with a flap door having air vent lovers at EATS unit area for proper heat dissipation.

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16.0 BODY PANELING:

16.1 **Truss Panel**: The interior portion of body side from waist to floor to be provided with 3 mm ACP sheet of FR grade in approved shade/design, pasted with PU sealants to the structural members.

16.2 All pillar finishers covering vertical and horizontal members should be in 0.70 mm PVC laminated GI sheet as per the design and source approved by APSRTC. Plastic buttons and screw caps for metal shall be used for fixing finishers on the pillars.

16.3 The mud wings should be in Stainless steel sheet 0.5 mm thick formed to suit the wheel arch and to be bolted to transverse angle at wheel arch. While providing mud wings, care shall be taken to avoid damages to air bellows of suspension system.

16.4 Dash cabin vertical portion i.e., front truss panel at pedals and side truss panel from front end to driver door pillar shall be covered with 0.5 mm stainless steel sheet of scotch brite finish and 430 grade.

16.5 Thermocole insulation of FR grade with 40 mm thick shall be provided between exterior and interior panels of body side structure between waist rail to floor and roof.

16.6 **Stretch panel:**

i. The exterior body from waist to floor level (660 mm) to be in 0.91 mm skin pass quality G.I. sheet and shall be laid horizontally in single piece by stretching in a fixture by applying load and then welded rigidly to the rear most pillar and rear pillar of entrance door & driver door on LHS & RHS respectively. There should not be any wrinkles or waviness or rattling in the stretch panel after welding.

ii. The top edge of the stretch panel to be sealed with P.U. sealant to avoid leakage of water to the structure. P.U. sealant shall also be applied on the structural members for bonding the stretch panel to the structure.

iii. Approved brands of P.U. sealants are: Sikaflex, Total seal, 3M, Anabond and Henkel.

16.7 **Side Modular panels:**

i. The exterior body below stretch panel up to skirt rail shall be in 1.6 mm thick Alu. Sheet i.e., at front wheels, rear wheels and rear of rear wheels. All flap doors including rear luggage booth door shall be in 2.0 mm thick Alu. sheet.

ii. All the wheel arches shall be provided with FRP wheel fenders in 3 mm thick with maximum height of 25 mm.

iii. The top edge of 2.0 mm thick Alu. Panel flap doors to be provided with hinges in Hindalco SE9389 and SE9390 and bonded with P.U. sealants of approved make. The hinge sections shall be joined together with a stainless-steel rod of 6.35 mm dia confirming to 430 bright grade. Flap doors should be reinforced duly pasting the Hindalco SP4822 with P.U. sealants along the four edges. The hinge at top should be welded to this stiffener before pasting. The Alu. hinges should be fastened to the bottom side of tube 60x40x3 mm at floor level duly providing tapping plate of 3 mm thick GI with M6 screws. P.U sealant shall also be applied for bonding hinges to the structural members while fastening. The flap shall also be reinforced with 2 mm thick Alu. Pressed top hat profile of 150 mm in two rows duly pasting with P.U. sealants for provision of locks, blinkers etc., and proper reinforcements shall be given for fixing of locks, stay rods etc., Dust proof door rubber of EPDM quality to be provided for these doors along the edges. These panels shall be pre formed to match the body profile. There should not be any play in hinges. All flap doors shall be provided with stay rods in SS rod of 10 mm dia. 480 mm long with holding clips. All flap doors shall be provided with 2 nos. of 'Southco' type black colour powder coated door locks on both sides. FRP covers in 2 mm thick shall be provided for these locks on inner side of flap door to avoid ingress of dust.

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iv. The battery box, spare wheel carrier, HSD oil tanks and Air tanks etc., i.e., the area within wheel base should be provided with these flap doors.

v. The front-end fascia consisting of bumper and front grill shall be provided in 4mm thick FRP profiles with provision for fixing Volvo type head lights and indicators etc., as per the approved design. Front bumper center piece shall be made detachable. Front grill top piece shall be provided with upward lifting mechanism consisting of two 350 N gas springs of approved makes. There should not any gap between structural members and front fascia. Front FRP to be pasted with sealant as well as fastened with M6 screws/riveted to the structure. Front FOP (grill) shall be in level with the aperture on all sides properly.

16.8 The rear end body shall be as per the Drg.nos. S3660FR22121, S4455.64FR22321 & S4454.84FR22221. The rear end body to be covered with 4 mm thick FRP profile in single piece. Rear FRP should be pasted to rear end structure rigidly with PU sealant.

16.9 The luggage booth flap door shall be in 2 mm single piece Alu. Sheet with proper reinforcements of 150X 30 mm hat sections, locks and pneumatic balancers of approved make in 675 mm length and 550 N capacity. The balancers shall have ball joints at both ends.

16.10 The FRP profiles are subjected to change at any point of time or during the fabrication of bus body.

16.11 The FRP profiles developed shall be produced for approval of CME(C&B) before taking up for fabrication and all designs should be unique.

16.12 The Interior centre portion of roof between hat rack brackets (with a width of 610 mm), Driver partition on both sides and side truss panels shall be provided with 3 mm ACP of FR grade. Remaining portion i.e., interior roof, all window finishers, hat rack bottoms shall be provided with 0.70 mm thick PVC laminated GI sheet of approved shade and design. The material should conform to IS 15061-2002 in respect of FR grade characteristics and behaviour. The joints shall be provided with decorative beading and insert with plastic ends.

16.13 The exterior roof complete shall be in 0.91 mm G.I. Skin pass sheet full length of body in two pieces (laid longitudinally) and welded. The overlap joint should be on longitudes, welded together from outside at the joint, full length without any blowholes or burning. Roof joints should be water leak proof. The roof sheet shall be tack welded to roof structural members from inside and all tack welds shall be applied with PU sealant after shower test. The roof joints, i.e., centre joint and front & rear doom joints shall be over laid with weather shield strip of approved make in 100/150 mm wide and 2 mm thick after shower test.

16.14 Every window bay, at waist level shall be provided with pressed 'Z' section of size 20x40x20 mm in 1.22 mm Aluminium sheet overlapping the stretch panel.

16.15 The hat rack with brackets in GI rectangle tube 40x20x2 mm and GI formed 'Z' in 2 mm thick shall be provided. The interior width shall not be less than 460 mm. Roof ceiling to hat rack clear opening shall be 240 mm.

16.16 The exterior of hat rack bottom shall be pasted with 0.7 mm PVC laminated GI sheet of approved shade. The interior of hat rack shall be provided with reinforcement of formed 'U' section of 1.6 mm GI sheet with 20 mm Thermocole insulation of FR grade and covered with 0.91 mm GI sheet and over laid by PVC coated GI sheet 0.7 mm thick.

16.17 Hat rack edges are to be provided on both sides with Mercedes Benz type profile beading having white LED strip and grab support at top area throughout the length. Hat rack ends are to be closed and to be made soft duly providing with foam and fabric covering.

17.0 FOOT BOARD:

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17.1 The footboard structure to suite in-swing/JK door shall be fabricated in M.S. angles 40x40x6 mm, 40x40x3 mm and MS flats 40x6 mm in three steps with minimum tread depth not less than 250 mm and tread height not to exceed 250 mm. The bottom tread height from ground shall not be more than 400 mm.

17.2 The step well structure on sides up to dash level and riser portion shall be covered with 0.91 mm GI sheet over laid with 0.5 mm stainless steel sheet of 430 grade and scotch brite finish. The tread portion shall be provided with 12 mm compressed chequered plywood bolted to structural members and overlaid with 2 mm vinyl mat.

17.3 Foot board steps shall be provided and illuminated with good quality approved LED strips in approved Aluminium extrusion throughout the edges on all sides.

17.4 All the edges of Step well shall be provided with Aluminium beading as per drawing finished with yellow powder coating and PVC insert in yellow colour similar to RKS-21 of M/s RK PROFILES Pvt. Ltd.

18.0 DRIVER PARTITION:

18.1 There shall be a full partition separating the saloon from cabin with Jack Knife door. The partition shall be fabricated in tubes of 40x20x2 mm, flats 25x6 mm and covered with ACP of 3 mm thick of FR grade with approved shades on both sides. The JK door frame shall be provided with male, female and valence rubber profiles for proper sealing. The door shall be provided with locking latch that shall be operable from inside and outside. The door glasses shall be in 1500 mm x 235 size, bronze tinted 5.0mm thick bonded with P.U sealant to flap frame. Suitable finishers with GI 0.91 mm shall be provided on all edges of ACP and glasses from both sides.

18.2 The partition shall be provided with one maintenance door, hinged at top side, above the floor trap door on gear box. The door shall be finished with ACP sheet of FR grade on both sides and finishers on all edges.

18.3 One steel tower bolt of 6" size is to be fitted on bottom edge to lock the door.

18.4 The partition shall have a mounting bracket/arrangement for fitment one LED TV of 32" size on saloon side.

18.5 One sliding window with Indal 6482 with 5.0 mm toughened bronze tinted glass shutters of 260 x 260 mm is to be provided on partition at suitable location.

18.6 The wiring cables for TV shall be routed through a PVC conduit of 1" dia provided in partition structure.

19.0 FRONT WIND SHIELD GLASS, SALOON REAR GLASSES AND WINDOWS:

19.1 The cabin front end shall be fitted with single piece-curved Windscreen glass of size 1450x2560 mm as per the drawing no. CB22WSG133. The wind shield glass shall be fixed to MS angle frame but not on FRP panel. The windshield glass shall be fitted with EPDM rubber of 50 mm as per sketch CB22ERG122 in MSL 25X25X3 mm angle frame. The curved laminated glass shall be of 7.76 mm minimum thickness with 0.76 mm minimum thickness of PVB interlayer and of select float quality, WAVE FREE as per IS: 2553(Part-II) – 1992. **The approved makes of glasses are IMPACT SAFETY, BANGALORE SAFETY and SOUTH GLASS.**

19.2 Window frames with provision to remove shutter glasses from top side shall be provided between Waist rail to intermediate rail in Hindalco 6482 Alu. Extruded sections. Z section in 2 mm Alu is to be provided on intermediate rail with PU sealant pasting and riveting. The window aperture height shall be 630 mm. For a standard bay of 1524 mm the window frame size (outer to outer) shall be 1518 x 622 mm (curved length). The curved window glasses shall be of size 750 W x 600 H mm and 5.0 mm thick, toughened float quality, safety bronze tinted glass as per IS: 2553 - 1990 & IS: 2835 – 1987. The fixing of

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windows and glasses shall ensure proper sealing and water leak proof. All window sliding glasses shall be provided with sweep rubber of EPDM quality.

19.3 Window frames shall be black powder coated. The vertical overlapping portion of window frames on pillars shall be provided with rubber profile packing as shown in the drawing no. CB22ERG122 to ensure water leak proof. The area between intermediate rail to cant rail shall be provided with 1518 x 410 mm size 5.0 mm thick, toughened float quality, safety bronze tinted glass as per IS: 2553 - 1990 & IS: 2835 – 1987 with P.U sealant bonding. There shall not be any leakage of water from glasses or window frames. The structural members shall be cleaned thoroughly for dirt &oil before applying sealant.

19.4 The edges of all sliding glasses shall be ground, chamfered and polished to smooth surface finish.

19.5 The saloon rear end glass shall be bonded to the M.S. angle 30x30x3 mm frame provided in the rear body structure with P.U. sealant. The single piece glass shall be of 1760 x 800 mm size in 5.0 mm thick, toughened safety bronze tinted glass as per IS: 2553 – 1990 & IS: 2835 – 1987. Ceramic coating on periphery with suitable width shall be provided.

19.6 The lettering work in Vinyl stickering to be done on the rear end glass from inside as mentioned below:

"BREAK ANY GLASS IN EMERGENCY FOR EXIT"

" అత్యవసర సమయంలో ఏ అద్దమునైనను పగుల గొట్టుము"

19.7 All window frames in Hindalco 6482 with EPDM rubber flock channel shall be secured intact duly providing M6 size CSK screws on tapping plates provided on pillars and top rail. The screws should be 2nos. on each vertical members and 3 nos. on top horizontal frame

19.8 The window shutter glasses to be provided with locks of approved type (Hole center distance shall be 32 mm). The fabricator shall supply one set of locks along with the bus.

19.9 Three slots of 50 x3 mm size are to be punched at bottom areas in the window frames for draining of water.

19.10 Approved makes of EPDM rubber and flock channel are Rubber Extrusions & Moulding/ASP/ALP/any other make approved by APSRTC.

20.0 PASSENGER ENTRANCE AND DRIVER'S DOOR:

20.1 The passenger entrance cum exit to be provided with pneumatically operated in-swing door/Jack Knife Door. The door frame shall be made to suit shape of entrance aperture in rectangle tubes 40x20x2 mm thick covered with 0.91 mm G.I. sheet. Passenger door aperture height shall be minimum 2150 mm. Door frame verticals should be provided with side valence and male/female rubbers. The door should have 5.0 thick toughened clear float glasses pasted to the door frame with P.U. sealant.

20.2 The door rubbers along the edges shall ensure dust/water leak proof. The actuating mechanism shall be provided with approved make pneumatic air cylinder, bottom and top pivot blocks with thrust bearing at bottom and taper roller bearing at top side. The door actuating mechanism shall be of fail-safe i.e., shall have 'open', 'close' and **'manual' stages** and shall have provision to open from inside and outside in case of emergency. The pneumatic door pipes shall be firmly clamped with tags and shall cover with Corrugated sleeve, care shall be taken for chaffing of pipes while routing through structure.

20.3 The in-swing should have one window at top side with horizontal sliding glasses of size 600x285x5.0 mm thick toughened clear glasses and one 5.0 mm thick toughened clear glass of size 580/325X940X5 pasted to the door frame with P.U. sealant

20.4 The bottom of the door shall be provided with **brushes PVC/Plastic bristle** to clean the tread of 1st step.

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20.5 One PU handle of min. 400 mm length shall be provided on inner side of in-swing door. One assist rail cum grab rail in stainless steel 32 OD x1.6 mm thick of 304 grade shall be provided from floor to cant rail on right side of foot board wall with SS Flat 50X6 mm.

20.6 Foot board is to be illuminated with one LED light assembly by placing at third step vertical portion facing towards door and having stickering on light glass area as **"APSRTC WELCOMES YOU"** which may not to affect the visibility of steps to passenger while boarding or alighting.

20.7 **EMERGENCY DOOR:** One Emergency door extending from intermediate cant rail to saloon floor on right side shall be provided as per the layout and drawings. The door is to be provided with one horizontal sliding window of size 600 X 285 mm and one heavy duty lock operable from inside. The location of the emergency door is to be exhibited from inside with vinyl stickers and outer periphery is to be provided with red colour reflective radium sticker. Red colour LED light has to be provided at Emergency door area inside the saloon. The door shall be provided with one stainless steel railway type latch made of Stainless steel apart from Stainless steel/Brass tower bolt from inside. The Emergency Door size shall be 1250 X 762 mm.

20.8 **DRIVER'S DOOR: (DRG.NO. CB22DRS123)** The driver's cabin door shall be provided from intermediate rail to cabin floor level to a height of 1650 mm. The door frame in rectangle tube 40x20x2 mm shall be covered with 0.5 mm Stainless steel sheet for door inside up to waist level and the rest of 0.91 mm GI sheet from outside. Door frame should be provided with valence rubber on three sides.

20.9 The door shall be fitted with two window frames in Hindalco 6482 section/Indal 2691/flock channel etc., One window with vertical sliding glasses of size 510(H) x 485(W) and another window at bottom of frame with horizontal sliding glasses of size 260mm(W) x 260mm(H).

20.10 The glasses shall be of 5.0 mm thick toughened safety clear float glasses. The door shall have one heavy-duty door lock of approved MSL make only and type with outer handle, one locking latch from inside and dove tail catches. The door shall be fitted with two forged hinges on 'A' pillar with suitable reinforcements. One assist rail of 25 mm dia x 1.6 mm thick in stainless steel of 304 grade and in 2B finish shall be provided on the interior side of driver door with suitable Nylon brackets.

20.11 One emergency hooter has to be provided at inner side top area of the door. It has to meet the latest norms of APMVR/CMVR/AIS:052.

20.12 All the door openings shall be provided with canopy in 0.91 mm GI sheet and finished with black painting.

21.0 PASSENGER SEATS:

21.1 The seat layout plan and arrangement shall be as per the respective Drg.nos. S3660SG22119 for (AL), S4455.64SG22219 for (ECH) and S4454.84SG22319 for (TATA)

21.2 **SEATS: Crystal model of Uno Minda/Grandslam/FP/FPP make** Luxury type passenger seats with reclining back shall be fitted in the bus with M 10 X 1.0 H.T. fasteners, flat washers and anti-vibrate type nyloc nuts. It should ensure that the seat leg mountings rest on floor longitudes. The fabricators shall supply E1 additional set of head rest covers of same size & material along with bus.

21.3 The seats are to be fitted with uniform pitch as per the drawing place the 5-seater with proper knee room duly ensuring the full reclining of the seats in that row.

21.4 USB wiring harness for crystal model passenger seats has to be provided in both sides of saloon and at rear area with Alu. Extruded section of INDAL 2735 with suitable connectors at each seat as per seat layout for proper connection.

21.5 **DRIVER'S SEAT:** The OE knitted driver seats supplied with chassis shall be retained. The driver seat frame mounting on cabin floor shall match the OE mounting position.

21.6 The driver seat to be fitted 350 mm away from steering wheel edge when the seat is fully forwarded.

21.7 The height of driver seat bottom shall be 450 mm when measured in fully lowered position.

21.8 There shall be a thigh clearance of 200 to 260mm between steering wheel edge and driver seating position.

21.9 The driver seat shall be so located that the center line of driver seat shall be 705 mm away from the centre line of body.

21.10 The driver seat shall be provided with "ELR" type safety belt of Autoliv/ Rane/other approved make and shall comply with the provisions of AIS 052.

21.11 Middle seat of last row five-seater (facing gang way), aisle seat of left first twin seater and single seat at front left side shall be provided with static type seat belts.

21.12 One driver berth shall be provided in cabin behind driver's seat. The frame shall be made in GI Square tube 30x30x2 mm with overall size of 1400x480 mm with an extension of 300mm. The rest berth shall be finished with powder coating in black colour. The berth cushion size shall be with 1400X480X50 mm P.U. foam mounted on 8 mm plywood and upholstered with 'Raymond Dobby/BMD/RELIANCE' FR grade fabric of approved shade. The driver berth bottom area shall be covered with pre-coated GI sheet of 0.70 mm.

22.0 REAR LUGGAGE BOOTH

22.1 A luggage booth at rear end shall be provided across the width of the body in rear most bay as indicated in the respective drawings. Two ISJC 75X40X6 mm Channels extending from rear end structure, connected to chassis long members by two ISJC 75X40X6mm Channels placed vertically and welded to web mounting plates of last cross bearer.

22.2 Remaining booth floor shall be fabricated in M.S. angles 40x40x3 mm. The booth top frame work shall be with floor riser in GI Sheet 2.0 mm thick 'Z' section and 280 mm height on last cross bearer and 4 nos. of GI formed 'U' section longitudes of 25x75x25 in 3 mm thick.

22.3 Two rows of top hat sections of same size shall be provided in transverse direction to support the five seat assembly leg mountings and bolting.

22.4 Booth interior vertical sides shall be provided with 0.91 mm GI sheet with hammer tone paint. Top side frame except five-seater bottom, is to be provide with 0.91 mm GI sheet.

22.5 All flap doors including rear luggage booth door shall be in 2 mm thick Alu. Sheets which are shall be provided to accommodate 120^0 openings.

22.6 Booth floor shall be covered with 2 mm Alu Chequred sheet. Five-seater bottom areas shall be laid with 12 mm compressed chequered plywood. 2 mm chequered sheet shall be provided with dust proof rubber for dust proof with MS solid rivets. Step edge beading Indal 5701 shall be provided along the edges of riser. Booth flap door with 2 mm in Alu. Sheet shall be provided with two 675 mm length, 550 N telescopic balancers of approved makes and 'Southco' type flap door locks on both sides. Booth flap doors shall be provided with door seal rubbers to make it dust/ water leak proof. The balancers shall have ball joints at both ends.

23.0 SPARE WHEEL CARRIER:

23.1 One cage type spare wheel carrier shall be provided on LHS behind rear wheels. The OE spare wheel carrier if supplied with the chassis is of cage type, it shall be located as

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shown in the structural drawing. The carrier shall be mounted on chassis duly providing the vertical and horizontal supports in ISMC 75X40 Channel, gussets.

23.2 If the chassis are not supplied with cage type carrier, the firm shall provide one such spare wheel carrier. The centre line of spare wheel shall be at 1800 mm away from the center of rear wheels. Care shall be taken to avoid fouling of spare tyre with any of the chassis units / spares under any circumstances.

23.3 The spare wheel carrier area is to be provided with one flap door similar to side luggage booth. The spare wheel carrier shall accommodate 10.00RX20 tyre.

23.4 One LED light with switch to be provided in spare wheel carrier area.

23.5 Southco flap door lock holders and locks are to be provided horizontally at side areas of spare wheel flap door and aperture, to accommodate free moment of tyre from carrier bracket.

24.0 BATTERY BOX:

24.1 The battery box under the saloon floor as per the layout drawing on LH side shall be fabricated in M.S. angle 40x40x6 mm and MS flat 40x6 mm. The batteries shall be mounted on a PUSH and PULL type cradle that shall accommodate two 12V. Locking arrangement shall also be provided for cradle to arrest movement while in operation. Panelling of inside walls is to be done with 0.91 mm GI sheet overlaid with 0.5 mm SS sheet on three vertical sides and the bottom of the box shall be provided with 12 mm compressed chequered plywood. Complete inner surface is to be over laid with 0.5 mm stainless steel sheet of 430 grade.

24.2 The bottom of the batteries in cradle shall be provided with 12 mm-compressed plywood and acid resistant rubber mat. Batteries shall be provided with suitable clamping, wood packing to prevent vibrations when the vehicle is in operation. One cut out is to be done on longitudinal wall for passage of battery cables and is to be provided with grommet of EPDM quality. Four rows of full-length battery cables without joints shall be connected to the battery cut-off switch terminals. The terminals and cables should be firmly clipped in position and soldered.

24.3 One LED light shall be provided in Battery Box for illumination.

24.4 One guard rail of SS 25 X 1.6mm pipe with brackets to be provided at front side to safeguard them.

25.0 LUGGAGE CARRIER: (DRG.NO. CB23LCS135)

25.1 A luggage carrier as per drawing (4 bays) shall be fabricated and mounted on the roof at rear portion of body. The side horizontal railing of luggage carrier frame shall be in MS angles 30x30x3 mm and vertical supports at every 762 mm of same angle and the exterior of frame shall be covered with 1.22 mm Alu. Sheet. All corners of the luggage frame shall be rounded off. Luggage carrier floor transverse members shall be fabricated in MS angles 40x40x6 mm as per roof profile and shall be mounted on the top hat supports provided at every roof stick at luggage carrier area. The luggage carrier floor shall be covered with 2mm Alu. Chequered sheet riveted to the floor members.

25.2 The luggage carrier mounting shall consist of MS angle 40x40x6mm of 100 mm long brackets welded to the luggage frame and bolted to the top hat base plate. The luggage carrier top hat base plates shall be applied with P.U. sealant while fixing on the roof supports to avoid water leakage and shall be provided with 100 mm wide weather shield strip along the edges. A landing platform on the rear side of luggage carrier at roof top has to be provided.

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25.3 A fixed access ladder in ERW pipes 25 OD x 2 mm thick, 300 mm wide shall be provided from luggage carrier frame to top level of rear luggage booth flap. In addition to this, one detachable ladder with hooks shall be provided from ground level to fixed ladder. The pitch of rungs shall be 300 mm.

26.0 ELECTRICAL WIRING AND OTHER FITMENTS:

26.1 The earth-return system of wiring should be used. All automotive cables used shall be of approved make and brand conforming to IS: 2465–1984 quality covered with PVC sleeve as per IS: 1951-1961. Wherever the cables have to pass through roof and side structures PVC conduits of ½" dia shall be provided. There shall not be any loose or hanging cables, and if they pass through holes in panels or structural members other than roof and side structures, rubber grommets shall be provided in such panels and structural members and shall be securely clipped as near as practicable to such rubber grommets to avoid chaffing.

26.2 Wiring shall be provided with suitable connectors for all lighting and audio/video points including additional tapping points for any future requirements. The saloon wiring shall be provided through wire casing fitted along the side wall in hat racks that it shall be easily accessible at all points and there shall not be any need to strip major panelling of body to carry out repairs. Any wiring, which has to run along the chassis frame shall be securely, clipped to ensure that there shall be no chaffing with any of the moving parts. Further care shall be taken to route such wiring in such a way that it is not subjected to splashing of oil, water, mud etc.

26.3 The battery main cable of size 398/0.40 mm shall be provided as required duly using good quality lugs with proper soldering, bolting and insulation etc. There shall be no joint in battery cables.

26.4 The saloon lights shall be provided with full length LED lighting in Aluminium extrusion with diffused glasses of suitable length with built in night lamps of blue colour, apart from LED roof light assemblies (round) 6 nos. and 1 no respectively. Out of the 6 roof lights in saloon, 2 lights are to be provided with in-built night lamps of blue colour. The assemblies shall be of approved make and specifications.

26.5 LED destination boards of make Sumith/Microcrafts with size 1800X 220 mm & 900 X 220 mm one each (as per UBS-II specification) with built in controller and LCD display for front LED destination board with a provision of numbers from 0 to 9 and Up & Down buttons to select service number & route, shall be provided **at front and rear** end of bus with proper tapping & secured clamping and Communication cable to be provided from Front master LED board to rear LED board for display of same route course details in both the boards.

26.6 One LED light shall be provided at cant level near front single seat.

26.7 All OE electrical items shall be retained and kept in working condition

26.8 One electrical radial type wiper machine of 120W capacity with twin blades of 815mm length of approved make shall be provided for front windshield glass below the front waist rail on left side. The mounting bracket (formed 'L' in MS 6 mm plate) shall be welded to the structural members in such a way that it shall not interfere while removing radiator.

26.9 One Single tone Air horn of approved make shall be provided. In addition to the OE electrical horn, one more electrical horn conforming to type -3 of IS 1884-1993 shall be provided. The noise levels of these horns should be between 93 dBA to 112dBA.

26.10 A 12-pole disc type fuse box with independent fuses designated for every electrical circuit shall be fitted on switch board provided at cant level. The current carrying capacity of a circuit shall be 1.5 times the load current of that electrical circuit.

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Maximum current carrying capacity of a circuit shall not exceed 15 Amps. The fuses used shall conform to IS-4063 /1982.

26.11 Modular switches and sockets of an approved make and shade as per IS: 9433 – 1980, 230Vx5 Amps shall be used for switch board, cell charging points.

26.12 Switches are to be located on top side of driver door, making a cut-out in the ACP of FR grade of inner cabin panel. Non metallic shielding is to be provided in side structure behind the switches to avoid any short circuit. Switches are to be located on a non metallic/ wooden box. All switches / fuses shall be provided with metallic plate labels for indication.

26.13 Cable ends shall be suitably crimped with lugs/soldered so as to with stand vehicle vibrations. The inter connections shall be made through couplers/junction boxes/ terminal blocks only. Weather roof connectors shall be used for connecting cables which are exposed to atmosphere to avoid water/moisture ingress during use.

26.14 The fabricator shall supply electrical wiring harness diagram of the bus along with the vehicle.

26.15 Volvo type head lights shall be provided. The OE head lights supplied with chassis shall be returned back. Head lamp assemblies shall be fitted at a distance not more than 400 mm from the extreme outer edge body and not more than 1200 mm height from the ground.

26.16 Front direction indicator lamps LED type of 2" dia shall be provided below 1500 mm height on the outer edge of body in amber colour. For TATA and EICHER buses, four more direction indicator lamps of LED type in amber colour shall be provided on the lateral side of the body at wheels and below 1500 mm height from the ground.

26.17 E 1 AMW type indicator light to be provided on both sides at front wheel arch top area.

26.18 Height marker lamps of LED type in white colour at front and in red at rear shall be provided. The marker lamps shall be above windshield glass at front and above cant level at rear on maximum possible outer edges. Care shall be taken to prevent water entry from these lamps.

26.19 The tail lamps 4 nos of 5" dia round type (Two-red, one-white and one – amber) on each side shall be provided. The mounting of tail lamps shall be below 1500 mm height from ground and 400 mm from the outer edge.

26.20 Two fog lamps shall be provided in front bumper.

26.21 Rear number plate shall be provided with LED light strip for illumination.

26.22 One 5 Amps 3-pin socket with piano switch and fuse shall be provided on dash board with 24 V connections for connecting TIMS.

26.23 One TIM holding stand with proper dimensions 280LX130WX70H all in mm, with 0.91 GI sheet has to be placed on dash board nearer to the left hand of driver with easy accessibility.

26.24 One reverse gear horn/alarm (4 tone) shall be provided with noise level not more than 100 dBA if not supplied with the chassis.

26.25 Electrical side flashers of LED type Flat type blinkers in amber colour shall be provided at cant level on all four corners.

26.26 OE battery cut-off switch supplied with chassis shall be provided with separate fuse control. In case of non supply of battery cut-off switch along with the chassis, IGSA-552 or part no. LP-134/3 of Lucas TVS India Services Ltd., make shall be fitted in driver's cabin with a label "Battery Cut-off switch".

26.27 Six speakers of 4" size of Boston (Si-600) or Pioneer (TS 1641 GS) or any approved make and brand speakers (5 provided in saloon hat racks with FRP speaker boxes with separate switch control for LH/RH side speakers and one in cabin) shall be provided. The speaker fitted in cabin has to be provided with separate switch.

26.28 One Pure sine wave type of Power inverter of Aargee / Neetu / MG solar/ Powertronics make with 600VA capacity shall be provided in the driver's cabin. One power switch

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shall be provided on partition in cabin for tapping power for TV & Cell charging. The inverter has to be fitted on cabin floor beneath the co-driver rest berth with suitable bracket and clamps.

26.29 One Public Addressing System of AHUJA make with mike and holder shall be provided at right side nearer to driver for announcement.

26.30 Ahuja make Amplifier and DPA- 370 Model or Sony make Digital Media Player of DSX-A100U model shall be provided.

26.31 Provision for fixing 32" LED TV shall be made on cabin partition on saloon side.

26.32 LED type light assemblies of 12 leads, 5W capacity of approved make are to be provided for illumination of Battery box (one), side luggage booths (two), for spare wheel carrier (one), R/s luggage booth(one) and in rear luggage booth (two).

26.33 Provision shall be made at partition to charge two cell phones at a time. One sunken type pouch with steel lining and wood beading on periphery is to be provided on partition with modular 5 pin sockets and switches.

26.34 REMI make one electric fan of 24Vx 8" dia. shall be provided in cabin for Driver.

26.35 Power for connecting Wiper, Indicators, Fog lamps shall be drawn from the sockets with male/female connectors.

26.36 All LED type lights shall comply with the specifications

26.37 In the driver cabin, Instrument panel with all gauges, OE switches& indicators with labels shall be provided at 45-degree angle and shall be within the reach of driver from his seat.

26.38 PVC conduits of ½" dia are to be provided for routing the cables and non-metallic shielding is to be provided behind the socket in side structure to avoid any short circuit.

26.39 Never connect the circuits with twists & knots. Never tap power by slashing the main harness.

27.0 BODY PAINTING AND COLOR SCHEME:

27.1 The exterior body to be painted with approved make & brand **Polyurethane 2K metallic paints.** The body under frame and chassis shall be painted with anti-corrosive, sound deadening and abrasive resistance bitumen based black paint. The exterior painting process shall consist of carefully cleaning and etching followed by surface levelling with polyester putty application, P.U primer surface coats, finish coat and glaze coat as per the recommendations of paint manufacturer. The quality of painting process and glossiness should be of superior class. The bus should be painted in a booth with baking arrangements for superior finish and longer life. Approved PU paint brands are 'Deltron' of ASIAN PPG, 'Glasurit' of BASF (Wuerth), 'Imron 9100' of Dupont (Axalta) and 'Sikkens' of AKZO-NOBEL, Max Ultima of Nippon. and 'Viton 2K' of Berger Rock, Valspar.

27.2 Colour Scheme shall be as per APSRTC approved scheme. The colour scheme may be modified or changed at the time of execution of bus body fabrication as per the orders of Chief Mechanical Engineer (C&B).

27.3 Lettering and Sticker work is to be done as detailed below:

a. APSRTC monogram is to be provided as per SKETCH1916.
b. APSRTC website 'online ticket booking: www.apsrtconline.in' is to be provided on both sides at top fixed glasses and on Rear end FRP in two rows in radium sticker with Times New Roman font with font size .
c. Front wind screen glass is to be provided with sun control film up to 300 mm from top side edge.
d. 'APSRTC' in white radium sticker with Times New Roman font in 6" size is to be provided on front wind screen glass on top side.
e. Labeling is to be done in red vinyl sticker for battery box, luggage booth, diesel tank, air cleaner and spare wheel.

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f. Seat nos. as per lay out are to be exhibited in red vinyl sticker with letter size 25H X 6 TH on hat rack beading.
g. 'Suswagatham' and 'Happy Journey' are to be provided in Vinyl sticker of suitable colour at top side of entrance door and on driver partition respectively.
h. A slogan in Telugu shall be exhibited as follows on the partition wall.

"ఈ బస్సు మనందరిది !
దీని పరిశుభ్రత మనందరం !! "

28.0 MISCELLANEOUS FITTINGS TO BE PROVIDED:

28.1 Two Fiber / PU handles of approved make with 100 mm size are to be provided at waist level of cabin front end. Two footsteps on the bumper shall be provided to assist in cleaning the front windshield glasses. Footsteps should not protrude outside the bumper.

28.2 Two fully adjustable rear-view mirrors of convex type conforming to latest CMVR Rules shall be fitted on either side of body at cant level with 'Marcopolo' type brackets provided with ABS covers duly extending forward. The rear-view mirrors shall be so located to have at least 2500 mm wide vision from the body line of vehicle when viewed from driver seat.

28.3 Two additional mirrors shall be provided on left and right A pillars for visibility of frontage of bus to avoid accidents.

28.4 Provision shall be made for easy removal and fitment of air cleaner during the maintenance duly providing flap doors.

28.5 One size of 500 mm X 500 mm Roof hatch with lid, EPDM U rubber sealing and holding mechanism with suitable gas spring of 150N capacity shall be provided in driver cabin above driver seat.

28.6 Two fire extinguishers of approved make and dry chemical type of each 5.0 kg capacity conforming to IS: 2171 of 1985 suitable for 'B & C' class of fires shall be provided with suitable MS clamping arrangement one in cabin and another below the rearmost centre seat in saloon.

28.7 Electric buzzer with 6 nos. bell switches of approved type to be provided.

28.8 One roller type sun visor 24" width shall be provided in driver cabin.

28.9 Rubber mud splashguards of size 560 x 457 mm for rear and front wheels to be provided. Mud wings shall be fitted with bolt and nuts in order to facilitate for removing and refitting during the maintenance.

28.10 First aid box of size 300x200x100 mm in stainless steel with leather straps and locking arrangement shall be provided in driver's cabin. First aid medicine kit containing the items mentioned under Rule 138(4)(d) of the latest M.V. Rules and MED Lr.Dt.19.04.23 shall be provided in the box.

a.	Sterilized dressings or cotton bundles (15-25 gms)	... 2 pcs.
b.	Elastic bandage for wounds and burns or roller bandages	... 5 pcs.
c.	Betadine ointment Big or a tube of antiseptic cream containing 0.5% of cetrimide B.P in a non-greasy base	... 1 pc.
d.	Dettol (plastic Bottle)	... 1 pc.
e.	Neosproin / Nebasulf	... 1 pc.
f.	New sealed blade	... 1 pc.
g.	Burnol ointment	... 1 pc.
h.	Water proof plaster or white adhesive tape	... 1 pc.
i.	Band – Aid flat/round or sterilized elastic plaster	... 4 pcs.

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28.11 All lettering work shall be done as per the guidelines in radium stickers. Seat nos. with letter size 25H x 6TH shall be provided in radium white stickers on the edge of hat rack beading as per the seat layout details.

28.12 One footstool of size 450 x 150 mm shall be provided in the driver cabin at foot control pedals with 2.0 mm 5 bar Aluminium Chequered sheet and Indal 2651 used for legs preparation.

28.13 The entrance door, emergency door and driver's door shall be provided with water drain canopies at cant level in 0.91 mm G.I. sheet and to be finished with black powder coating.

28.14 One assist rail of 32 mm dia x 1.6 mm thick in stainless steel of 304 grade and in to be finish shall be provided left side of cabin extending from floor to a height of 1500 mm following the side pillar and then horizontally landing on driver partition.

28.15 SS Flat 40X6 mm with balata packing shall be used for fitment of assist rails.

28.16 Tapping of compressed air for windscreen wiper, and air suspension should be taken from port no.24 of system protection valve or auxiliary tank with proper unions, 'T' joints Metallic pipeline of 5.0-mm dia. with copper coated interior shall be used for tapping air. The pipeline shall be firmly clamped in position.

28.17 One attendant seat with collapsible bottom cushion (size:400X400X50) fixed back (size: 400x300mm) and safety belt shall be provided in the cabin. The frame shall be made in SS sq. tube 30x30x1.6 mm. The cushions shall be with 40 mm P.U. foam mounted on 8 mm plywood and upholstered with 'Raymond Dobby/Sarckle/BMD/Reliance' of FR grade fabric of approved shade.

28.18 Retro-Reflective Conspicuity marking tapes of Diamond grade 50 mm wide conforming to AIS: 90 and approved by STA, Govt.of A.P shall be bonded to the body sides as per the sketch provided. The cumulative length of tapes provided shall not be less than 80% of length of that side. These tapes shall be white in colour at front, yellow on sides and in red at rear of the body.

28.19 At right side front corner at waist area, one peep window has to be provided.

28.20 Cabin rear view mirrors supplied along with chassis are to be provided.

28.21 One Cabin box of FRP of size 1416 X 326 X 206 mm with E 2 0.91 mm thickness GI doors has to be provided at top side of driver partition in cabin area with proper reinforcements with roof and driver partition with self-tapping screws.

28.22 Guard rails in SS of size 25x1.6 mm to be provided in side luggage booths.

28.23 G.I. sheet of 0.50 mm thick shall be provided inside the bonnet.

28.24 One SS handle of 200 mm size to be provided on outer side of driver door.

28.25 Stainless steel sheets, tubes, pipes etc. should be of Jindal /any other make approved by APSRTC.

28.26 Head light assemblies should be fitted to a rigid frame welded to front end structure and should not be mounted on front FRP facia.

28.27 Provision of two inspection doors with stay rod, Lock arrangement and sealing rubber shall be provided for attention of air suspension bellows.

28.28 Crash guard of 40X40X2 mm GI for front bumper shall be provided.

28.29 Courier box is to be provided in Right side front bay of the hat rack as per given dimensions in drawing no CB22CRB140.

28.30 A power connection has to be provided for the provision of VMU.

28.31 In case of any complaint on body the firm has to depute the technical persons to attend within 72 hours of intimation and to rectify the same.

28.32 All unutilized chassis components to be returned at the time of delivery of bus.

28.33 Colour shades painted on the bus shall be displayed along with RAL numbers and colour codes and make on a sheet of 150x150mm size and location will be communicated during fabrication.

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28.34 If there are any modifications in specifications are proposed during fabrication, it will be communicated by APSRTC from time to time and to be implemented immediately.

28.35 Provisions as per AIS 135: Fire Alarm & Protection System for saloon compartment is mandatory from 01-10-2023 as per GSR no 337(E) dt 28-04-2023. It will be included in BoM as and when it becomes mandatory without extension.

28.36 The ACP sheets used shall be of Metallic type only & prior approval of APSRTC has to be obtained with regard to colours of ACP sheet.

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SPECIFICATIONS FOR ULTRA DELUXE (GI) BUS BODIES HIRE BUS TENDER - 2024

1.0 GENERAL DESIGN:

The general design shall be a streamlined body with passenger service door on LH side in front of front wheel with pneumatically operated in swing/JK door and luxury passenger seats with 125 mm reclining back facing forward in 2x2 pattern.

2.0 REGULATION :

The general appearance, structure, seat layout etc., shall be in accordance with respective drawings. **The bus body design should comply with the provisions of latest Central Motor Vehicle Rules, Andhra Pradesh Motor Vehicle Rules, AIS:052 and any other statutory requirement that may come in to force during execution of fabrication work order. The coach interior shall meet the standard of IS: 15061-2002 or latest amended one.**

2.1 The firms must possess Bus Body Accreditation Certificate issued by CIRT /ARAI/or any other Agency approved by GOI.

3.0 MAIN DIMENSIONS: (ALL DIMENSIONS ARE IN MILLIMETERS)

Sno	CHASSIS MODEL DESCIPRTION	AL 222"WB	TATA 224"WB	EICHER 230"WB
	Chassis Suspension: Front Weveller & Rear Air Suspension			
1	Wheelbase	5639	5700	5840
2	Rear overhang max of 60% WB	3383	3420	3504
3	Front overhang	2340	2100	2370
4	Overall length	11362	11220	11714
5	Overall width	2590		
6	Pillar centre (std)	1130		
7	Waist Rail height from Skirt level	1390		
8	Cant rail height from waist level	1122		
9	Interior saloon clear height(Minimum)	1900		
10	Clear aperture of passenger servicedoor (minimum when measured from the edge of door flap)	650		
11	Clear aperture of Driver door	650		
12	Clear Aperture of Emergency Door	1250X762		
13	Seating capacity	40+1Driver		

4.0 DRAWINGS: The list of drawings to be followed are shown at **ANNEXURE-I**

5.0 MATERIAL: The fabrication of bus bodies shall be as per the specifications and the material shall be procured from the recommended sources / brands of material mentioned in **ANNEXURE-II.**

6.0 CHASSIS POSITIONING:

6.1 The firm shall take care of all the chassis and its aggregates to avoid damage due to rain, dust and heat.

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6.2 Before commencement of bus body fabrication all important units of chassis viz. Alternator, self-starter, radiator, tyres, batteries, air cleaner, air cleaner indicator, power steering reservoir, fuse boxes, electrical relays, ECU, EDC, accelerator Pedal ,brake pipe lines, filters, clutch reservoir, Instrument cluster should be protected by providing suitable covering and also wiring connections to Vehicle ECU, ABS ECU, Vehicle tracking Unit shall be disconnected and the Wiring harness connector ends should be protected to prevent from damages that may happened due to welding, drilling, cutting, hammering, riveting, falling of metal scrap or dust during the course of fabrication. Driver seat, steering wheel, hand brake valve etc., shall also be protected from any damage or paint spray.

6.3 Chassis number on long members and identification plates provided by the chassis manufacturer shall be properly covered and protected before commencing the fabrication work.

6.4 The Ashok Leyland , Eicher and TATA chassis are supplied with following items as OE fitment.

1. Cabin floor on RH side
2. Bulk head structure (AL)
3. Out riggers on RHS(AL)
4. Anti-sag channel (TATA)
5. Engine bonnet
6. Knitted Driver seat
7. Head lights 24v E2 with relays
8. Front indicators E2
9. Tail Lamps E2
10. Battery cut off switch
11. Wiper motor with twin blades/linkages(tata/eicher)
12. Washer tank with pipes(TATA)
13. Reflective warning triangles with stands
14. Wheel stoppers
15. Spare wheel carrier (rope type/cage type)
16. First aid kit
17. Tools as per CMVR
18. Rear view mirrors with brackets (E2 plus 1 small mirror)
19. Electrical horn
20. ELR safety belt E1

7.0 PROTECTIVE TREATMENT:

7.1 All Mild Steel components used for fabrication shall be carefully de-greased, de-rusted with three in one solution by dipping and wiped with dry cloth to remove all dirt/oil etc., Then the material shall be applied immediately (without any time lag) with Zinc Phosphate epoxy primer "Rust-O-Cap" (part no.24570608320) of M/s. Asian Paints or *'60 BT PRIME GREY'* of M/s. Akzo Nobel, before assembly.

7.2 After assembly of structure and completing the welding work, all the joints shall be carefully cleaned, ground and applied with Epoxy primer without any time delay and then complete body structure shall be applied with the above anticorrosive paint once again fully.

7.3 After completion of body assembly, bitumen based anti-corrosive, abrasive resistance and sound deadening property coating of the make as specified in material specifications shall be applied on the under floor body frame members and chassis.

7.4 All Alu. Components shall be carefully cleaned with thinner. Bi-metallic paint shall be used at joints of dissimilar metals. The interior and exterior panels should be cleaned with thinner and then self-etching primer shall be applied.

8.0 BODY STRUCTURE:

8.1 **GI STRUCTURE:** All principal structural members should be in Galvanized Iron Tubes as per BIS 4923-2017 of grade YST-310.

8.2 **Aluminium:** All Aluminium extruded sections of Alloy designation 64430, 63400 and 65032, condition WP as per IS: 733 – 1983. The rivets shall be of Aluminium alloy wire of IS: 740 – 1977. Alloy condition 64430 (HR-30) – OD. Aluminium 5-bar chequared plate with 3.0/2.0 mm base thickness shall conform to alloy designation 65032 and condition WP of IS: 737 of 2008. All Aluminium sheets shall conform to alloy designation 19000, condition H2 of IS: 737 of 2008.

8.3 **GI & Mild Steel structural members:**
Galvanised steel sheets should be as per grade 175 GSM of IS: 277- 2018. Rolled sections should be as per IS - 2062 of 2011. The structural joints shall be by MIG welding only. In case of Stainless steel, TIG welding is to be done invariably. The welding should be full length of joint. After welding, the weld joint is to be ground to smooth finish and epoxy primer is to be painted without loss of time.

8.4 All bolts used shall be of sizes reckoned in Metric system. The bolts shall be of high tensile hexagonal head bolts of fine thread, conforming to property clause 8.8 of IS: 1367 of 1979. The nuts of approved anti-vibrate type suchas Nyloc conforming to IS: 1364 of 1983 shall be used. Each bolt and nut shall be provided with a flat washer. A spring washer should accompany every tapped bolt. The approved brands of bolts are TVS / STL / HINDUSTAN FASTENERS / KFL/ UNBRAKO/ IMPERIAL FASTENERS brandsonly.

8.5 Specifications of Aluminum extruded sections as per Chart no. CB23CTG132 and Drg.no. CB23AEG112 (sheet 1&2) shall be followed.

9.0 PARTICULARS OF IMPORTANT STRUCTURAL MEMBERS:

Sl.no.	Description	Material
1	Cross bearers	Rolled steel channel ISMC 100x50x6 mm
2	Anti sag bar	Rolled steel channel ISMC 75x40x6 mm
3	Floor longitudes	G.I 'U'section25x75x25x3 mm thick(5rows)
4	Pillars and Horizontal supports	GI Rectangle tube 60x40x3 mm
5	Roof sticks	GI square tube 40x40x2 mm
6	Roof longitudes	GI square tube 40x40x2 mm (5 rows)
7	Crib rail	GIrectangular60X40X3mm
8	Cant rail	GI Rectangle tube 60x40x3 mm
9	Waist rail	GI square tube 40x40x2 mm
10	Panel stiffener	Formed GI Z 20x40x20x0.91 mm
11	Skirt rail	GI rectangular tube 40x20x2 mm
12	Water channel a) On cant rail	a) Indal 6250 section
13	Step edge beading	As per drawing
14	Flat beading	Indal 5505 section
15	Decorative beading for interior roof	As per Drawing.
16	Window sections a. Window guide b. Split section 1. c. Split section 2 d. Sweep rubber section e. Finger pull	a. Hindalco 6482 section b. 'T' section c. 'F' section d. Hindalco 2691 section e. Indal 1752 section
17	Wire casing	Indal 2735 section
18	Rub rail on body side	Indal 6551 section
19	Roof grab rail brackets	Indal 9638 section of 30 mm wide

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20	Flitch plate	MS 6 mm sheet of 150 mm x 75 mm
21	JK door frame	GI 40X20X2 mm tubes, GI formed section in 1.6 mm GI sheet
22	Hatrack beading	Mercedes Benz type (drawing enclosed)

10.0 PRECAUTIONS:

10.1 Pillars shall be of single piece and joints will not be allowed.

10.2 Single Joint is allowed for cant rail and it should be within wheel base and not on pillars.

10.3 "NEGATIVE TOLERANCES" are not allowed either for Alu. Extruded sections or Aluminium sheets and also for GI sheets/tubes.

10.4 All welding shall be done with **MIG welding process** only. Under any circumstances, arc welding shall not be allowed. Welding of Stainless steel components shall be done with **TIG welding process** only with same grade SS filler rod.

10.5 The following workmanship must be carefully followed during the fabrication.

i. All castings must be truly formed and free from blow holes.
ii. All bolts and rivets should be well fastened.
iii. Rigid water test shall be carried before fixing the interior ceiling using pressurized water spray system. The fabricator shall equip water leak test facility confirming to IS:11865-1982 at the firm for conducting leak test in two stages i.e., before fixing the interior ceiling and before dispatch of vehicle.
iv. All welded joints must be well ground to get a smooth surface and applied with Epoxy primer without any delay.
v. Sharp corners shall be grounded and made smooth
vi. Wherever pitch for rivets / bolts is not specified, it shall be 100 mm.
vii. Bolt ends shall protrude at least 2 to 3 threads length above the nuts.
viii. All tapping bolts such as grab rail, handles and assist rail bolts etc., shall be tightened using thread lock adhesive of approved makes.
ix. All fixed glasses shall be provided with ceramic coating of suitable width on periphery.
x. There should not be any air pockets while laying vinyl mat.

10.6 FRP Profiles :

xi. All the FRP profiles shall be of FR grade and to comply with the provisions of IS:15061.
xii. The layup of FRP profiles shall be as detailed below:
xiii. Two coats of ISO UV FR grade Gel coat and surface mat 30
xiv. CSM 420 mat layer with ISO FR grade resin
xv. WR 610 mat layer with ISO FR grade resin
xvi. CSM 420 mat layer with ISO FR grade resin
xvii. WR 610 mat layer with ISO FR grade resin
xviii. Permitted pigments and additives
xix. Grey primer coat
xx. Suitable reinforcements at all points of fastening
xxi. Front bumper reinforcement

11.0 CAB UNDER FRAME STRUCTURE:

11.1 The Ashok Leyland 222" WB chassis will be supplied with OE cab floor, bulk head structure, out riggers, driver seat and engine bonnet. The cab under frame shall be fabricated as per the

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Drg.S2260UF23118. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor. The OE floor on RH Side & LH side of cabin shall be connected in line with the 1st cross bearer with an **ISJC channel 75X40X6 mm**. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.2 For TATA 224" WB chassis bulkhead should be cut to suite the dash structure. The remaining portion of cabin floor shall be retained and fabricated as per the Drg.no. S2460UF23318. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor. The OE floor on RH Side & LH side of cabin shall be connected in line with the 1st cross bearer with an **ISJC channel 75X40X6mm**. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.3 The Eicher 230" WB chassis will be supplied without FES, cab floor, out riggers, driver seat, engine bonnet and bulk head structure. The cab under frame shall be fabricated as per the Drg.no.S3060UF23218. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor. The OE floor on RH Side & LH side of cabin shall be connected in line with the 1st cross bearer withan **ISJC channel 75X40X6 mm**. The height of wheel arch box from the floor level shall be 160 mm minimum from top surface of the tyre.

11.4 In all AL and EICHER buses an Anti-sag bar in 3-pieces in ISMC 75x40x6 mm connecting both A pillars and chassis frame shall be provided. In TATA buses the OE anti-sag bar ends shall be connected to 'A' pillars on both sides duly making suitable changes.

11.5 Out riggers in M.S. angles 50x50x6 mm shall be provided connecting 'B' (2nd) pillars to the chassis long members by means of clamps made of M.S flat 50x6 mm.

11.6 The dashboard frame shall be fabricated in MS angle 40x40x6 mm to the required profile and covered with GI. Sheet 0.91 mm thick. A door with stainless steel piano hinge and stainless steel tower bolt shall be provided for water top up to Radiator, power steering reservoir and Fuse box as required to facilitate easy periodicalmaintenance.

11.7 Flap doors with suitable auto hinges, steel collapsible handles and tower bolts shall be provided at air cleaner, power steering reservoir, Radiator, instrument panel etc., to facilitate easy maintenance and access.

12.0 BODY FRAME STRUCTURE:

The bus body frame structure should be fabricated as per the following drawings.

ASHOK LEYLAND 222" WB chassis	–Drg.nos.UD2260SL23111&UD2260SR23112.
TATA 224" WB chassis	–Drg.nos. UD2460SL23311 &UD2460SR23312.
EICHER 230" WB chassis	--Drg.no. UD3060SL23211 &UD3060SR23212.

12.1 Cant rail joint shall be provided with box type reinforcement formed by welding of two GI pressed U sections of 17x27x17x2 mm in 300 mm length and to be plug welded on bothsides.

12.2 Pillar to waist rail joints shall be provided with plus type gussets, the joints connecting waist rail to diagonals/stump pillar shall be provided with proper gussets.

12.3 Chassis long member cutting is not allowed and they shall be retained as supplied by the manufacturer as shown in the respective drawings while fabricating the rear luggagebooth.

12.4 An opening of size 250-mm x 250 mm, fabricated in M.S. angles 40x40x6 mm. the opening is to be finished with beading in Indal 5505 and a flap with ball catcher shall be provided at fuel oil tank mouth.

12.5 Engine protection guard to be provided in the front-end structure to safe guard the engine in case of front collision.

12.6 Fuel tank mouth shall be provided with an opening of size 250 mm x 250 mm, flap with suitable auto hinges, collapsible handles and locking arrangement.

12.7 MS/SS tapping plates of 30x6 mm flat of 200 mm length shall be provided wherever necessary for fixing body components such as grab rail, assist rail, Driver partition, windows, stanchions and hat racks on both sides etc.

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12.8 Chassis long member cutting is not allowed and they shall be retained as supplied by the manufacturer as shown in the respective drawings while fabricating the rear luggage booth.

12.9 Hat racks to be fabricated as per respective drawings on both sides in saloon. Hat rack on right side is to be fabricated up to driver partition.

12.10 On left hand side, side luggage booths shall be provided within wheel base with MSL 40X40X6mm, GI 25X40X25X2 mm pressed section and 40x6 mm MS flats. Luggage booth flooring shall be 2mm Alu. Chequered sheet riveted with MS rivets.

12.11 Luggage booths from crib level to skirt level are to be provided on left side of vehicle as indicated in structural drawings with flap doors in 2.00mm thick Aluminum sheet and locks.

12.12 Flap doors are to be provided with hindalco 9389 and 9390 hinges.

13.0 CABIN AND BODY MOUNTING:

13.1 The OE Cabin mountings shall be retained. The remaining portion of cabin floor connecting Ist-cross bearer and OE floor shall be fabricated as per Drg. no.UD2260UF23113 for AL 222" WB, UD2460UF23313 for TATA 224" WB and UD3060UF23213 for EICHER 230"WB chassis.

13.2 The OE anti-sag members shall be retained. If the chassis are not supplied with the anti-sag members a 3-piece anti sag channel in ISMC 75x40x6 mm shall be provided at front end of the chassis bottom frame connecting to the 'A' pillars on both sides as shown in the drawing.

13.3 Additional Out riggers in M.S.angles 50x50x6 mm shall be provided connecting 'B' pillars to the chassis long members by means of clamps made of M.S flat 50x6 mm.

13.4 The body should be mounted on the chassis web duly providing 6 mm (inverted pressed "L" type) M.S. plate as per the size shown in the respective drawings over the chassis long members. These "L" plates shall be bolted together at every cross bearer mounting to Long member web with M12x 50 H.T. bolts at least 4 nos. per plate. OE holes on the chassis long members shall only be picked up for mounting this plate.

13.5 Wherever the holes are not matching holes shall be drilled on the web 40 mm below the top level of long member with prior approval. Over these plates, cross bearers in ISMC 100x50 channels shall be provided as per the respective drawings. At rear wheels the cross bearers shall be fastened with 16 mm dia. "U' bolts of approved make and with 150mm x 6 mm thick base plate welded to the bottom of cross bearer. Spacers made of Alu. casting shall be placed between bottom flanges of chassis long member and "U" bolts. The "U" bolts are to be made out of EN-15/14B steel as per IS 5517-1978 (Tensile strength 80 kg/Sq.mm minimum). The "U" bolts should be galvanized and fitted with galvanized nyloc nuts as per drg.no. CB23UBG114. The length of bolt shall suit the depth of chassis long member and should not project more than 6 mm after tightening the nuts.

13.6 The front bulkhead ends are to be connected to the A-pillar of the body duly giving the support members. In ASHOK LEYLAND and EICHER vehicles a tie bar in front of radiator in 3-piece in ISMC 75x40 connecting I-pillars on both sides and chassis long members shall be provided as shown in the drawing. This tie-bar to be mounted on MSL 50x50x6 mm angle 'L' brackets connected to the chassis long members.

13.7 The body mounting must be easily detachable from the chassis during major overhauls.

13.8 Pillar gussets on four sides of the body shall be provided with 32 mm dia hole to facilitate lifting of the body during major overhauls.

13.9 Rear luggage booth flooring shall be fabricated with 2 mm alu. Cheqd. Sheetwith dust proof rubber with MS solid revits verticals shall be in 0.91 GI sheet with hammer tone paint as indicated in respective drawing. Flap door with 'Southco' type locks finished in black colour powder coating on both sides and balancersof size 550 N shall be provided. The balancers shall have ball joints on both ends.

13.10 The side and rear luggage booth floor shall be in 2 mm Alu Chequred sheet with dust proof rubber and ms solid revits. sides to be provided with 0.91 mm GI sheet with hammer tone paint.

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14.0 CABIN AND SALOON FLOOR:

14.1 The cabin and saloon floor shall be laid with 12 mm thick polymer impregnated compressed chequered plywood of FR grade conforming to IS: 3513 (Part-3)-1989. The Plywood should be bolted to the under frame members with CSK self tapping screws of 6 mm size (for steel application) at a pitch of 200 mm.

14.2 The floor plywood should be overlaid with 2.0 mm thick non-skid safety vinyl mat of approved make and design as per IS-3462 of 1986 with good quality adhesives of approved brands with minimum joints, without gaps and air bubbles. The edges of the vinyl mat shall be welded with hot air welding process. Alu. step edge beading of as per drawing with PVC insert in yellow colour shall be provided along the edges of step well. Aluminum 'L' beading shall be provided along the edges of vinyl mat along the side wall. The flooring shall be made dust proof.

14.3 The wheel arches shall be made rectangle shape.

14.4 Thewheel arch frames shall be covered with 0.5 mm stainless steel sheet before laying 12 mm compressed plywood and vinyl mat.

14.5 The height of rear wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

14.6 The number of joints of cheq. Ply used for cabin and saloon flooring should be minimum possible.

14.7 In TATA & EICHER vehicles, an inspection cover to be provided in saloon floor over fuel tank suction pipe of size 250x250mm.

14.8 The floor longitudes should be in five rows excluding crib rails. They should be arranged in such a way that the seat legs are fixed on the floor longitudes. Floor longitudes shall be provided wherever necessary for floor plate joints.

14.9 Dust proof rubber packing of 2 mm of EPDM quality shall be provided at the joints and ends of chequered sheet to avoid entry of water/ dust in to the luggage booths from the joints.

14.10 Trap door of 580x 540 mm size must be provided in cabin flooring above gearbox with proper sealing and M6 tapping bolts.

14.11 One more trap door of size 860 X 520 mm shall be provided in gangway above rear axle for maintenance.

14.12 Trap doors in floor shall be finished with vinyl mat and Alu.Fluted strip. Sunken type steel collapsble handles to be provided to lift the trap doors.

14.13 Side luggage booth floor shall be provided with 2 mm Alu. Chequd sheet.

14.14 One trap door on rear transverse wall (facing air bellows) shall be provided with 2 mm Alu. Sheet with southco locks and sealing rubber in between Alu. Chequd sheet and bottom structure. The vertical panelling of the booth and finishing of out riggers in side luggage booth is to be done with 0.91 mm GI sheet with hammer tone paint.

14.15 Four drain holes of 25-mm diameter and 75 mm length ERW pipe shall be provided in saloon flooring corners below seat frames for draining of water whilewashing.

14.16 A cut out shall be provided with a flap door for maintenance of DEF tank at right side back area of front wheel.

14.17 A cut out shall be provided with a flap door having air vent lovers at EATS unit area for proper heat dissipation.

15.0 BODY PANELING:

15.1 Truss Panel:

The interior portion of body side from waist to floor to be provided with 3 mm ACP of FR grade in approved shade/design pasted with PUsealants to the structural members. The vertical butt joints of the ACP sheet shall be on structural members only.

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15.2 The joint shall be provided with decorative beading with PVC insert.Truss panel of rear end shall be covered with PVC Laminated GI sheet of 0.70 mm thick.

15.3 The mud wings should be in Stainless steel sheet 0.5 mm thick formed to suit the wheel arch and to be bolted to transverse angle at wheel arch. While providing mud wings, care shall be taken to avoid damages to air bellows of suspension system.

15.4 Dash cabin vertical portion i.e., front truss panel at pedals and side truss panel from front end to driver door pillar shall be covered with 0.5 mm stainless steel sheet of scotch brite finish and 430 grade.

15.5 The fascia including front bumper, radiator grill, vertical finishers for Front wind shield glasssize of 2620(W) X1300(H) (Approved) and front end doom and rear end shall be in FRP profile of FR grade in 4 mm thick in approved design. The center portions of front bumper shall be of detachable type. Dash board shall be provided with 3 mm thick FR grade FRP profile of approved design duly providing suitable supports in MS flat 40x6 mm.

15.6 The FRP profiles are subjected to change at any point of time or during the fabrication of bus body.

15.7 The FRP profiles developed shall be produced for approval of CME(C&B) before taking up for fabrication and all designs should be unique

15.8 Thermocole insulation of FR grade with 40 mm thick shall be provided between exterior and interior panels of body side structure between waist rail to floor and roof.

15.9 USB wiring harness for crystal model seats to be provided in both sides of saloon and rear side with Alu. Extruded section of INDAL 2735 with suitable connectors.

15.10 Stretch panel:

i. The exterior body from waist to floor level to be in 0.91-mm skin pass quality G.I. sheet and shall be laid horizontally in single piece by stretchingin a fixture by applying load and then welded rigidly to the rear most pillar and rear pillar of entrance door and driver door. There should not be any wrinkles or waviness or rattling in the stretch panel afterwelding.

ii. The top edge of the stretch panel to be sealed with P.U. sealant to avoid leakage of water to the structure. P.U. sealant shall also be applied on the structural members for bonding the stretch panel to the structure.

iii. Approved brands of P.U. sealants are: Sikaflex, Total seal, 3M, Anabond andHenkel.

15.11 Side Modular panels :

The remaining portion of exterior body i.e., between crib level and skirt rail is to be paneled with with1.22mm Alu for fixed panels and2.00mm for flapdoors to avoid rusting. The vertical butt joint of panels should be on Structural members. End portion of panels at wheel arches and skirt rail shall be folded inside by 20 mm.

15.12 The roof exterior sheet should be 0.91 mm GI skinpass sheet in full length of body and laid longitudinally in two pieces (with single longitudinal weld joint). The roof sheet shall also be tack welded to the roof structure members. The tack welds shall be applied with PU sealant from inside after conducting water leak test.

15.13 Roof joints should be water leak proof. Approved make weather shield strip of 100 mm wide shall be laid longitudinally covering roof center joint from front end to rear end and also at front and rear transverse joint (FRP profile to roof sheet joints) to avoid water leakage fromroof.

15.14 The interior centre portion of body is to be paneled with 3 mm ACP sheetofFR grade of approved shade with a width of 610 mm. Remaining interior roofportion shall be finished with 0.7 mm PVC laminated GI sheet.

15.15 The ACP of FR grade sheet butt joints and overlap joints of PVC laminated GI sheet in transverse direction should be on the roof longitudes and to be aligned properly.

15.16 The joints of ACP of FR grade and PVC laminated GI sheet shall be provided with decorative beading with PVC insert andends.

15.17 The interior vertical finishers for pillars, horizontal finishers for windows at cant level, waist level and finishers for intermediate rail shall be in 0.5 mm stainless steel of 430 grade and

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scotch brite finish . The finishers are to be pasted to structural members with PU sealants. There should not be any waviness in finishers and the sealant should not drip through the joints. All the horizontal finishers shall be in single piece per two bays and the overlap joints on pillars only. To avoid the expose of sharp edges and waviness of the SS sheet used, the inner edge of the finisher is to be bent inside and to be provided with suitable PVC 'U' beading.

15.18 Panel stiffener in formed GI section 20x40x20x0.91 mm should be provided in between crib rail to skirt level in order to avoid rattling of exterior panels.

15.19 Rear end exterior shall be provided with 4 mm thick FRP profile of approved design.

15.20 The FRP profiles shall be fastened rigidly to front & rear end structures with M6 CSK bolts on all structural members. Flat beading is to be provided on front and rear end pillars for fixing FRP profiles. Suitable reinforcement shall be provided in FRP profiles for fixing of front grill, Front bumper centre portion and balancers for RLB door etc.

15.21 The rear end saloon glass frame shall be covered with 0.5 mm stainless stell finishers frominside.

15.22 All the wheel arches shall be provided with FRP wheel fenders in 3 mm thick.

15.23 The body sides have to be provided with Volvo type rub rail at crib level.

15.24 Alu. sheet 1.22 mm formed to 'Z' section (size 25x45x25) shall be provided on waist rail which shall be pasted with PU sealants to waist rail duly overlapping the exterior body panel at a pitch of 100 mm. The ends of 'Z' section shall be bent vertically to overlap the pillar web. Ends and corners shall be applied with P.U.sealant to avoid seepage of water in to saloon.

15.25 An ALU. Sheet formed 'Z' section (30x8x30) 2.0 mm thick shall be pasted with PU sealant and riveted to intermediate rail to facilitate bonding of top fixedglass.

15.26 The area between exterior and interior panels of waist rail to crib rail in side structure, cant rail to cant rail in roof structure shall be provided with 40 mm thick of FR grade thermocole insulation.

15.27 4 no's of Stanchions, pipe size of 38 X 1.6 mm in SS 304 Gradeand 6 mm SS plate with balata packing shall be provided.

16.0 FOOT BOARD:

16.1 The foot board structure to suite pneumatically operated in swing /JK door shall be in three steps built in M.S. angles 40x40x3 mm. The tread portion shall be provided with 12 mm thick chequered ply wood over laid with 2 mm thick vinyl mat.

16.2 The step well structure on sides up to dash level and the raiser portion shall be paneled with 0.91 GI sheet over laid with 0.5 mm 430 grade stainless steel sheet of scotch brite finish.

16.3 Foot board steps shall be provided and illuminated with good quality approved LED strips in approved Aluminium extrusiion throughout the edges on all sides.

16.4 All Step edges shall be provided with Alu. Beading as per drawing, finished with yellow powder coating and yellow colour PVC insert similar to RKS-21 of M/s RK PROFILES Pvt.Ltd. The tread depth should not be less than 300 mm. Maximum step height allowed is 250 mm.

17.0 WHEEL ARCH BOX FRAMES:

The front & rear wheel arch box frames should be fabricated in MS angles 40x40x6 mm and M S flats 40x6 mm in rectangle shape. The height of box frame shall be 160 mm above top surface of the tyre. The boxes should be designed to accommodate 10.00 x 20 size tyres. The wheel arch box frames have to be covered with 0.5 sheet and followed by 12 mm ply wood and 2 mm vinyl mat. Step edge beading shall be provided at the riser and along the edges of wheel arch. Mudguard shall be provided in 0.5 mm thick SS Sheet roundly along wheel arch area with proper clamping and a clear gap of 100 mm from the edge of tyres.

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18.0 DRIVER'S PARTITION:

The construction of driver's partition shall be as per drg.no.CB23DRP120. It should be fixed behind driver seat and shall be supported on structural members duly reinforced in the floor as well as roof. The minimum distance from bonnet shall be maintained as per seat layout drawing. A timing board of size 500 x 500 mm shall be provided in Alu. sheet 1.22mm duly painted with white paint. The board should be provided in a sliding channel frame on 3 sides made of Indal 3620 section and fixed to the partition on saloon side. The partition shall have mounting bracket/arrangement for fitment one LED TV of 28" /32" size at top area.On right side top area of partition, Inverter & Amplifier of approved make are to be provided with proper calmping.

19.0 DESTINATON BOXES AND BOARDS:

19.1 LED destination boards of make Sumith/Microcrafts with ize 1800X 220 mm & 900 X 220 mm one each (as per UBS-II specification) with built in controller and LCD display for front LED destination board with a provision of numbers from 0 to 9 and Up & Down buttons to select service number & route, shall be provided **at front and rear** end of bus with proper tapping & secured clamping and Communication cable to be provided from Front master LED board to rear LED board for display of same route course details in both the boards.

19.2 The side destination box shall be in first 1130 mm bay on LH side at window top fixed glass area. The size of the side destination boards shall be 910x210 mm.

19.3 The side destination box flap door to be fabricated in Stainless steel sheet 0.70 mm thick with full-length stainless steel piano hinge and locking latches. The destination bracket suitable to keep two destination boards of 910x210 mm size is to be riveted to this flap door with solid rivets.

19.4 **Two destination boards in G.I sheet 1.22 mm have to be supplied along with the vehicle duly painted in white color.** These destination boards shall be provided in a WS-415 frame attached to the flap door with provision for keeping two boards. The destination board should be visible clearly from outside.

19.5 The side destination board shall be illuminated by LED lights of 600 mm length of approved design and make with luminosity of 150 to 200 lux.

20.0 HAT RACKS:

20.1 The hat rack with brackets in GI rectangle tube 40x20x2 mm and GI formed 'Z' in 2 mm thick shall be provided. The interior width shall not be less than 460 mm. Roof ceiling to hat rack clear opening shall be 240 mm.

20.2 The exterior of hat rack bottom shall be pasted with 0.7 mm PVC laminated GI sheet of approved shade. The interior of hat rack shall be provided with reinforcement of formed 'U' section of 1.6 mm GI sheet with 20mm Thermocole insulation of FR grade and covered with 0.91 mm GI sheet and over laid by PVC coated GI sheet 0.7 mm thick.

20.3 Hat rack edges are to be provided on both sides with Mercedes Benz type profile beading having LED strip and grab support at top area through out the length. Hat rack ends are to be closed and to be made soft duly providing with foam and fabric covering.

20.4 SS tapping plates of 150 mm length in 30x6 mm flat shall be provided wherever necessary for fixing body components such as grab rail, assist rail, partition,windows and hat rack etc.

20.5 Hat racks to be fabricated as per respective drawings. Hat rack on right side is to be fabricated up to driver partition.

20.6 One parcel Courier box to be provided at left side of parcel rack in 2nd pillar bay with suitable locking system Drawing no CB23CRB140.

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21.0 STANCHIONS :

Four stainless steel tube stanchions in 304 grade of 38 mm OD x 1.6 mm thickness as per IS: 6913-1992 should be provided in between the saloon continuous beam and saloon floor as per seat layout plan. 6 mm thickness SS Flat has to be SS welded and fitted with 3 mm balata packing shall be provided at bottom ends of the stanchions and SS 40x40x4 mm angle on roof continuous beam at top area. The stanchions have to be fitted on floor longitudinal members and to roof continuous beam with M6 size through bolts. The stanchions shall be fitted rigidly with dome nuts.

22.0 WINDOW GUARD RAILS:

Two rows of guard rails in stainless steel tube in 304 grade and 2B finish of 20 mm OD x 1.6 mm thick as per IS: 6913-1992 has to be provided from outside on both sides of the vehicle at a height of 75 mm and 175 mm above waist level. The pipes shall be bolted to the pillars through SS brackets (in single piece) and end sockets with M6 bolts as per drg.no.CB23LBG115.

23.0 CABIN FRONT WIND SCREEN, SALOON REAR GLASSES AND WINDOWS:

23.1 The cabin front-end shall be fitted with single laminated windscreen glasses of size 2620(W) X 1300(H) mm. The curved laminated glasses shall be of 7.76 mm thick with minimum 0.76 mm PVB film, select float quality, safety clear WAVE FREE as per IS: 2553–1971 and to be fitted with EPDM quality synthetic rubber extruded section as per drawing No:CB23ERG122.

23.2 The windshield glass frame assembly shall be made in MSL 25x25x3 mm to match the profile of the curved glasses. The windshield frame shall be welded on all sides. The complete frame to be covered with 0.5 mm SS sheet from inside.

23.3 **The approved brands for glasses are Banglore safety, South Glass, GSC.**

23.4 All corners of windshield glass shall be provided with clamps in Alu.sheet 1.6 mm.

23.5 The saloon rear end glass shall be bonded with P.U. sealant. The single piece glass shall be of 1760 x 800 mm size in 5.0 mm thick, toughened safety bronze tinted glassas per IS: 2553 – 1990 & IS: 2835 – 1987. The lettering work to be done on the glasses and at cant level as mentioned below:

" BREAK THE GLASSES IN EMERGENCY FOR EXIT"

In Telugu:

" అత్యవసర సమయంలో ఏ అద్దమునైనను పగులగొట్టుము"

23.6 The window frames in Hindalco 6482 extruded section shall be provided between waist rail and intermediate rail. For a standard bay of 1130 mm, the window frame size shall be 1125 x 673 mm. The window frame shall have two horizontal sliding bronze tinted toughened glasses of 600(H)x540(W)x5(T) mm size with flock channel of EPDM rubber quality. The area between cant rail to intermediate rail shall be provided with a fixed bronze tinted toughened glass of size 450(H)X1127(W)X5(T) mm. The glass shall be bonded to the 2 mm GI formed section at cant level and 2 mm Alu Sheet 'Z' flange on the intermediate rail by applying P.U. sealant of approved make/brands.

23.7 The window sliding glasses and top fixed glasses (except at side destination) shall be toughened float quality, safety bronze tinted glasses as per IS: 2553 - 1990 & IS: 2835 – 1987. Window frames shall be black powder coated.

23.8 At side destination i.e., at first 1130 mm bay behind entrance door shall be provided with clear fixed glass.

23.9 The edges of all sliding glasses shall be ground, chamfered and polished to smooth surface.

23.10 All fixed glasses shall be provided with ceramic coating on periphery as per drawing.

23.11 All window frames to provide corner cleats with flat rivets besides welding to the window corners should be fitted with M6x30 mm CSK head screws-2 nos. on each vertical side on pillars and -3nos. on intermediate rail. M.S. flat 30x6 mm tapping plates shall be provided on pillars and intermediate rail.

23.12 Three drain slots of 50X3 mm shall be punched on side of window frame to drain out water collected in frame grooves.

23.13 All sliding shutters are to be provided with window locks. One extra set of window locks has to be supplied along with the vehicle by the fabricator.

23.14 Vertical overlap of window frames on pillars shall be provided with a sealing rubber profile as shown in the drawing. The fixed glasses are to be secured intact.

23.15 Approved makes of EPDM rubber profiles are Rubber Extrusions & Moulding/ ASP/ALP.

23.16 Approved makes of P.U sealants are Total seal/Sikaflex/3M India/Bostik/ Anabond and Henkel.

24.0 PASSENGER ENTRANCE, ASSIST RAILS AND DRIVER'S DOOR:

24.1 The passenger service door shall be on LH side in front of front wheels with pneumatically operated in swing / JK door as shown in the drawings.

24.2 The passenger entrance cum exit and Stepwell of three to four raised (Trapezoidal) full type has to be provided which has to be properly suit to the pneumatically operated in-swing door. The door can be operated by approved make and fail safe highly reliable pneumatic actuating mechanism i.e., shall have 'open', 'close' and 'manual' stages and shall have provision to open from inside and outside in case of emergency.

24.3 The door frame shall be made in rectangle tubes 40x20x2 mm thick covered with 0.91 mm G.I sheet on outside . Passenger door aperture height shall be minimum 2150 mm. Door frame verticals should be provided with side valence and male / female rubbers. The door rubbers along the edges shall ensure dust/water leak proof. The actuating mechanism shall be provided with approved make pneumatic air cylinder. The linkages shall be as per drawing with thrust bearing at bottom and taper roller bearing at top side. The door actuating mechanism shall be of fail-safe i.e., shall have 'open', 'close' and 'manual' stages.

24.4 The in-swing door should have one window at top side with horizontal sliding glasses of 5.0 mm thick toughened bronze tinted glasses and one 5.0 mm thick toughened bronze tinted glass as drawing pasted to the door frame with P.U. sealant at bottom side.

24.5 The bottom of the door shall be provided with **brushes PVC / Plastic bristle** to clean the tread of 1st step.

24.6 One PU handle of min. 400 mm length shall be provided on inner side of in- swing door. One assist rail cum grab rail in stainless steel 25mm dia x1.6 mm thick shall be provided from floor to cant rail to partition wall with SS Flat 50X6 mm with balata packing.

24.7 One LED light assembly shall be provided above the entrance door with concealed wiring for foot board illumination.

24.8 DRIVER'S DOOR:

The driver's cabin door shall be provided with a full drop type window duly extending up to floor level as per sketch no.CB23DRG119. The window frame shall be in Hindalco 6482 section as per the window design. The door shall have one heavy-duty door lock of approved MSL make with outer handle, one locking latch from inside, striking plates and dovetail catches. The door shall be fitted with two forged hinges on 'A' pillar. Driver door frame shall be provided with one horizontal bar in stainless steel 20x1.6 pipe from inside for holding.

24.9 EMERGENCY DOOR:

One Emergency door of size min 1250mm X 762mm extending from intermediate cant rail to saloon floor on right side shall be provided as per the layout and drawings. The door is to be provided with one horizontal sliding window of size 600X285 mm and one heavy duty lock of approved make operable from inside.

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24.10 The location of the emergency door is to be exhibited from inside with vinyl stickers and outer periphery is to be provided with red colour reflective radium sticker. Red colour LED light has to be provided at Emergency door area inside the saloon.

24.11 It should have railway type latch made of Stainless steel apart from Stainless steel/Brass tower bolt.

25.0 LUGGAGE CARRIER: (Drg.no. CB23LCS139)

25.1 A luggage carrier fabricated on the lines of drawing no. CB23LCS139 covering four bays (Overall length of 4520 mm) from rear end shall be provided on the roof top. The floor of luggage carrier shall be 2 mm thick Aluminium chequred sheet riveted to the floor members. The luggage carrier mounting shall be by means of bolting to facilitate easy removal at the time of major overhauls. The frame and floor of the luggage carrier shall be applied with epoxy primer as in case of structure, before fitment on roof.

25.2 The side horizontal railing of luggage carrier frame shall be in MS angles 30x30x3 mm and vertical supports at every 565 mm of same angle and the exterior of frame shall be covered with 1.22 mm Alu. Sheet. All corners of the luggage frame shall be rounded off. Luggage carrier floor transverse members shall be fabricated in MS angles 40x40x6 mm as per roof profile and shall be mounted on the top hat supports provided at every roof stick at luggage carrier area.

25.3 The luggage carrier mounting shall consist of MS angle 40x40x6 mm of 100 mm long brackets welded to the luggage frame and bolted to the top hat base plate. The luggage carrier top hat base plates shall be applied with P.U. sealant while fixing on the roof supports to avoid water leakage and shall be provided with 100 mm wide weather shield strip along the edges. A landing platform on the rear side of luggage carrier at roof top has to be provided.

25.4 Access Ladder & Unloader: An access ladder with detachable lower part at the rear end should and Unloader be provided as per Drg.no.CB23LDG113. Unloader grill in left side above rear wheels has to be provided in ERW 19X1.6 mm and it should be covered with 1.22 mm Alu.chequd sheet.

25.5 In addition to this, one detachable ladder with hooks shall be provided from ground level to fixed ladder. The pitch of rungs shall be 300 mm.

25.6 A luggage carrier as per drawing (4 bays) shall be fabricated and mounted on the roof at rear portion of body.

26.0 PASSENGER SEATS:

26.1 The seat layout plan and seating arrangement shall be as per the respective drawing nos. UD2260SG23114 for AL, UD3060SG23214 for Eicher and UD2460SG23314 for TATA.

26.2 **Crystal model of Uno Minda/Grandslam/FP/FPP make** Luxury type passenger seats with reclining back shall be fitted in the bus with M 10 X 1.0 H.T. fasteners, flat washers and anti -vibrate type nyloc nuts. It should ensure that the seat leg mountings rest on floor longitudes. Seat Belts are to be provided for fore most front row of seats and the middle seat of rear most row.

26.3 Seat numbers in red letters on 2mm thick milky white acrylic sheet of size 65x50 mm shall be provided on intermediate rail. The aisle and window seat numbers shall be indicated clearly as per seat layout.

26.4 The fabricators shall supply E1 additional set of head rest covers of same size & material along with bus.

26.5 The seats are to be fitted with proper uniform pitch as per the drawing and to facilitate rear 5 seat has to be fitted with provision of complete inclination for back rests of both corner seats.

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26.6 USB wiring harness for crystal model passenger seats has to be provided in both sides of saloon and at rear area with Alu. Extruded section of INDAL 2735 with suitable connectors at each seat as per seat layout for proper connection.

26.7 REAR LUGGAGE BOOTH:

26.8 A luggage booth at rear end shall be provided across the width of the body and in rear most bay as indicated in the respective drawings. Two ISJC 75X40 Channels extending from rear end structure, connected to chassis long members by two ISMC 75X40 Channels placed vertically and welded to web mounting plates of last cross bearer.

26.9 Remaining booth floor shall be fabricated in M.S. angles 40x40x3 mm. The booth top frame work shall be with floor riser in GI Sheet 2.0 mm thick 'Z' section and 280 mm height on last cross bearer and 4 nos.of GI formed 'U' section longitudes of 25x75x25 in 3 mm thick.

26.10 Two rows of top hat sections of same size shall be provided in transverse direction to support the five seat assembly leg mountings and bolting.

26.11 Booth interior vertical sides shall be provided with 0.91 mm GI sheet with hammer tone paint. Top side frame except five seater bottom, is to be provide with 0.91 mm GI sheet.

26.12 All flap doors including rear luggage booth door shall be in 2 mm thick Alu. Sheets which are to be provided to accommodate 120 degree openings.

26.13 Booth floor shall be covered with 2 mm Alu Chequred sheet. Five seater bottom areas shall be laid with 12 mm compressed chequered plywood. 2 mm chequered sheet shall be provided with dust proof rubber for dust proof with MS solid rivets. Step edge beading Indal 5701 shall be provided along the edges of riser. Booth flap door with 2 mm in Alu. Sheet shall be provided with two 675 mm length, 550 N telescopic balancers of approved makes and 'Southco' type flap door locks on both sides. Booth flap doors shall be provided with door seal rubbers to make it dust/ water leak proof. The balancers shall have ball joints at both ends.

27.0 SPARE WHEEL CARRIER :

27.1 One cage type spare wheel carrier shall be provided on LHS behind rear wheels. The OE spare wheel carrier if supplied with the chassis is of cage type, it shall be located as shown in the structural drawing. The carrier shall be mounted on chassis duly providing the vertical and horizontal supports in ISMC 75X40 Channel, gussets.

27.2 If the chassis are not supplied with cage type carrier, the firm shall provide one such spare wheel carrier. The centre line of spare wheel shall be at 1800 mm away from the center of rear wheels. Care shall be taken to avoid fouling of spare tyre with any of the chassis units / spares under any circumstances.

27.3 The spare wheel carrier area is to be provided with one flap door similar to side luggage booth. The spare wheel carrier shall accommodate 10.00RX20 tyre.

27.4 One LED light with switch to be provided in spare wheel carrier area. South co flap door lock holders and locks are to be provided horizontally to spare wheel flap door, to accommodate free moment of tyre from carrier bracket.

28.0 DRIVER'S SEAT:

28.1 The OE knitted driver seats supplied with chassis shall be retained. The driver seat frame mounting on cabin floor shall match the OE mounting position.

28.2 The driver seat to be fitted 350 mm away from steering wheel edge when the seat is fully forwarded.

28.3 The height of driver seat bottom shall be 450 mm when measured in fully lowered position.

28.4 There shall be a thigh clearance of 200 to 260 mm between steering wheel edge and driver seating position.

28.5 The driver seat shall be so located that the center line of driver seat shall be 705 mm away from the center line of body.

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28.6 The driver seat shall be provided with "ELR" type safety belt of Autoliv/Rane/other approved make and shall comply the provisions of AIS 052.

28.7 Middle seat of last row five-seater (facing gang way), aisle seat of left first twin seater and single seat at front left side shall be provided with static type seat belts.

29.0 BATTERY BOX:

29.1 The battery box shall be provided on LHS side below floor level to accommodate two 12V batteries of size 521L x 292W x 248H mm with a push and pull type cradle/slider arrangement. The battery box is to be fabricated with MSL 40X40X6 mm and MS Flat 40x6 and is to be paneled with 12 mm cheq.ply on floor and 0.91 mm GI sheet on three vertical sides. Complete interior of the battery box is to be overlaid with 0.5 mm stainless steel sheet of 430 grade. Wood packing shall be provided between holding clamps and batteries to prevent vibrations while the vehicle is in operation. Four rows of single -length battery cables to be connected to the battery cut-off switch terminals to self starter and batteries. The terminals and cables should be firmly clipped in position with cable tie. The cut-out provided for passage of cables shall be provided with rubber grommet.

29.2 One LED light shall be provided in Battery Box for illumination.

29.3 One guard rail of SS 25 X 1.6 mm pipe with brackets to be provided at front side to safeguard them.

30.0 ELECTRICAL WIRING AND OTHER FITMENTS:

30.1 The earth return system of wiring should be used. All automotive cables used shall be of approved brands conforming to IS: 2465 – 1984 quality covered with PVC sleeve as per IS: 1951-1961. Wherever the cables have to pass through roof and side structures PVC conduits of ½" dia shall be provided.

30.2 Modular switches as per IS: 9433 –1980, 230Vx5 amps shall be used. A 6-pole disc type fuse box with independent fuse designated for every electrical circuit shall be fitted on switch board provided at cant level. Maximum current capacity of a circuit shall not exceed 15 Amps. The current carrying capacity shall be 1.5 times the load current of the electrical circuit. The fuses used shall conform to IS-4063 /1982. Switches and fuse box are to be fitted on hylam/decolam sheet of 3 mm thick and to be fitted on sunken tray located above the driver door with non metallic shielding to avoid short circuits.

30.3 All wiring shall be carried through Aluminum extruded section wire casing in Indal 2735 section in two rows along the seat rail offside and near side in such a way that it shall be easily accessible at all points with out the need to strip major paneling of body. The extruded section shall be so located and fitted as not to affect the appearance of body. Any wiring, which has to run along the chassis frame shall be securely, clipped to ensure that there shall be no chaffing with any of the moving parts. Further care shall be taken to route such wiring in such a way that it is not subjected to splashing of oil, water, mud etc.,

30.4 The battery main cable of size 398/0.40 mm shall be provided as required duly using good quality lugs with proper soldering, bolting and insulationetc. No joint is allowed in battery cables.

30.5 One LED lamp assembly shall be provided in cabin above the engine bonnet.

30.6 The side luggage booths and rear luggage booth shall be illuminated with LED lamp assemblies.

30.7 One LED lamp assembly with separate switch shall be provided at conductor seat in approved design.

30.8 The saloon lights shall be provided with full length LED lighting in Aluminium extrusion with diffused glasses of suitable length with built in night lamps of blue color, apart from LED roof light assemblies (round) 6 nos. and 1 no respectively. Out of the 6 roof lights in saloon, 2

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lights are to be provided with in-built night lamps of blue colour. The assemblies shall be of approved make and specifications.

30.9 All OE electrical fitments shall be retained and kept in working condition. Any extension of wiring harness should be done by providing male female connectors only. Tapping of power for saloon lighting etc., shall be taken from the OE female sockets provided by the chassis manufacturers. There should not be any tapping of power by slashing the main harness.

30.10 One electrical radial type wiper machine of 120W capacity with twin blades of 815 mm length of approved make shall be provided for front wind shield glass below the front waist rail on left side. The mounting bracket (formed 'L'in MS 6 mm plate) shall be welded to the structural members in such a way that it shall not interfere while removing radiator.

30.11 One single tone Air horn of Roots/ELGI make shall be provided. In addition to the OE electrical horn, one more electrical horn conforming to type -3 of IS 1884- 1993 shall be provided AL vehicles. The noise levels of these horns should be between 93 dB to112dB.

30.12 Cable ends shall be suitably crimped with connectors so as to with stand vehicle vibrations. The inter connections shall be made through connectors / couplers/ junction boxes / terminal blocks only. Weather proof connectors shall be used for connecting cables which are exposed to atmosphere to avoid water/moisture ingress during use.

30.13 Four head lamp assemblies with 75/70W-H4 bulbs (including two OE headlight assemblies in AL) shall be fitted at a distance not more than 400 mm from the extreme outer edge body and not more than 1200 mm height from the ground in AL vehicles. OE head light assemblies supplied with chassis in TATA & Eicher buses to be returned.

30.14 Two parking lamps at front in white colour provided beside head lamp on either side with mounting distance not more than 1500 mm from the ground.

30.15 Front direction indicator lamps shall be provided below 1500 mm height from ground level on the outer edge of body in amber colour. In addition to this, four more direction indicator lamps in amber color shall be provided on the lateral side of the body at wheels and below 1500 mm height from theground.

30.16 Height marker lamps in white colour at front and in red at rear shall be provided. The marker lamps shall be above windshield glass at front and above cant level at rear on maximum possible outer edges.

30.17 The tail lamps 4 nos of 5" dia round type (Two-red, one-white and one – amber) on each side shall be provided. The mounting of tail lamps shall be below 1500 mm height from ground and 400 mm from the outer edge.

30.18 Rear number plates shall be illuminated with 300 mm length LED light.

30.19 Electrical side flashers shall be provided at cant level on all four corners in addition to the above lamps.

30.20 One inverter of 600 VA capacity in full sine wave type and one amplifier of approved make Argee/MG Solar Powertronics shall be provided.

30.21 Provision for mounting 28" LED TV shall be made on driver partition with suitable brackets.

30.22 One Amplifier of approved make i.e. AHUJA/SONY shall be provided.

30.23 Six speakers of 6" size of Boston (Si-600) or Pioneer (TS 1641 GS) or any approved make and brand speakers (5 provided in saloon hat racks with FRP speaker boxes with separate switch control for LH/RH side speakers and one in cabin) shall be provided. The speaker fitted in cabin has to be provided with separate switch.

30.24 OE battery cut-off switch supplied with chassis shall be provided with separate fuse control. Incase of non supply of battery cut-off switch along with the chassis, IGSA-552 or part no. LP-134/3 of Lucas India Services Ltd., make shall be fitted in driver's cabin with a label "Battery Cut-off switch". The battery cut-off switch to be located 300 mm above the cabin floor on 3 mm thick GI base plate provided in side structure with suitable insulation.

30.25 One 24V, 3-pin plug socket mounted on suitable gang box has to be provided on the dashboard in driver's cabin for connecting inspection lamp/TIMS.

30.26 One TIM holding stand with proper dimensions with 0.91 GI sheet has to be placed on dash

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board nearer to the left hand of driver with easy accessibility.

30.27 Conductor's buzzer with bell switches 4 nos. to be provided.

30.28 One reverse gear horn/alarm shall be provided with noise level not more than 100 db if not supplied with the chassis.

30.29 In the driver cabin Instrument panel all gauges, OE switches & indicators with labels shall be provided at 45-degree angle and shall be in the reach of driver from his seat. The frame shall be fabricated in MS angle 25x25x3 mm covered with 1.22 mm thick G.I. sheet.

30.30 Two fog lamps shall be provided in front bumper.

30.31 Power for connecting Wiper, Indicators, Fog lamps shall be drawn from theOE fuse box with sockets duly providing male / female sockets.

30.32 E 1 AMW type indicator light to be provided on both sides above front wheel arch area

30.33 Never connect the circuits with twists & knots. Never tap power by slashing the main harness.

31.0 BODY PAINTING AND COLOR SCHEME:

31.1 Body to be painted on the exterior with premium quality Polyurithane paints. The body under frame and chassis shall be painted with anti corrosive rubberized paint. The exterior painting process shall consist of carefully cleaning and etching followed by surface leveling with polyester putty application, P.U primer surface coats, finish coat and glaze coat as per the recommendations of paint manufacturer.

31.2 Approved paint brands are 'Deltron' of Asian PPG, 'Glassurit' of BASF(Wuerth), 'Sikkens' of Akzo Nobel, 'Imron 9100' ofDupont(Axalta) and Nax Ultima of Nippon and 'Viton 2K' of Berger Rock, Vulsper.

31.3 Colour Scheme: As per the approved Color scheme.

31.4 The Colour scheme may be modified or changed at the time of execution of bus body fabrication as per the orders of Chief Mechanical Engineer(C&B).

31.5 Lettering and Sticker work is to be done as detailed below:

i. APSRTC monogram is to be provided as per SKETCH2316.

ii. APSRTC website 'online ticket booking: www.apsrtconline.in' is to be provided on both sides at top fixed glasses and on Rear end FRP in two rows in radium sticker with Times New Roman font with font size .

iii. Front wind screen glass is to be provided with sun control film up to 300 mm from top side edge

iv. 'APSRTC' in white radium sticker with Times New Roman font in 6" size is to be provided on front wind screen glass on top side.

v. Labeling is to be done in red vinyl sticker for battery box, luggage booth,diesel tank, air cleaner and spare wheel.

vi. Seat nos. as per lay out are to be exhibited in red vinyl sticker on hat rack beading.

vii. Suswagatham' and 'Happy Journey' are to be provided in Vinyl sticker of suitable colour at top side of entrance door and on driver partition respectively.

viii. A slogan in Telugu shall be exhibited as follows on the partition wall.

"ఈ బస్సు మనందరిది !

దీని పరిశుభ్రతను పాటిద్దాం !! "

32.0 MISCELLANEOUS FITTINGS TO BE PROVIDED

32.1 Two Fiber handles of 100 mm size are to be provided at waist level of cabin front end. Two-foot steps on the bumper shall be provided for cleaning of front windshield. Footsteps should not protrude outside the bumper.

32.2 Two OE fully adjustable rear view mirrors of convex type supplied with chassis shall be fitted with brackets of Markopolo type, one convex mirror to be fitted inside driver cabin . The

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location of rear view mirrors shall be so located to have at least 2500 mm wide vision from the body line of vehicle when viewed from driver seat.

32.3 Two additional mirrors shall be provided on left and right A pillars for visibility of frontage of bus to avoid accidents.

32.4 The size of the number plate shall be 660 x 125 mm. The front Registration number plate in Aluminum sheet 1.6 mm to be provided on the front bumper at right side with Indal 5505 beading around registration number plate. It shall be exhibited in black alphabets/numerals with golden yellow back ground. The size of the number plate shall be 450x250 mm. The rear registration number plate shall be at rear bumper center area.

32.5 Single seat ear marked for conductor shall be provided with a barricade in SS tube of 304 grade of 25 dia x1.6 mmthick.One size of 500mm X 500mm Roof hatch with lid, EPDM U rubber sealing and holding mechanism with suitable gas spring of 150N capacity shall be provided in driver cabin above driver seat.

32.6 Two fire extinguishers of approved make and dry chemical type 5.0 kg capacity in 2 numbers conforming to IS: 2171 of 1985 suitable for 'A', 'B & C' class of fires shall be provided with suitable MS clamping arrangement one in cabin and one under rear most seat.

32.7 Rubber mud splash guards of size 762x457 mm for rear and front wheels to be provided.

32.8 First aid box of size 300x200x100 mm in stainless steel with leather straps and locking arrangement shall be provided in driver's cabin. First aid medicine kit containing the items mentioned under Rule 138(4)(d) of the latest M.V. Rules and MED Lr.Dt.19.04.23 shall be provided in the box.

a.	Sterilized dressings or cotton bundles(15-25 gms)	... 2 pcs.
b.	Elastic bandage for wounds and burns or roller bandages	... 5 pcs.
c.	Betadine ointment Big or a tube of antiseptic cream containing 0.5% of cetrimide B.P in a non-greasy base	... 1 pc.
d.	Dettol (plastic Bottle)	... 1 pc.
e.	Neosproin / Nebasulf	... 1 pc.
f.	New sealed blade	... 1 pc.
g.	Burnol ointment	... 1 pc.
h.	Water proof plaster or white adhesive tape	... 1 pc.
i.	Band – Aid flat/round or sterilized elastic plaster	... 4 pcs.

32.9 All lettering work shall be done as per the guidelines.

32.10 Two sunken footsteps of size 150x150mm shall be provided below the driver door one at 700 mm from the ground and another at 950 mm.

32.11 The entrance, Emergency and driver's door shall be provided with water drain canopies at cant level in GI sheet of 0.91 mm powder coated in black colour.

32.12 Pure rubber matting of 3.0mm thick shall be provided for foot control pedal in driver's cabin.

32.13 A foot stool for driver to be provided in Alu.5-bar cheq. sheet 2.00mm and Indal 2651 as legs. Size:450x150mm.

32.14 Tapping of compressed air for windscreen wiper and air horn should be from port no.24 of system protection valve with proper unions, 'T' joints. Metallic pipeline of 5.0-mm dia. with copper coating on inner side shall be used for tapping air for wiper. The pipeline shall be firmly clamped in position.

32.15 One roller type sun visor of 24" size to be provided in driver cabin.

32.16 The OE spare wheel carrier if supplied with the chassis shall be located as shown in the structural drawing. In case of non-supply of carrier type bracket, one Spare wheel carrier arrangement shall be provided as per Drg.no.CB23SWG131 on LHS at rear of rear wheels. If the chassis are not supplied with carrier type bracket, the firm shall provide one spare wheel carrier fabricated in MS flat 75x12mm. Care shall be taken to avoid fouling of spare tyre with any of chassis units/parts under any circumstances. The Spare Wheel carrier shall be provided with flap door with full length stainless steel hinge of 30x1.6 mm from the bottom of

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the cross bearer to skirt rail with locks and stay rod in SS rod 6 mm. It shall accommodate 10R20 size tyre.

32.17 Driver seat & engine bonnet area shall be separated by providing a barricade at a height of 760 mm from cabin floor. The barricade shall be provided with vertical supports in Stainless steel pipe (304 grade) of 25 OD x 1.6 mm thick with Stainless Steel Flat 50X6 mm.

32.18 All unutilized chassis components to be returned at the time of delivery of bus.

32.19 The seats earmarked for ladies, PHC persons; senior citizens are to be very clearly exhibited with printed metallic plates of size 100x150 mm. Emergency exit symbol also shall be exhibited in metallic plate in red colour.

32.20 Retro-Reflective Conspicuity Marking tapes of dimond grade 50 mm wide conforming to AIS:90 and approved by STA, Govt. of A.P shall be bonded to the body sides as per the sketch provided. The cumulative length of tapes provided shall notbe lessthan 80% of length of that side. These tapes shall be white incolor at front, yellow on sides and in red at rear of the body.

32.21 One Stainless steel tube of 304 grade in 32 mm dia x1.6 mm thick up to aheight of 600 mm from floor shall be provided on 'B' pillar from inside.

32.22 Head light assemblies should be fitted to a rigid frame welded to front end structure and should not be mounted on front FRP facia.

32.23 G.I. sheet of 0.50 mm thick shall be provided inside the bonnet.

32.24 Stainless steel sheets, tubes, pipes etc. should be of Jindal /any other make approved by APSRTC.

32.25 Each one set of head rest covers to be supplied along with the bus. The headrest cover should cover to the full width of the seat.

32.26 Roof hatch of size 500X500 mm above the driver seat to be provided.

32.27 One Fan of REMI make for driver to be provided.

32.28 E1 set of window locks to be supplied along with vehicle.

32.29 Crash guard of 40X40X2 mm GI for front bumber shall be provided.

32.30 Provision of two inspection doors with stay rod, Lock arrangement and sealing rubber shall be provided for attention of air suspension bellows.

32.31 The firm has to return the OE TATA E2 head lights assemblies with new vehicle.

32.32 USB wiring harness for crystal model seats to be provided in both sides of saloon and rear with Alu. Extruded section of INDAL 2735 with suitable connectors.

32.33 Guard rail to be provided in SS of size 25x1.6 mm in side luggage booths.

32.34 Landing platform for luggage carrier shall be provided.

32.35 One SS handle of 200 mm size to be provided on outer side of driver door.

32.36 The formed Z section on Intermediate railshould be with 2 mm Alu. Sheet.

32.37 All Slogans & Stickering to be done as per the instructions from time to time given by APSRTC with size of 25H X6T.

32.38 Colour shades painted on the bus shall be displayed along with RAL numbers and colour codes andmake on a sheet of 150x150mm size and location will be communicated during fabrication

32.39 If there are any modifications in specifications are proposed during fabrication, it will be communicated by APSRTC from time to time and to be implemented immediately.

32.40 Provisions as per AIS 135: Fire Alarm & Protection System for saloon compartment is mandatory from 01-10-2023 as per GSR no 337(E) dt 28-04-2023. It will be included in BoM as and when it becomes mandatory without extension.

32.41 The ACP sheets used shall be of Metallic type only & prior approval of APSRTC has to be obtained with regard to colours of ACP sheet.

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SPECIFICATIONS FOR EXPRESS BUS BODIES
HIRE BUS TENDERS - 2024

1.0 GENERAL DESIGN:

The general design shall be a streamlined body with passenger service door on LH side in front of front wheels with pneumatically operatedjack knife door and passenger seats facing forward in 2x3 pattern.

2.0 REGULATION:

The general appearance, structure, seat layout etc., shall be in accordance with respective drawings. The bus body design should comply with the provisions of latest Central Motor Vehicle Rules, Andhra Pradesh Motor Vehicle Rules, Bus body code – AIS:052 and any other statutory requirement that may come in to force during execution of fabrication work order. The coach interior shall meet the standard of IS: 15061-2002 or latest amended one.

2.1 The firms shall possess Bus Body Accreditation Certificate issued by CIRT /ARAI or any other Agency approved by GOI and shall be registered with APSRTC.

3.0 MAIN DIMENSIONS: (ALL DIMENSIONS ARE IN MILLIMETERS)

SL.NO	CHASSIS MODEL –DESCIPRTION	AL222"WB	TATA 224"WB	EICHER 230"WB
	Chassis Suspension : Front & Rear Weveller Suspension			
1	Wheelbase	5639	5700	5840
2	Rear overhang	3383(60%)	3420(60%)	3504(60%)
3	Front overhang	2265	1845	2370
4	Overall length (excluding bumpers)	11287	10965	11714
5	Overall width (structure)	2590		
6	Pillar centers (standard)	1130		
7	Window sill(waist rail)height from top of the cross bearer	610		
8	Waist rail height from Skirt level	1200		
9	Cant rail height from waist level	1130		
10	Interior saloon clear height	1900		
11	Clear aperture of passenger service door (minimum when measured from the edge of door flap)	650		
12	Clear aperture of Driver door	650		
13	Seating capacity	50+1 Driver		55+1 Driver
14	Emergency Door Dimensions	1250 X 762		

4.0 DRAWINGS: The lists of drawings to be followed are shown at ANNEXURE– I.

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5.0 MATERIAL: The fabrication of bus bodies shall be as per the specifications and the material shall be procured from the recommended sources / brands of material as mentioned in ANNEXURE-II.

6.0 CHASSIS POSITIONING:

6.1 All chassis received by the firm for fabrication of bus bodies should be kept safely in a covered area. The chassis should not be kept open to atmosphere without any protection to avoid damage to chassis and its units due to rain, dust and heat.

6.2 Before commencement of bus body fabrication all important units of chassis viz. Alternator, self-starter, radiator, tyres and batteries should be protected by providing suitable covering in addition to disconnecting the wiring connections to Vehicle ECU, ABS ECU, Vehicle tracking unit ,protection to Wiring harness connectors to prevent from damages that may occur due to welding, drilling, cutting, hammering, riveting, falling of metal scrap or dust during the course of fabrication. Driver seat, Steering wheel, hand brake valve etc., shall also be protected from any damage or paint spray.

6.3 Chassis number on long members and identification plates provided by the chassis manufacturer shall be properly covered and protected before commencing the fabrication work.

6.4 The Ashok Leyland, TATA and Eicher chassis are supplied with following items as OE fitment.

1. Cabin floor
2. Bulk head structure (AL/EICHER)
3. Out riggers (AL/EICHER)
4. Anti-sag channel (TATA)
5. Bonnet and Front bumper(AL/TATA/EICHER)
6. Knitted Driver seat.
7. Head lights E2
8. Front indicators E2
9. Tail Lamps E2
10. Battery cut off switch
11. Reflective warning triangles with stands
12. Wheel stoppers
13. Spare wheel carrier rope type
14. First aid kit
15. Tools as per CMVR
16. Rear view mirrors with brackets(E2 plus 1 small mirror)
17. Electrical horn
18. ELR safety belt

7.0 PROTECTIVE TREATMENT:

7.1 All Mild Steel components used for fabrication shall be carefully de- greased, de-rusted with Three in One solution by dipping and wiped with dry cloth to remove all dirt/oil

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etc. Then the material shall be applied immediately (without any time lag) with Zinc Phosphate epoxy primer "Rust-O-Cap" (part no.24570608320) of M/s. Asian Paints or "*60 BT PRIME GREY*" of M/s. Akzo-Nobel Coatings before assembly.

7.2 All Alu. Components shall be carefully cleaned with thinner. Bi-metallic paint shall be used at joints of dissimilar metals. The interior and exterior panels should be cleaned with thinner and then self-etching primer shall be applied.

8.0 BODY STRUCTURE:

8.1 **Aluminium Structure**: All principal structural members should be in Aluminium extruded sections of Alloy designation 64430, 63400 and 65032, condition WP as per IS: 733 – 1983. The structural joints shall be by riveting, bolting and combination of both. The rivets shall be of Aluminium alloy wire of IS: 740 – 1977.Alloy condition 64430 (HR-30) – OD. Aluminium 5-bar chequered plate with 3.0/2.0 mm base thickness shall conform to alloy designation 65032 and condition WP of IS: 737 of 1986.All Aluminium sheets shall conform to alloy designation 19000, conditionH2 of IS: 737 of 1986.

8.2 Chart no. CB22CTG132 andDrg.no.CB22AEG112 (sheet 1&2) containing the details of specifications of Aluminum extruded sections & sheets to be used and it shall be followed.

8.3 **Other Mild Steel structural members:** Galvanized steel sheets should be as per grade 175of IS: 277- 2018. Rolled sections should be as per IS - 2062 of 2006. The structural joints shall be by riveting, bolting, combination of both and MIG welding in case of GI structural members. The welding should be for full length of joint. Welding area shall be ground to smooth finish in order to avoid sharp edges.

8.4 All bolts used shall be of sizes reckoned in Metric system. The bolts shall be of high tensile hexagonal head bolts of fine thread, conforming to property clause 8.8 of IS: 1367 of 1979. The nuts of approved anti-vibrate type such as Nyloc conforming to IS: 1364 of 1983 shall be used. All bolts nuts and washers should be galvanized. Each bolt and nut shall be provided with a flat washer. A spring washer should accompany every tapped bolt. The approved brands of bolts are TVS/STL/HINDUSTAN FASTENERS /KFL/ UNBRAKO/ IMPERIAL FASTENERS brands only.

9.0 PARTICULARS OF IMPORTANT STRUCTURAL MEMBERS :

Sl no.	Description	Material
1	Cross bearers	Rolled steel channel ISMC 100x50x6 mm
2	Anti sag bar	Rolled steel channel ISMC 75x40x6 mm
3	Floor longitudes	G.I'U'section25x75x25x3 mm thick (5 rows)
4	Pillars and horizontal supports	Indal 2654 section, All pillars including wheel arch horizontal supports shall be reinforced with formed channel inserts of GI sheet 3 mm thick.
5	Roof sticks and roof longitudes	Indal 2651 section(5 rows roof longitudes)
6	Crib rail and Seat rail	Indal 1756 section
7	Cant rail	Indal 2800 section
8	Waist rail	Indal 2613 section

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9	Waist rail stiffener	Indal 3402 section& 3.0 mm Alu.5-bar chequered plate 100mm wide with minimum joints one on LH side and two on RH side with in Wheel Base
10	Panel stiffener	Indal 3405 section
11	Skirt rail	MS Angle 40x40x3 mm
12	Water channel a) On cant rail b) Front & rear-end	a) Indal 6250 section b) Hindalco WC-695 section
13	Step edge beading	Indal 5700 section
14	Flat beading	Indal 5505 section
15	Decorative beading at a) Exterior waist level front b) Interior ceiling	Indal 2721 section Indal 2684 section with plastic filler and ends
16	Window sections Window guide Split section 1. Split section 2 Sweep rubber section Finger pull	 Hindalco 6482 section 'T' section 'F' section Hindalco 2691 section Indal 1752 section
17	Wire casing	Indal 2735 section
18	Rub rail on body side	Hindalco 2676 on G.I.formed U in 2 mm
19	Cleats & Brackets a) Roof structure b) Cant to roof stick and cant to pillar c) Side Structure	 a) Indal 1760 section b) 'C' bracket formed in GI sheet 2.5 mm c) 'C' bracket formed in GI sheet 2.5 mm at wheel arches and Indal 1760 cleats
20	Roof grab rail brackets	Indal 9638 of 30 mm wide
21	Gussets for Cross bearer to Pillar joint	ISMC 100 X50 mm
22	JK door frame	Indal 9124 section
23	Parcel rack tube	Stainless steel tube of 16 mm diameter

10.0 PRECAUTIONS:

10.1 Aluminum extrusions such as seat rail, crib rail, cant rail shall be joined with in wheelbase only.

10.2 "NEGATIVE TOLERANCES" are not allowed for Aluminum Extruded sections, Aluminum sheets and GI sheets/tubes.

10.3 All holes in cleats and roof longitudes shall be PUNCHED to close tolerances. Under any circumstances drilling of holes is not allowed.

10.4 All welding shall be done with MIG welding process only. Under any circumstances, arc welding shall not be allowed. Welding of Stainless steel components shall be done with TIG welding process only with same grade SS filler rod.

10.5 The following workmanship must be carefully followed during the fabrication.

i. All castings must be truly formed and free from blow holes.

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ii. All bolts and rivets should be well fastened.
iii. Rigid water test shall be carried before fixing the interior ceiling using pressurized water spray system. The fabricator shall equip water leak test facility confirming to IS:11865/1982 at the firm for conducting leak test in two stages i.e., before fixing the interior ceiling and before dispatch of vehicle.
iv. All welded joints must be chipped and well ground to get a smooth surface and applied with Epoxy primer without any delay.
v. Sharp corners shall be grounded and made smooth.
vi. Wherever pitch for rivets / bolts is not specified, it shall be 100 mm.
vii. Bolt ends shall protrude at least 2 to 3 threads length above the nuts.
viii. Roof stick, roof longitude, floor longitude and waist rail members shall butt properly at mating joints and shall not have gaps at the joints.
ix. All tapping bolts such as at grab rail, handles and assist rail etc., shall be tightened by using thread lock adhesive of approved makes.
x. Roof stick, roof longitude, floor longitude and waist rail notching to be done on power press only.
xi. All fixed glasses shall be provided with ceramic coating of suitable width on periphery.

11.0 CAB UNDERFRAME STRUCTURE:

11.1 Cab under frame of Ashok Leyland 222" WB chassis shall be fabricated as per the drg.no.E2260UF24108. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side of cabin shall be connected to the 1st cross bearer by providing a 'Z' riser in G.I. Sheet of 3.00 mm. On LH Side, a raised wheel arch box shall be provided on front wheel duly fabricating in MS flats 40x6 mm and MS angles 40x40x6 mm. The height of wheel arch box frame shall be provided minimum 160 mm from top surface of the tyre.

11.2 The Tata 224"WB chassis shall be fabricated as per the drg.no.E2460UF24308. The cabin floor longitudinal members shall be connected to a 'Z' raiser in G.I. sheet 3.00 mm provided on 1st cross bearer to makeup the height difference of cabin and saloon floor. Suitable wheel arch boxes in rectangle shape fabricated in MS flat 40x6 mm and MS angles 40x40x6 mm shall be provided. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.3 The Eicher 230"WB chassis will be supplied with OE cab floor, bulk head structure, out riggers, driver seat and engine bonnet. The cab underframe shall be fabricated as per the drg.no.E3060UF24208.The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side of cabin shall be connected to the 1st cross bearer by providing a 'Z' riser in G.I. sheet 3.00 mm. On LH Side, a raised wheel arch box shall be provided on front wheel duly fabricating in MS flats 40x6 mm and MS angles 40x40x6 mm. The height of wheel arch box from the floor level shall be 160 mm minimum from top surface of the tyre.

11.4 The dashboard frame shall be fabricated in MS angle 40x40x6 mm to the required profile and covered with GI sheet of 0.91mm thick. Flap door with suitable Stainless Steel hinges

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and Stainless Steel tower bolts shall be provided for easy access to fuse box, radiator, power steering reservoir and clutch oil container.

12.0 BODY FRAME STRUCTURE:

The bus body frame structure should be fabricated as per the following drawings.

ASHOK LEYLAND 222" WB chassis	–E2260SL24106 and E2260SR24107.
TATA 224" WB chassis	– E2460SL24306 and E2460SR24307.
EICHER 230" WB chassis	– E3060SL24206 and E3060SR24207.

12.1 The cant rail at the passenger entrance and driver door area shall be reinforced with GI sheet formed channel in 2.0 mm thick and the joint of cant rail should not be exactly on any pillar or within door bay.

12.2 A&B pillars on both sides shall be provided with GI 3 mm thick formed section similar to Indal 2654. First and second roof sticks connecting A&B Pillars shall also be provided in GI formed section similar to Indal 2651 in 3mm thick. All the structural members in this bay (Waist rail, Intermediate rail and roof longitudes) shall be in GI formed sections of 3 mm thick with dimensions of corresponding Aluminum sections.

12.3 An opening of size 250mm x 250 mm, fabricated in M.S. angles 40x40x6 mm, finished with beading in Indal 5505 and a flap with ball catcher shall be provided at fuel oil tank mouth.

12.4 M.S. tapping plates in 30x6 mm flat of 200 mm length shall be provided with 3 mm balata wherever tapping is to be done for fixing body components such as roof continuous beam, roof hand grab rail, window guard rails, assist rails, driver partition, windows etc.

12.5 Cant rail on both sides full length shall be reinforced with M.S angle30x30x3 mm. This angle shall be riveted to pillars flanges at cant level and connected to the cant rail duly providing two GI plates of size 75x30 mm of 2 mm thick welded to the angle and riveted to cant rail in every bay.

12.6 Luggage booths from crib level to skirt level are to be provided on both sides duly providing E 2 LED Lights& Guard rails in SS of size25x1.6 mm as indicated in structural drawings with flap doors in 1.6 mm thick Alu. Sheet and locks.

12.7 The flap doors for the extended luggage booth on right side in continuation to the rear luggage booth have to be provided with Hindalco 9389 and 9390 hinges.

12.8 Rear luggage booth door has to fabricate with MS angular 40X40X3 mm and to be provided with E 2 no's of 550N gas springs.

12.9 Rear luggage booth and side luggage booths inside area should be covered with 0.91mm GI sheets followed by Hammer tone paint.

12.10 Luggage booth flooring area to be covered with 2.00 mm thick Alu. Chq.sheet.

12.11 Rear and side luggage booths to be fabricated as per drawings.

12.12 Rear luggage booth to be provided with E3LED lights for proper illumination.

12.13 Chassis long member cutting is not allowed and they shall be retained as supplied by the manufacturer as shown in the respective drawings while fabricating the rear luggage booth.

13.0 CABIN AND BODY MOUNTING:

13.1 The OE Cabin floor and mounting arrangement shall be retained. The remaining portion of cabin floor has to be fabricated by connecting the 1st Cross bearer as per drg. No.

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E2260UF24108for AL 222" WB, E2460UF24308 for TATA 224"WB and E3060UF24208 for Eicher 230" WB chassis.

13.2 The OE anti-sag members shall be retained. If the chassis are not supplied with the anti-sag members, a 3-piece anti sag channel in ISMC 75x40x6 mm shall be provided at front end of the chassis bottom frame connecting to the 'A' pillars on both sides.

13.3 Additional Out riggers in MS angles 50x50x6 mm shall be provided connecting 'B' pillars to the chassis long members with proper fitment. The body should be mounted on the chassis web duly providing 6 mm(inverted pressed "L" type) MS plate as per the size shown in the respective drawings over the chassis long members. These "L" plates shall be bolted together at every cross bearer mounting to Long member web with M12x 50 H.T. bolts at least 4 nos. per plate. OE holes on the chassis long members shall only be picked up for mounting this plate.

13.4 Wherever the OE holes are not available for bolting of web mounting plate, holes shall be drilled on the web 40 mm below the top level of long member with prior approval of competent authority. Over these plates, cross bearers in ISMC 100x50x6 mm channels shall be provided as per the respective drawings. If the web mounting plate position at rear wheels coincide with rear spring bracket, the cross bearers shall be fastened with 16 mm dia. "U' bolts of approved make and with 150mm x 6mm thick base plate welded to the bottom of cross bearer. Spacers made of Alu. Casting shall be placed between bottom flanges of chassis long member and "U" bolts. The "U" bolts are to be made out of EN-15/14B steel as per IS 5517-1978 (Tensile strength 80 kg/Sq.mm minimum).The "U" bolts should be galvanized and fitted with galvanized nyloc nuts as per drg.no. CB22UBG114. The length of bolt shall suit the depth of chassis long member and should not project more than 6 mm after tightening the nuts.

13.5 In **ASHOK LEYLAND** and **EICHER** vehicles the front bulkhead ends are to be connected to the A-pillar of the body duly giving the suitable support members. In ASHOK LEYLAND and EICHER vehicles a tie bar in front of radiator in 3-piece in ISMC 75x40x6 connecting A-pillars on both sides and chassis long members shall be provided. This tie-bar to be mounted on MSL50x50x6 mm angle 'L' brackets connected to the chassis long members.

13.6 The body mounting must be easily detachable from the chassis during major overhauls. Pillar gussets on four sides of the body shall be provided with 32 mm dia hole to facilitate lifting of the body during major overhauls.

14.0 CABIN AND SALOON FLOOR:

14.1 The cabin and saloon floor shall be in Alu.5-bar cheq.plate of 3.0 mm base thickness conforming to alloy designation 65032, Temper WP of IS: 737-1986. The cheq.plate should be riveted with M.S rivets of 5mm dia. to the floor longitudes at a pitch of 100 mm and in Zig-Zag manner at joints. The cabin area and wheel arch boxes shall be riveted at 75 mm pitch. The riveting on crib rail shall be done with 6 mm Alu.alloy solid rivets of HR –30 and condition OD as per IS: 740-1977. Intermediate bolting with M8 bolts shall be done on cross bearers and wheel arch frames.

14.2 The wheel arches shall be made in rectangle shape.

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14.3 The number of chequered plates used for cabin and saloon flooring should be least in order to keep the joints at minimum possible. The floor chequered plate shall be joggled at crib level to get proper seating.

14.4 In TATA and EICHER vehicles, an inspection cover fitted to a frame in under frame with tapped bolts, to be provided in saloon floor over fuel tank suction pipe of size 250x250 mm.

14.5 The floor longitudes should be in five rows excluding crib rails. They should be arranged in such a way that the seat legs are fixed on the floor longitudes. Dust proof rubber packing of 2 mm of EPDM quality shall be provided at the joints and ends of chequered sheet to avoid entry of water/ dust in to the saloon from the joints. The floor chequered plate laying shall ensure dust proof. Floor longitudes shall be provided wherever necessary for floor plate joints and stanchions.

14.6 Trap door of 580x 520 mm size must be provided in cabin flooring above gearbox with proper sealing and M6 tapping bolts.

14.7 Four drain holes of 25-mm diameter and 75 mm length ERW pipe shall be provided in saloon flooring corners below seat frames for draining of water while washing.

15.0 BODY PANELING:

15.1 The exterior portion of body i.e., sides, front end, rear end, mud wings and roof exterior should be in Aluminum sheet 1.22 mm thick of alloy designation 19000 and condition H2 of IS: 737 of 1986.

15.2 Front radiator grill is to be provided in 2 mm thick GI sheet (A/Leyland Type) for Eicher and TATA vehicles.

15.3 **Truss panel for body sides:** Full height truss panel between waist to crib rail for entire length of body and at rear end including corners shall be provided in Stainless Steel sheet of 0.7 mm of 430 Grade and in scotch/ mirror bright finish. These panels shall be riveted with 5 mm Aluminum alloy solid rivets to the structural members at waist rail together with 3mm 5 bar Aluminum chequered sheet and Indal 3402 stiffener at a pitch of 100 mm in zig-zag manner. The riveting pitch on seat rail and crib rail shall be 75 mm. The riveting pitch on pillars shall be 100 mm.

15.4 **Roof structure reinforcement:** The roof structure above on each door opening i.e., passenger entrance, Emergency door and driver door between roof longitude and cant rail shall be reinforced with a truss panel of 0.91 mm thick GI sheet and shall cover three bays. The GI sheet in single piece has to be formed to the required contour of roof prior to the assembly and shall be riveted to the roof longitudes and cant rail lower flange and also to the MS angle 30x30x3 provided above cant rail between 'C' brackets with MS flat head rivets at a pitch of 100mm.

15.5 The roof exterior sheet with 1.22 mm thick Al for center portion should be in full length of body and laid longitudinally in one single piece of 1220 mm wide. The riveting should be done on the roof longitudes in ZIG-ZAG manner. The exterior sides (LH & RH) of roof sheets with 1.22 mm thick Al have to be provided in single piece as required. The riveting on cant rail, front and rear end roof sticks should be with flat beading Indal 5505. The overlap of roof exterior panels should be equal to full width of roof longitude section and should be riveted by 5mm dia. Aluminum alloy solid rivets (HR-30) at a pitch of

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75 mm in two rows ZIG-ZAG manner. While riveting roof side sheet on cant rail, an Aluminum sheet of 1.6 mm thick and 75 mm wide has to be provided on full length of cant rail for pasting top fixed glasses. The sides of roof shall also be provided with water channel in Indal 6250 and shall be riveted along with flat beading Indal 5505.

15.6 PU sealant has to be provided at overlapping portion of roof panel joints to avoid water leakages. The edges along the roof joints shall also be applied with PU sealant for filling up the gaps. Roof joints should be water leak proof. Approved make weather shield strip of 150 mm wide and 2 mm thick shall be laid longitudinally covering roof center joints from front end to rear end to avoid water leakage from roof.

15.7 Exterior of roof sticks and longitudes shall be provided with expanded polyurethane sheet (Heat lan) of 6 mm thick.

15.8 The interior roof up to Cantlevel should be in Aluminum sheet 0.91 mm thick of alloy designation 19000, condition H2 of IS: 737 – 1986.

15.9 The interior vertical finishers for pillars, horizontal finishers for windows at cant level, waist level and finishers for intermediate rail, shall be in 0.5mm stainless steel of 430 grades and scotch bright finish. The finishers are to be pasted to structural members with PU sealants. There should not be any waviness in finishers and the sealant should not drip through the joints. All the horizontal finishers shall be in single piece per two bays and the overlap joints on pillars only. To avoid the expose of sharp edges and waviness of the SS sheet used, the inner edge of the finisher is to be bent inside.

15.10 The overlap joint for roof interior ceiling panels should be on the roof sticks. The overlap of the interior roof panels should be equal to the full width of roof stick section and should be riveted by 4.76 mm dia. Alu.alloy multi grip blind rivets at a pitch of 100 mm. Riveting should be done on roof longitudes and cant rail also.

15.11 Interior ceiling panel joints on every roof stick, cant rail and on all sides of door openings shall be provided with decorative beading Indal 2684with plastic filler and end covers.

15.12 Formed 'Z' section (size 25x45x25) of Alu.Sheet of 1.22 mm shall be provided on waist rail which shall be riveted with flat head blind rivets to waist rail duly overlapping the exterior body panel. The ends of 'Z' section shall be bent vertically upwards to overlap the pillar web. Suitable 30x3mm thick balata packing shall be provided below the 'Z' section to match the height of rivet heads of waist rail. Ends and corners shall be applied with P.U.sealant to avoid seepage of water in to saloon.

15.13 An Alu.sheet formed 1.6mm thick 'Z' section (30x8x30) shall be riveted to intermediate rail with Alu. flat head rivets of 5 mm to facilitate bonding of top fixed glass.

15.14 Two rows of panel stiffeners in Indal 3405 should be provided at seat rail level and in between crib rail to skirt level.

15.15 The exterior body panels from waist to skirt should be without joints in1.22 mm thick Alu. Sheets of alloy designation 19000, condition H2 of IS:737 of 1986. The vertical butt joint of panels should be on Structural members and to be pasted with two sided VHB tape of 3M make on all sides i.e., vertical joint, on waist rail and on skirt rail and approved make sealant of 'metal to metal' type and end portion of panels at wheel arches and skirt rail shall be folded inside by 20 mm and should be fixed with flat beading and Alu. alloy head solid rivets of 5.0 mm dia. at a pitch of 100 mm.

15.16 At rear end exterior from waist to skirt and between end pillars shall be provided with aluminum sheet 1.22 mm sheet in single piece. This panel shall be bonded to the

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rear end structure with PU sealant of metal to metal type. The rear end saloon glass frame shall be covered with 0.91mm aluminum finishers from outside and 0.5 mm Stainless steel finishers from inside. Body structural members and aluminum sheet surfaces where the sealant has to be applied shall be cleaned thoroughly for oil/dirt etc., before applying sealant.

15.17 The body sides have to be provided with rub rail in Indal 2676 with EPDM rubber insert with end covers on 2mm GI sheet formed in U 30x60x30x2 size. The rub rail ends shall be black powder coated.

15.18 The front end exterior panels shall be provided with decorative beading Indal 2721 at waist rail. The beading shall be anodized and fixed with blind rivets. The rear end waist level shall be provided with aluminum flat beading in Indal 5505 with blind rivets.

15.19 The exterior corner dooms both at front and rear on off side and near side from cant rail to waist and waist to skirt rail shall be provided in 0.91 mm GI sheet over laid with aluminum sheet of 1.22mm thick and Indal 5505 beading on full length of pillars.

15.20 The area between exterior and interior panels of waist rail to crib rail in side structure, cant rail to cant rail in roof structure shall be provided with 40 mm thick Thermocole insulation.

16.0 FOOT BOARD:

The foot board structure as shown in the drawing to suite Pneumatically operated Jack Knife doors shall be in three steps built in MS. Angles 40x40x3 mm and over laid with Aluminum 5-bar chequered sheet of 2.0 mm base thickness on sides and 3.0 mm base thickness on tread and riser portion. The footboard should be given a support under the lowest tread by providing a 'U' type bracket made of MS angles 40x40x6 mm. The arms of 'U' bracket should be 230 mm long and secured to pillars with M10x 4numbers bolts on each pillar. Step edge beading in Indal 5700 shall be provided along the edges. The bottom tread height from ground shall not be more than 400 mm. The tread depth should not be less than 300mm. Maximum step height allowed is 250 mm.

17.0 WHEEL ARCH FRAMES AND BOXES:

The front &rear wheel arch box frames should be fabricated in MS angles 40x40x6mm and M S flats 40x6 mm in rectangle shape. The height of box frame shall be 160 mm above top surface of the tyre. The boxes should be designed to accommodate 10.00 x 20 size tyres. The wheel arch box frames has to be covered with 1.6mm GI sheet and followed by 2mm Alu. 5-bar Chequered sheet in single piece instead of 3mm Aluminium5-bar chequered sheet. Step edge beading shall be provided at the riser and along the edges of wheel arch. Mud guard shall be provided in1.22 mm thick Alu.Sheet roundly along wheel arch area with proper clamping and a clear gap of 100 mm from the edge of tyres.

18.0 DRIVER'S PARTITION:

The driver's partition fabricated with 30x30x1.6 stainless steel tubes shall be as per drg.no.CB22DRP120. It should be fixed behind driver seat and shall be supported on structural members duly reinforced in the floor as well as at roof. The minimum distance from the Bonnet to partition wall shall be as per seat layout drawing. A timing board of size 500x500 mm shall be provided in Alu sheet 1.22mm duly painted white. The board should be provided in a sliding channel frame on 3 sides made of Indal3620 section and fixed to the partition on saloon side.

18.1 A provision for mounting 28" LED TV shall be made on the partition.

19.0 DESTINATION BOXES AND BOARDS:

19.1 LED destination boards of size 1800x220 mm & 900x220 mm of approved make Micro craft/MG Grey Engine shall be provided **at front and rear** end of bus with proper tapping & secured clamping and as per UBS-II specification with built in controller and LCD display for front LED destination board with a provision of numbers from 0 to 9 and Up & Down buttons to select service number & route. Communication cable to be provided from Front master LED board to rear LED board for display of same route course details in both the boards.

19.2 The side destination box shall be in first 1130 mm bay on LH side at window top fixed glass area after passenger entrance.

19.3 One flap door in 0.7 mm stainless steel sheet in size 1180 mm x330 mm is to be riveted with Stainless Steel piano hinge for full length at bottom and to be blind riveted on intermediate rail in 1st1130 mm window after passenger entrance on LH side of body. Bracket in indal 3620 is to be fitted on inner face of the door for holding the destination board of size 910 mm x210 mm. LED type lighttobe provided forillumination. Two locking latches and chain in stainless steel are to be provided on both sidefor locking the door and to hold it at convenient angle to change board. E 1 tower bolt has to be provided at middle of top centre and E 1 at centre areas on both sides for side destination board door.

19.4 Six destination boards in 0.91 mm thick GI sheet have to be supplied along with the vehicle duly painted in white color.

19.5 The side destination boardshall be illuminated by LED lights of 600-mm length of approved design and made with luminosity of 150 to 200 lux.

20.0 PARCEL RACKS:

Tubular type Parcel racks shall be provided on both sides of saloon above windows. The parcel rack tubes should be provided in 16 mm dia. & 1.6 mm thick stainless-steel tubes of 304 grade placed longitudinally at a pitch of 65 mm in the Stainless Steel (304 grade) rectangular tube brackets of 40x20x1.6 mm provided at each pillar. The pipes shall be spot welded to the rectangular tube brackets.

20.1 Intermediate brackets in same material, shall be provided in between two main brackets.These brackets shall be connected to the Cant reinforced MS angle 30x30x3 mm and roof sticks.

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20.2 The interior width of the racks shall not be less than 460 mm. There shall be a clear vertical gap of 230 mm between roof ceiling and parcel rack end tube. Parcel rack end brackets shall be provided with a stay bar in same tube.

20.3 One parcel Courier box to be provided at left side of parcel rack in 2nd pillar bay with suitable locking systemDrawing no CB22CRB140.

21.0 CONTINUOUS BEAM:

A longitudinal continuous beam in pressed top hat section of GI sheet of2.0 mm thick similar to roof stick profile should be provided. This beam in inverted position shall connect all the roof sticks from front end to the rear as shown in the seat layout drawing. The joints should not be more than three with reinforcement using 30x25x2 mm thick, 50 mm long 'U' channel welded at joints from inside. There should not any mismatch at the joints. Welded joints are to be ground for even surface and ends should be tapered to a length of 150 mm. Reinforcement is to be provided in the beam with MS flat 30 x6mm in 200 mm length flats for fitment of stanchions. This beam shall be fitted with M6 tapping bolts at every roof stick on both sides and the remaining beam shall be riveted in Zig–Zag manner at 100 mm pitch.

22.0 STANCHIONS:

Four stainless steel tube stanchions in 304 grade of 38 mm OD x 1.6mm thickness as per IS: 6913-1992 should be provided in between the saloon continuous beam and saloon floor as per seat layout plan. SS Flat 4 mm with 3 mm balata packing shall be provided at bottom ends of the stanchions and SS 40x40x4 mm angle on roof continuous beam .The stanchions have to be fitted on floor longitudinal members and to roof continuous beam with M6 size through bolts. The stanchions shall be fitted rigidly with dome nuts.

23.0 CONTINUOUS ROOF HAND RAIL:

One row of continuous roof hand rail in stainless steel tube in 304 grade of 25 mm OD x 1.6 mm thick has to be provided as shown in seat layout drawing. The intermediate support brackets to be in Alu. Extruded section Indal 9638 of 30mm width. These brackets are to be grey powder coated. Grab handles of approved source are to be provided.

24.0 WINDOW GUARD RAIL:

Two rows of window guard rails ofstainless steel tubes in 304 grade and 2B finish of 20mm OD x 1.6 mm thick as per IS: 6913-1992 have to be provided at a height of 75 mm and 175 mm above waist level outside on both sides of the vehicle. The pipes shall be bolted to the pillars with M6 bolts with intermediate and end sockets as per drg.no.CB22LB115. Tapping plates in MS flat 30x6 mm x 125-mm long shall be provided inside the pillar for fitment of guard rails.

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25.0 CABIN FRONT WINDSCREEN, SALOON REAR GLASSES AND WINDOWS:

25.1 **The cabin front-end shall be fitted with single laminated windscreen glasses of size 2620(W)X1300(H) mm.** The curved laminated glasses shall be of 7.76 mm thick with minimum 0.76 mm PVB film, select float quality, safety clear WAVE FREE as per IS: 2553–1971 and to be fitted with EPDM quality synthetic rubber extruded section as per drawing No:CB23ERG122.

25.2 The wind shield glass frame assemblies shall be made in MSL 25x25x3 mm to match the profile of the curved glasses.

25.3 The windshield glass frame assembly shall be made in MSL 25x25x3 mm to match the profile of the curved glass. The windshield frame shall be welded on all sides. The complete frame to be covered with 0.5 mm SS sheet from inside

25.4 **The approved brands for glasses are Bangalore safety, South Glass, GSC.**

25.5 All corners of windshield glass shall be provided with clamps in Alu.sheet 1.6mm.
The saloon rear end glass shall be bonded to the M.S. angle 30x30x3 mm frame provided in the rear body structure with P.U. sealant. The single piece glass shall be of 1760 x 800 mm size in 5.0 mm thick, toughened safety bronze tinted glass as per IS:2553–1990 & IS:2835–1987. Ceramic coating on periphery with suitable width shall be provided. The lettering work to be done on the glass from inside and at cant level as mentioned below with in size of 50 mm.:

"BREAK THE GLASSES IN EMERGENCY FOR EXIT"

In Telugu:

" అత్యవసర సమయంలో ఏ అద్దమునైనను పగులగొట్టుము"

25.6 The window frames in Hindalco 6482 extruded section as per drg no:CB22WDG128 shall be provided between waist rail and intermediate rail. For a standard bay of 1130 mm, the window frame size shall be 1125 x 673 mm. The window frame shall have two horizontal sliding glasses of 600x540 mm size with flock channel of EPDM rubber quality. The area between cant rail to intermediate rail shall be provided with a fixed glass of size 1127x450 mm. The glass shall be bonded to the 1.6 mm Alu.Sheet on cant rail and 1.6 mm Alu. Sheet 'Z' flange on the intermediate rail by applying P.U. sealant of approved make/ brands. The window glasses shall be of 5.0 mm thick toughened float quality, safety bronze tinted glasses as per IS: 2553 - 1990 & IS: 2835 – 1987. Window frames shall be black powder coated.

25.7 The edges of all sliding glasses shall be ground, chamfered and polished to smooth surface.

25.8 All window frames to be provided with corner cleats with flat rivets besides welding to the window corners. They should be fitted with M6x30 mm CSK head screws E 2 nos. on each vertical side on pillars and 3nos. on intermediate rail. Galvanized M.S. flat 30x6 mm tapping plates shall be provided inside on pillars and intermediate rail. Four drain slots of 50X3 mm shall be punched on side edges of bottom of window frame to drain out water collected in frame grooves.

25.9 All sliding shutter glasses are to be provided with finger pulls in Indal 1752 section of 100 mm long in black colour.

25.10 Vertical overlap of window frames on pillars shall be provided with a sealing rubber profile as shown in the drawing. The fixed glasses are to be secured intact.

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25.11 Approved makes of EPDM rubber profiles Rubber Extrusions & Moulding/ASP/ALP/Sri Venkateswara Bangalore and any approved make of APSRTC.

25.12 Approved makes of P.U sealants are Total seal /Sikaflex/3M India/Bostik /Anabond and Henkel.

26.0 PASSENGER ENTRANCE, ASSIST RAILS AND DRIVER'S DOOR:

26.1 The passenger entrance cum exit on LHS side as shown in the drawings shall be provided with pneumatic operated Jack knife door.

26.2 Pneumatic cylinder to be provided for opening & closing of passenger door. This pneumatic system mounted on tie bar besides the Power Steering Oil Container door without obstructing the passenger movement at entrance door and also to take necessary arrangement for safety of passengers.

26.3 The Jack Knife door design with Pneumatic operation should be as per drawing no. CB22JKG121. Two railway type latches in SS. flat 30x4mmshall be provided from inside for locking the door in closed and open position. Two SS handles of 100 mm long shall also be provided for the JK doors. The JK door mounting shall be with 3 forged hinges on 'A' pillar. Two flaps shall be joined with 3 forged hinges with reinforcement of 3.00mm GI. sheet.

26.4 At entrance, assist rail in stainless steel tube of 32OD x 1.6mm thick shall be fitted at cant level. The ends of these pipes are to be welded with stainless steel flats 50x4 mm with balata packing.

26.5 **DRIVER'S DOOR**: The driver's door should be provided with full drop sliding glass type between top and bottom duly extending up to floor level as per sketch no.CB22DRG119. The window frame shall be in Hindalco 6482 section as per the window design. The door shall have one heavy-duty door lock of MSL make only with outer handle, one locking latch from inside, striking plates and dovetail catches. The door shall be fitted with two forged hinges on 'A' pillar. Driver door frame shall be provided with one horizontal bar in stainless steel 20x1.6 pipe from inside for holding.

26.6 **EMERGENCY DOOR:** One Emergency door of min 1250mm height X 715 mm width extending from above intermediate cant rail to saloon floor on right side shall be provided as per the layout and drawings. The door is to be provided with one horizontal sliding window and one heavy duty lock operable from inside. The location of the emergency door is to be exhibited from inside with vinyl stickers and outer periphery is to be provided with red color reflective radium sticker. It should have railway type latch made of Stainless steel apart from Stainless steel/Brass tower bolt.

27.0 LUGGAGE CARRIER AND LANDING PLAT FORM:

A luggage carrier fabricated on the lines of drawing no. CB24LCG124 covering four standard bays including a landing platform up to rear end shall be provided on the roof top. The Luggage carrier frame and side railing shall be provided in MS angle 30x30x3 mm. The floor of luggage carrier should be covered with 2.0 mm base thickness 5-bar Alu. cheq.sheet conforming to alloy 65032, Temper WP of IS: 737-1986 and riveted to Cross members and frame of luggage carrier with MS solid rivets . The luggage carrier

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legs to be mounted on the Galvanized MS 6mm base plates attached to the roof sticks. The mounting of the luggage carrier shall be by means of bolting to the Galvanized formed 'L' bracket that is welded to the base plate. PU Sealant to be applied around the legs to prevent water entry.

27.1 **Landing Platform:** A landing platform on the rear side of roof top should be provided as per drawing no. CB22LDG113. The platform floor should be in 5-bar Alu.Cheq.plate of 2.0 mm base thickness.

27.2 **ACCESS LADDER:** One access ladder folding type with E2 heavy duty railway locks both sides at the rear end should be provided as per Drg.no. CB22LDG113 up to skirt level only.

27.3 **UNLOADER GRILL :**A un-loader grill on LH side above rear wheels has to be provided in ERW 19 OD x 1.6 mm as per drawing no. CB22LDG113.Itshall be covered with 1.22 mm Alu. Chequered sheet.

28.0 PASSENGER SEATS :

The seat layout plan and seating arrangement shall be as per the respective drawings.no.E2260SG22109 for AL, E2460SG22309 for TATA and E3060SG22209 for Eicher.

28.1 **SEAT FRAMES** :The seat frames for single, twin and triple seater shall be as per the drg.no.CB22SFE129. The legs of seat frames should be located on floor longitudes and seat rail only. Belting fabric 3 mm thick (one piece) shall be provided in between the floor and seat leg foot piece. The seat legs shall be fastened with M8 hexagonal head H.T.bolts using plain washers and nyloc nuts. Seat backrests shall have a provision for advertisement. The seat frames should be powder coated. Ladies seat frames should be yellow powder coated. All Seat frames MS pipe at welding portion should be cup cutting in order to facilitate full welding at joints instead of pressing.

28.2 **SEAT BOTTOM CUSHIONS**: Seat bottom cushions shall be provided in P.U. molded foam conforming to grade "J" of IS: 8255 – 1976. The density of P.U. foam shall be between45 to 50 kg /Cu.m. and indentation hardness shall be between 15-17 Kgf at 25% deflection.

Sizes:	Three seater	:1240 x 406 x 100/75 mm
	Twin seater	: 840 x 406 x 100/75 mm
	Single seat	: 420 x 406 x 100/75mm

The cushions to be mounted on 8.0 mm thick ply wood conforming to Grade-MR, type-AA, as per IS: 303 – 1989. The upholstery shall be with expanded vinyl coated fabrics as per the specifications (RDSO)at **ANNEXURE-II.**The color of Rexene shall be in charcoal grey with prior approval of CME(C&B) only. The bottom plywood shall have 04vent holes of 10 mm dia.per passenger seat. The bottom of plywood should be pasted with 1.0 mm thick ABS panel. The bottom cushion should be fitted 25 mm ahead of seat frame front end.

28.3 **SEAT BACK SQUABS:** The P.U. molded foam individual back cushion of size 710X400X130/75mm as shown in the drawing and conforming to grade "E" of IS: 8255-1976 shall be mounted on 8 mm plywood and upholstered with expanded vinyl coated fabric as mentionedabove. The back side of plywood shall be placed with 1.0 mm ABS sheet of matching shade. Seat back rests shall have a provision for advertisement.

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28.4 A sample seat shall be produced for approval of Chief Mechanical Engineer (C&B) before manufacturing in bulk and fitting in the vehicles.

28.5 All upholstery work shall be carried out with 3mm piping at all joints. A margin of 12 mm shall be provided for Rexene along the stitching lines and double stitching to be provided duly folding the Rexene edge by 6mm. The tacking of Rexene to plywood is to be by folding the Rexene by12 mm with a pitch of 50mm in between nails.

28.6 The sewing thread makes to be of "MODI/COATS", variety no.38 as perIS: 1720-1978.

29.0 DRIVER'S SEAT:

The OE knitted type driver seat supplied with chassis shall be retained. The driver seat frame mounting on cabin floor shall match the OE mounting position.

29.1 In case of non-supply of OE knitted driver seat with the chassis, HDPE knitted driver seat of approved make shall be fitted. The seat shall have fore and aft, up and down adjustment of 100mm with reclining back and to be fitted 350 mm away from steering wheel edge when the seat is fully forwarded.

29.2 The height of driver seat bottom shall be 450 mm when measured in fully lowered position.

29.3 There shall be a thigh clearance of 200 to 260mm between steering wheel edge and driver seating position.

29.4 The driver seat shall be so located that the center line of driver seat shall be 705 mm away from the center line of body.

29.5 The driver seat shall be provided with "ELR" type safety belt of make Autoliv/Rane/any other make approved by APSRTC (conforming to AIS- 052).

30.0 BATTERY BOX:

The battery box shall be provided on LHS side below floor level positioned as per drawing to accommodate two 12V batteries of size 521L X 292W X 248H mm with slider arrangement. The battery box is to be fabricated with MSL 40X40X6mmand MS Flat 40x6 and is to be paneled with 0.91 mm GI sheet on floor and three vertical sides. Interior of the battery box is to be overlaid with 0.5 mm stainless steel sheet of 430 grade. Wood packing shall be provided in the battery box on the sides of batteries to prevent vibrations while the vehicle is in operation. Four rows of single length battery cables to be connected to the battery cut-off switch terminals to self-starter and batteries. The terminals and cables should be firmly clipped in position. One LED light shall be provided in Battery Box.

31.0 ELECTRICAL WIRING AND OTHER FITMENTS:

31.1 The earth return system of wiring should be used. All automotive cables used shall be of IS: 2465 – 1984 quality covered with PVC sleeve as per IS: 1951-1961. Wherever the cables have to pass through roof and side structures, PVC conduits of ½" dia. shall be provided. There shall not be any loose or hanging cables, and if they pass through holes in panels or structural members other than roof and side structures, rubber grommets

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shall be provided in the holes of such panels and structural members and shall be securely clipped as near as practicable to such rubber grommets to avoid chaffing.

31.2 Wire casing Indal 2735 in two rows along the cant rail offside and nearside in such a way that it shall be easily accessible at all points without the need to strip major paneling of body. The extruded section shall be so located and fitted as not to affect the appearance of body. Any wiring, which has to run along the chassis frame shall be securely, clipped to ensure that there shall be no chaffing with any of the moving parts. Further care shall be taken to route such wiring in such a way that it is not subjected to splashing of oil, water, mud etc.

31.3 The battery main cable of size 398/0.40 mm shall be provided as required duly using good quality lugs with proper soldering, bolting and insulation etc., there shall be no joint in battery cables.

31.4 The saloon and cabin are to be provided with 8 nos. of 390 x130 mm LED light assemblies of approved makes as per layout drawing. Out of these, two shall be with in-built night lamp of blue colour.

31.5 All OE electrical fitments shall be retained and kept in working condition. Any extension of wiring harness should be done by providing male female connectors only. Tapping of power for saloon lighting etc., shall be taken from the OE female sockets provided by the chassis manufacturers. There should not be any tapping of power by slashing the main harness.

31.6 17 W Lucas TVS electrical wiper machine with E 2 blades of 610 mm length (min) shall be provided by the fabricator.

31.7 One single tone Air horn of Roots/ELGI make shall be provided. In addition to the OE electrical horn, One more electrical horn conforming to type -3 of IS 1884- 1993 shall be provided for AL and Eicher vehicles. The noise levels of these horns should be between 93 dB to 112dB.

31.8 Modular switches as per IS: 9433 –1980, 230Vx5 amps shall be used. A 6-pole disc type fuse box with independent fuse designated for every electrical circuit shall be fitted on switch board provided at cant level. Maximum current capacity of a circuit shall not exceed 15 Amps. The current carrying capacity shall be 1.5 times the load current of the electrical circuit. The fuses used shall conform to IS-4063 /1982. Switches and fuse box are to be fitted on hylam/decolam sheet of 3 mm thick and to be fitted on sunken tray located above the driver door with non-metallic shielding to avoid short circuits.

31.9 Cable ends shall be suitably crimped/soldered with lugs so as to with stand vehicle vibrations. The inter connections shall be made through couplers/ junction boxes /terminal blocks only. Weather proof connectors shall be used for connecting cables which are exposed to atmosphere to avoid water/moisture ingress during use.

31.10 Two additional head light assemblies of 8" dia with suitable reinforcement for fitment on front end structure, are to be provided along with OE head lamp assemblies on AL buses. Four round type headlights of approved make shall be provided on Eicher and Tata vehicles with proper reinforcement structure for fitment. They shall be fitted at a distance not more than 400 mm from the extreme outer edge body and not more than 1200 mm height from the ground.

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31.11 In Ashok Leyland buses, OE front direction indicator lamps shall be retained and to be provided below 1500 mm height on the outer edge of body in amber color. For TATA and Eicher buses, approved type front indicators shall be provided. In addition to this, four LED type direction indicator lamps (flat type) in amber color shall be provided on the lateral side of the body at wheels and below 1500 mm height from the ground. E 1 AMW type indicator light to be provided on both sides above front wheel arch area.

31.12 LED type height marker lamps in white color at front and in red color at rear shall be provided. The marker lamps shall be above windshield glasses at front and above cant level at rear on maximum possible outer edges.

31.13 LED type tail lamps in 5" dia. of 4nos.shallbe provided on each side (two-red, one-white and one –amber). The mounting shall be below 1500 mm from ground and 400 mm from the outer edge. The red lights shall have individual circuits for parking and brake lights.

31.14 Rear number plate shall be provided with LED type light assembly of 300 mm length.

31.15 Electrical side flashers of LED type in amber colour shall be provided at cant level on all four corners.

31.16 OE battery cut-off switch supplied with chassis shall be provided with separate fuse control. In case of non-supply of battery cut-off switch along with the chassis, IGSA-552 or part no. LP-134/3 of Lucas India Services Ltd., make shall be fitted in driver's cabin with a label "Battery Cut-off Switch". The battery cut-off switch to be located 300mm above the cabin floor on 3mmG.I. plate provided in side structure.

31.17 **Tims:** One 12V Converter has to be provided at conductor seat area on intermediate rail for connecting TIMS. One LED type light with separate switch of approved design shall be provided at conductor seat.

31.18 Conductor's buzzer with 4 nos. of bell switches are to be provided in Saloon.

31.19 One reverse gear horn/alarm (with 4 tones) shall be provided with noise level not more than 100 db if not supplied with the chassis.

31.20 Six 6" dia speakers of Boston (Si-600) or Pioneer (TS 1641 GS) make shall be provided in parcel rack with FRP speaker boxes with separate switch control for LH/RH side speakers.

31.21 In the driver cabin , Instrument panel with all gauges, OE switches & indicators with labels shall be provided at 45-degree angle and shall be in the reach of driver from his seat. The frame shall be fabricated in MS angle 25x25x3 mm covered with 0.91 mm thick GI. Sheet.

31.22 Power for connecting Wiper, Indicators and Fog lamps shall be drawn from the OE fuse box supplied by Chassis manufacturer only duly providing male / female sockets.

31.23 Never connect the circuits with twists & knots. Never tap power by slashing the main harness.

32.0 BODY PAINTING AND COLOR SCHEME:

32.1 Body to be painted on the exterior with **premium quality Polyurithane paints**. The body under frame and chassis shall be painted with anti corrosive rubberized paint. The exterior painting process shall consist of carefully cleaning and etching followed by surface leveling with polyester putty application, P.U primer surface coats, finish coat and glaze coat as per the recommendations of paint manufacturer. It is suggested to take up the painting activity in Paint booth.

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32.2 Approved paint brands are 'Deltron' of Asian PPG, 'Glassurit' of BASF(Wuerth), 'Sikkens' of Akzo Nobel, 'Imron 9100' of Dupont(Axalta) and Nax Ultima of Nippon and 'Viton 2K' of Berger Rock, Vulsper.

32.3 Colour Scheme: As per the approved Color scheme & the colour shades will be communicated.

32.4 The Colour scheme may be modified or changed at the time of execution of bus body fabrication as per the orders of Chief Mechanical Engineer(C&B).

32.5 APSRTC monogram shall be provided on both sides of body at center portion as per SKETCH1916in image transfer stickers.

33.0 MISCELLANEOUS FITTINGS TO BE PROVIDED:

33.1 Two Fiber handles of 100 mm size at waist level of cabin front end & Two footsteps on the bumper shall be provided forgiving feasibility to clean the front windshield glasses. Footsteps should not protrude outside the bumper.

33.2 Two OE fully adjustable rear view mirrors of convex type shall be fitted with brackets as per drawing CB22RVM139, One convex mirror to be fitted inside driver cabin at center pillar between front glasses &one convex type mirror to be fitted at outside of front end (center) for near vision of road in front of bus. The location of rear view mirrors shall be so located to have at least 2500 mm wide vision from the body line of vehicle when viewed from driver seat.

33.3 The front registration number plate in Alu.sheet 1.6 mm has to be provided on the front bumper at right side with Indal 5505 beading around registration numberplate. The size of the number plate shall be 450x250 mm. The rear registration number plate shall be on rear bumper.

33.4 Two fire extinguishers of approved make and dry chemical type 5.0kg capacity conforming to IS: 2171of 1985 suitable A,B&C class of fires shall be provided with suitable MS clamping arrangement.

33.5 Rubber mud splashguards of size 650x456 mm are to be provided for front and rear wheels.

33.6 First aid box of Stainless steel and in size 310x220x128 mm with leather straps and locking arrangement shall be provided in driver's cabin. First aid medicine kit containing the items mentioned under Rule 138 (4)(d) of the latest M.V.Rules shall be provided in the box.

a) Antiseptic cream of 0.5 % Centrimide I.P in non-greasy base 5 mg ... 2 pcs.
b) Sterile Surgical gauge dressing ...1 packof 4 pcs.
c) Wash proof plaster ... 5 pcs.
d) Sterile elastic plaster – size 6cmx30 cm ... 1 pc.
e) Gauge rolled – size 7.5 cm x 2.5 mtrs. ... 3 pcs.
f) Elastic bandage for wounds and burns Size – 8 cm x 1.5 mtrs. ... 1 pc.

33.7 One pair of towing hooks with 36 mm eye dia. in MS flat 75x12 shall be provided at the rear end, to be attached to chassis long member with04nos.ofM12 bolts.

33.8 All lettering works in Vinyl stickers shall be done as per the guidelines with 25H X 6T.

33.9 The rear bumper should be in GI sheet **2.0** mm thick-formed channel section of size 50x175x50 mm in single piece with brackets in MSL40x40x6mm and to be fitted to the chassis long members. The ends of the bumper are to be curved. The center

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portion of the bumper shall be made sunken to accommodate a registration number plate and number plate light.

33.10 The OE front bumper supplied with the chassis shall be retained. Front bumper length shall be increased to suite the body width i.e. 2590 mm. If the chassis is not supplied with front bumper, the bumper shall be fabricated in GI sheet **2.0** mm of size 40x300x40 mm to suite the body width by the fabricator. The mounting shall be attached to chassis long members with M.S. angle50x50x6 mm of 400 mm long.

33.11 Two sunken off set foot steps of size 150x150mm shall be provided below the driver door, one at 700 mm height from the ground and another at 950 mm.

33.12 The entrance door, emergency door and driver door shall be provided with water drain canopies at cant level with 1.22 mm Alu.sheet.

33.13 Pure rubber matting of 3.0mm thick shall be provided at foot control pedals area in driver's cabin.

33.14 A footstool for driver to be provided in Alu.5-bar cheq.sheet 3.00mm and Indal 2651 as legs

33.15 Tapping of compressed air for air horn and wind screen wiper should be obtained from port no.24 of system protection valve with proper unions, 'T' joints. Polyamide pipe of 6 mm shall be used for tapping of air. The pipeline shall be firmly clamped in position.

33.16 One safe locker under twin seater for keeping conductor's cash, tickets etc., with locking arrangement shall be provided at 1st two-seater frame.

33.17 One roller type sun visor of 24" size to be provided in driver cabin.

33.18 The firm shall provide one spare wheel carrier fabricated in MS flat 75x12 mm and 6.0 mm MS sheet as perDrg.no.CB22SWG131 on LHS at rear of rear wheels. The centre of spare wheel shall be at 1800 mm away from the center of rear wheels. Care shall be taken to avoid fouling of spare tyre with any of chassis units/parts under any circumstances. The Spare Wheel carrier shall be provided with flap door with full length stainless steel hinge of 1.6 mm thick and 30 mm wide from the bottom of the cross bearer to skirt rail with locks and stay rod in Stainless steel rod 6 mm.E1 LED light shall be provided at spare wheel carrier.

33.19 Driver & engine bonnet area to be separated from passengers by providing one row of stainless steel pipe of 304 grade in 32OD x 1.6 mm thick vertical supports and SS Flat 50X4 mm with balata packing.

33.20 The seats earmarked for ladies, PHC persons, senior citizens are to be very clearly exhibited on seat back rests.

33.21 Retro-Reflective Conspicuity Marking tapes of Diamond grade 50 mm wide conforming to AIS: 90 of approved make shall be bonded to the body sides as per the sketch provided. The cumulative length of tapes provided shall not be lessthan80% of length of that side. These tapes shall be white in color at front, yellow on sides and in red at rear of the body.

33.22 One stainless steel assist rail of 25x1.6 OD(304 grade) up to a height of 600 mm from floor shall be provided on rear side pillar of driver door from inside.

33.23 Guard rails are to be provided in SS of size 25x1.6 mm in all side luggage booths.

33.24 REMI make one electric fan 0f 24Vx 8" dia. shall be provided in cabin for driver.

33.25 G.I. sheet 0.50 mm thickness shall be provided inside the bonnet.

33.26 One Amplifier of approved make i.e. AHUJA/SONY shall be provided.

33.27 One 200 mm SS handle to be provided on outer side of driver door.

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33.28 Stainless steel sheets, tubes, pipes etc. should be of Jindal make/any other source approved by APSRTC.

33.29 Dash board area front left side, where it is clearly visible to passengers, provide stickering of "Book Your Tickets Online, www.apsrtconline.in"in 3" of font size with "Times Roman" lettering font.

33.30 Slogans in Telugu to be exhibited as follows

1. టికెట్టులేనిప్రయాణంనేరం, అందుకురూ. 500/- వరకుజరిమానా
2. ఈబస్సుమనందరిది!దీనినిపరిశుభ్రంగాఉంచుదాం!!

33.31 LED Lights of 12 leads, 5W capacity are provided at luggage booths.

33.32 All Slogans &Stickering to be done as per the instructions from time to time given by APSRTC with size of 25H X6T.

33.33 If there are any modifications in specifications are proposed during fabrication, it will be communicated by APSRTC from time to time and to be implemented immediately.

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S.No	Drawing No	Description
1	CB22LDG113	Ladder, unloader, platform
2	CB22AEG112	Extruded AL sections
3	CB22CTG132	Chart for Sheet Specs
4	CB22DRG119	Driver door
5	CB22DRP120	Driver Partition
6	CB22JKG121	JK door
7	CB22LBG115	Window guard rail bracket
8	CB22LB115	Body lifting
9	CB24LCG124	Luggage carrier
10	CB22RVM139	Rear view mirror bracket
11	CB22SFE129	Passenger seat frame
12	CB22SWG131	Spare wheel carrier
13	CB22UBG114	Body u bolt
14	CB22WDG128	Window assy
15	CB22CRB140	Courier box
16	SKETCH1916	Monogram
17	E2260SG24109	
18	E2260UF24108	
19	E2460SG24309	
20	E2460UF24308	
21	E3060SG24209	
22	E3060UF24208	
23	E2260SL24106	
24	E2260SR24107	
25	E2460SL24306	
26	E2460SR24307	
27	E3060SL24206	
28	E3060SR24207	

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SPECIFICATIONS FOR METRO EXPRESS BUS BODIES
HIRE BUSES TENDERS - 2024

1.0 GENERAL DESIGN:

The general design shall be a streamlined body with two passenger entrances on LH side; one at front of front wheels and another at rear of rear wheels without doors and passenger seats facing forward in 2x2 pattern.

2.0 REGULATION:

The general appearance, structure, seat layout etc., shall be in accordance with respective drawings. The bus body design should comply with the provisions of latest Central Motor Vehicle Rules, Andhra Pradesh Motor Vehicle Rules, Bus Body Code AIS:052 and any other statutory requirement that may come in to force during execution of fabrication work order. The coach interior shall meet the standard of IS: 15061-2002.

2.1 The firms shall possess Bus Body Accreditation Certificate issued by CIRT /ARAI or any other Agency approved by GOI and shall be registered with APSRTC.

3.0 MAIN DIMENSIONS: (ALL DIMENSIONS ARE IN MILLIMETERS)

SL NO	CHASSIS MODEL -> DESCRIPTION	AL 222"WB	TATA 224"WB	EICHER 230"WB
	Chassis Suspension : Front & Rear Weveller Suspension			
1	Wheelbase	5639	5700	5840
2	Rear overhang	3383 (60%)	3420 (60%)	3504(60%)
3	Front overhang	2265	1845	2370
4	Overall length (excluding bumper)	11287	10965	11714
5	Overall width (structure)	2590		
6	Pillar centers (standard)	1130		
7	Window sill(waist rail)height from top of the cross bearer	610		
8	Waist rail height from Skirt level	1200		
9	Cant rail height from waist level	1130		
10	Interior saloon clear height (Minimum)	1900		
11	Clear aperture of passenger service door	650		
12	Clear aperture of Driver door	650		
13	Seating capacity	45+1 Driver	45+1 Driver	47+1 Driver

4.0 DRAWINGS: The lists of drawings to be followed are shown at **ANNEXURE-I**.

5.0 MATERIAL**:** The fabrication of bus bodies shall be as per the specifications and the material shall be procured from the recommended sources / brands as mentioned in **ANNEXURE-II.**

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6.0 CHASSIS POSITIONING:

6.1 All Chassis received by the firm for fabrication of bus bodies should be kept safely in a covered area. The Chassis should not be kept open to atmosphere without any protection to avoid damage to Chassis and its units due to rain, dust and heat.

6.2 Before commencement of bus body fabrication all important units of chassis viz. Alternator, self-starter, radiator, tyres, batteries, air cleaner, air cleaner indicator, power steering reservoir, fuse boxes, electrical relays, ECU, EDC, accelerator Pedal ,brake pipe lines, filters, clutch reservoir, Instrument cluster should be protected by providing suitable covering. Wiring connections to Vehicle ECU, ABS ECU and Vehicle tracking Unit shall be disconnected and the Wiring harness connector ends should be protected to prevent from damages that may occur due to welding, drilling, cutting, hammering, riveting and falling of metal scrap or dust during the course of fabrication. Driver seat, steering wheel, hand brake valve etc., shall also be protected from any damage or paint spray.

6.3 Chassis number on long members and identification plates provided by the Chassis manufacturer shall be properly covered and protected before commencing the fabrication work.

6.4 The Ashok Leyland, TATA and Eicher Chassis are supplied with following items as OE fitment.

1. Cabin floor
2. Bulk head structure (AL/EICHER)
3. Out riggers (AL/EICHER)
4. Anti-sag channel (TATA)
5. Bonnet and Front bumper (AL/TATA/EICHER)
6. Knitted Driver seat
7. Head lights E2
8. Front indicators E2
9. Tail Lamps E2
10. Battery cut off switch
11. Reflective warning triangles with stands
12. Wheel stoppers
13. Spare wheel carrier cage type/rope type
14. First aid kit
15. Tools as per CMVR
16. Rear view mirrors with brackets E2 plus 1 small mirror
17. Electrical horn
18. ELR safety belt

7.0 PROTECTIVE TREATMENT:

All Mild Steel components used for fabrication shall be carefully de-greased, de-rusted with three in one solution by dipping and wiped with dry cloth to remove all dirt/oil etc. as per IS-3618. Then the material shall be applied immediately (without any time lag) with Zinc Phosphate epoxy primer "Rust-O-Cap" (part no.24570608320) of M/s. Asian Paints or "60 BT PRIME GREY" of M/s. Akzo-Nobel Coatings, to a thickness of 40 to 50 microns before assembly.

7.1 All Aluminum Components shall be carefully cleaned with thinner. Bi-Metallic Paint shall be used at joints of dissimilar metals. The interior and exterior panels should be cleaned with thinner and then self-etching primer shall be applied.

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8.0 BODY STRUCTURE:

8.1 Aluminum Structure: All principal structural members should be in Aluminum extruded sections of Alloy designation 64430, 63400 and 65032, condition WP as per IS: 733– 1983. The structural joints shall be by riveting, bolting and combination of both. The rivets shall be of Aluminum alloy wire of IS:740 – 1977 alloy condition 64430 (HR-30)–OD.
Aluminum 5-bar chequered plate with 3.0/2.0 mm base thickness shall conform to alloy designation 65032 and condition WP of IS:737 of 1986.All Aluminum sheets shall conform to alloy designation 19000, conditionH2 of IS: 737 of 1986.

8.2 Chart no.CB22CTG132 and Drg.no.CB22AEG112 (sheet 1&2) containing the details of specifications of Aluminum extruded sections and sheets to be used, shall be followed.

8.3 Other Mild Steel / GI structural members: Galvanized steel sheets should be as per grade 175 of IS: 277- 2018. Rolled sections should be as per IS - 2062 of 2006. The structural joints shall be done by riveting, bolting or combination of both and for MS/GI structural members MIG welding is only allowed. The welding should be for full length of joint. Welding slag to be removed and ground to smooth finish in order to avoid sharp edges.

8.4 All bolts used shall be of sizes reckoned in Metric system. The bolts shall be of high tensile hexagonal head with fine thread, conforming to property clause 8.8 of IS: 1367 of 1979. The nuts shall be off approved anti-vibrate type such as Nyloc conforming to IS: 1364 of 1983. All bolts, nuts and washers should be galvanized. Each bolt and nut shall be provided with a flat washer. A spring washer should accompany every tapped bolt. The approved brands of bolts are TVS / STL / HINDUSTAN FASTENERS / KFL/ UNBRAKO/ IMPERIAL FASTENERS brands only.

9.0 PARTICULARS OF IMPORTANT STRUCTURAL MEMBERS

Sl no.	Description	Material
1	Cross bearers	Rolled steel channel ISMC 100x50x6 mm
2	Anti-sag bar	Rolled steel channel ISMC 75x40x6
3	Floor longitudes	GI'U'section25x75x25x3 mm thick(5 rows)
4	Pillars and horizontal supports	Indal 2654 section, All pillars including wheel arch horizontal supports shall be reinforced with formed 'U' inserts of GI sheet 3.0mm thick.
5	Roof sticks and roof longitudes	Indal 2651 section(5 rowsof roof Longitudes)
6	Crib rail and Seat rail	Indal 1756 section
7	Cant rail	Indal 2800 section
8	Waist rail	Indal 2613 section
9	Waist rail stiffener	Indal 3402 section& 3.0 mm Aluminum5-bar chequered plate 100mm wide with minimum joints one on LH side and two on RH side with in Wheel base
10	Panel stiffener	Indal 3405 section
11	Skirt rail	MS Angle 40x40x3 mm
12	Water channel a) On Cant rail b) Front & rear-end	a) Indal 6250 section b) Hindalco WC-695 section
13	Step edge beading	Indal 5700 section

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14	Flat beading	Indal 5505 section
15	Decorative beading at a) Exterior waist level front b) Interior ceiling	Indal 2721 section b) Indal 2684 section with plastic filler and ends
16	Window sections Window guide Split section 1 Split section 2 Sweep rubber section Finger pull	 Hindalco 6482 section 'T' section 'F' section Hindalco 2691 section Indal 1752 section
17	Wire casing	Indal 2735 section
18	Rub rail on body side	Hindalco 6551 section
19	Cleats & Brackets a. Roof structure b. Cant to roof stick and c. Cant to pillar Side Structure	a) Indal1760 section b) 'C'bracket formed in GI sheet 2.5 mm c) 'C'bracket formed in GI sheet 2.5 mm at wheel arches and Indal1760 cleats
20	Roof grab rail brackets	Indal 9638 of 30 mm wide powder coated in grey colour
21	Gussets for Cross bearer to Pillar joint	ISMC 100 X50

10.0 PRECAUTIONS:

10.1 Aluminum extrusions such as seat rail, crib rail, Cant rail shall be joined with in wheelbase only.

10.2 "NEGATIVE TOLERANCES "are not allowed either for Aluminum Extruded sections or Aluminum sheets and also for GI sheets/tubes.

10.3 All holes in cleats and roof longitudes shall be PUNCHED to close tolerances. Under any circumstances drilling of holes is not allowed.

10.4 All welding shall be done with MIG welding process only. Under Any circumstances, arc welding shall not be allowed. Welding of Stainless steel components shall be done with TIG welding process only with same grade Stainless Steel filler rod.

10.5 The following workmanship must be carefully followed during the fabrication.

i. All castings must be truly formed and free from blow holes.
ii. All bolts and rivets should be well fastened.
iii. Rigid water test shall be carried before fixing the interior ceiling using pressurized water spray system. The fabricator shall equip water leak test facility confirming to IS: 11865-1982 at the firm for conducting leak test in two stages i.e., before fixing the interior ceiling and before dispatch of vehicle.
iv. All welded joints must be chipped and well ground to get a smooth surface and applied with Epoxy primer without any delay.
v. Sharp corners shall be grounded and made smooth.
vi. Wherever pitch for rivets / bolts is not specified, it shall be 100 mm.
vii. Bolt ends shall protrude at least 2 to 3 threads length above the nuts.
viii. Roof stick, roof longitude, floor longitude and waist rail members shall butt properly at mating joints and shall not have gaps at the joints.

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ix. All tapping bolts at grab rail, handles and assist rails etc. shall be tightened using thread lock adhesive of approved makes.

x. Roof stick, roof longitude, floor longitude and waist rail notching to be done on power press only.

xi. All fixed glasses shall be provided with ceramic coating of suitable width on periphery.

11.0 CABIN UNDERFRAME STRUCTURE:

11.1 Cab under frame of Ashok Leyland 222" WB Chassis shall be fabricated as per the drg.no.M2260UF22129. The OE structure shall be retained and modified accordingly to suit the fabrication. The saloon floor shall be made in line with cabin floor except at wheels. The OE floor on RH Side of cabin shall be connected to the 1st cross bearer by providing a 'Z' riser formed with3.00 mm GI sheet On LH Side, a raised wheel arch box shall be provided on front wheel duly fabricating in MS flats 40x6 mm and MS angles 40x40x6 mm. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.2 The Tata 224" WB Chassis shall be fabricated as per the drg.no.M2460UF22329. The cabin floor longitudinal members shall be connected to a 'Z' raiser formed with3.00 mm GI sheet provided on 1st cross bearer to make up the height difference of cabin and saloon floor. Suitable wheel arch boxes in rectangle shape fabricated in MS flat 40x6 mm and MS angles 40x40x6 mm shall be provided. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.3 The Eicher 230" WB Chassis will be supplied with OE cab floor, bulk head structure, out riggers, driver seat and engine bonnet. The cab under frame shall be fabricated as per the drg.no.M3058UF22229. The OE structure shall be retained and modified accordingly to suit the fabrication. The saloon floor shall be made in line with cabin floor except at wheels.
The OE floor on RH Side of cabin shall be connected to the 1stcross bearer by providing a 'Z' riser formed with3.00 mm GI sheet. On LH Side, a raised wheel arch box shall be provided on front wheel duly fabricating in MS flats 40x6 mm and MS angles 40x40x6 mm. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.4 The dashboard frame shall be fabricated in MS angle 40x40x6 mm to the required profile and covered with GI sheet of 0.91mm thick. Flap doors with suitable stainless steel hinges and tower bolts shall be provided for easy access to fuse box, radiator and power steering reservoir and clutch oil container.

12.0 BODY FRAME STRUCTURE:

12.1 The bus body frame structure should be fabricated as per the following drawings. ASHOK LEYLAND 222" WB Chassis – M2260SL22127 and M2260SR22128TATA 224" WB Chassis – M2460SL22327 and M2460SR22328.EICHER 230" WB Chassis – M3058SL22227 and M3058SR22228.

12.2 The Cant rail at the passenger entrance and driver door area shall be reinforced with GI sheet formed channel in 2.0 mm thick and the joint of Cant rail should not be exactly on any pillar or within door bay.

12.3 A & B pillars on both sides shall be provided with GI 3 mm thick formed section similar to Indal 2654. First and second roof sticks connecting A& B pillars shall also be provided in GI formed section similar to Indal 2651 in 2 mm thick. All the structural members in this bay (Waist rail, Intermediate rail and roof longitudes) shall be in GI formed sections of 2 mm thick with dimensions of corresponding Aluminum Sections.

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12.4 At fuel oil tank mouth, an opening of size 250-mm x 250 mm shall be fabricated in MS angles 40x40x6 mm. The opening is to be finished with flat beading (Indal 5505) and with a flap with ball catcher shall be provided.

12.5 MS tapping plates in 30x6 mm flat of 200 mm length shall be provided wherever tapping is to be done for fixing body components such as roof continuous beam, roof hand grab rail, window guard rail, assist rail, drivers' partition, windows etc.

12.6 Cant rail on both sides full length shall be reinforced with MS Angle30x30x3 mm. This angle shall be riveted to pillars flanges at Cant level and connected to the Cant rail duly providing two GI plates of size75x30 mm of 2 mm thick welded to the angle and riveted to Cant rail in every bay.

13.0 CABIN AND BODY MOUNTING :

13.1 The OE Cabin floor and mounting arrangement shall be retained. The remaining portion of cabin floor connecting Ist-cross bearer and OE floor shall be fabricated as per drg. no. M2260UF22129 for AL 222" WB, M2460UF22329 for TATA 224" WB and M3058UF22229 for Eicher 230" WB Chassis.

13.2 The OE anti-sag members shall be retained. If the Chassis are not supplied with the anti-sag members a 3-piece anti sag bar in channel ISMC 75x40x6 shall be provided at front end of the Chassis bottom frame connecting to the 'A' pillars on both sides.

13.3 Additional Out riggers in MS angles 50x50x6 mm shall be provided connecting 'B' pillars to the Chassis long members with suitable fitment. The body should be mounted on the Chassis web duly providing 6 mm (inverted pressed "L" type) MS plate as per the size shown in the respective drawings over the Chassis long members.
These "L" plates shall be bolted together at every cross bearer mounting to Long member web with M12x 50 H.T. bolts at least 4 nos. per plate. OE holes on the Chassis long members shall only be picked up for mounting this plate. Wherever the OE holes are not available for bolting of web mounting plate, holes shall be drilled on the web 40 mm below the top level of long member with prior approval.

13.4 Over these plates, cross bearers in channels ISMC 100x50x6 shall be provided as per the respective drawings. If the web mounting plate position at rear wheels coincide with rear spring bracket, the cross bearers shall be fastened with 16 mm dia. "U' bolts of approved make and with 150mm x 6 mm thick base plate welded to the bottom of cross bearer. Spacers made of Aluminum casting shall be placed between bottom flanges of Chassis long member and "U" bolts.
The "U" bolts are to be made out of EN-15/14B steel as per IS 5517-1978 (Tensile strength 80 kg/Sq.mm minimum). The "U" bolts should be galvanized and fitted with galvanized nyloc nuts as per drg.no. CB22UBG114. The length of bolt shall suit the depth of Chassis long member and should not project more than 6 mm outside of nut after tightening.

13.5 In ASHOK LEYLAND and EICHER vehicles the front bulkhead ends are to be connected to the A-pillar of the body duly giving the support members. In ASHOK LEYLAND and EICHER vehicles a tie-bar in front of radiator in 3- piece in ISMC 75x40x6shall be provided, connecting both A-pillars and Chassis long members. This tie-bar to be mounted on MSL 50x50x6 mm angle 'L' brackets connected to the Chassis long members.

13.6 The body mounting must be easily detachable from the Chassis during major overhauls. Pillar gussets on four sides of the body shall be provided with 32 mm dia hole to facilitate the lifting of the body during major overhauls.

14.0 CABIN AND SALOON FLOOR:

14.1 The cabin and saloon floor shall be in Aluminum5-bar cheq.plate of 3.0 mm base thickness conforming to alloy designation 65032, Temper WP of IS: 737-1986. The cheq.plate should

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be riveted with MS rivets of 5mm dia. to the floor longitudes at a pitch of 100 mm and in Zig-Zag manner at joints. The cabin area and wheel arch boxes shall be riveted at 75 mm pitch. The riveting on crib rail shall be done with 6 mm Aluminum alloy solid rivets of HR – 30 and condition OD as per IS: 740-1977. Intermediate bolting with M8 bolts shall be done on cross bearers and at wheel arch frames.

14.2 The wheel arches shall be made rectangle shape. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

14.3 The number of cheq.plates used for cabin and saloon flooring should be least in order to keep the joints at minimum possible. The floor cheq.plate shall be joggled at crib level to get proper seating on crib rail.

14.4 In TATA and EICHER vehicles an inspection cover fitted to a frame in under frame with tapped bolts to be provided in saloon floor over fuel tank suction pipe of size 250x250 mm.

14.5 The floor longitudes should be in five rows excluding crib rails. They should be arranged in such a way that the seat legs are fixed on the floor longitudes. Dust proof rubber packing of EPDM quality, in 2 mm thick shall be provided at the joints and ends of chequered sheet to avoid entry of water / dust in to the saloon from the joints. The floor cheq.plate laying shall ensure dust proof. Additional floor longitudes shall be provided wherever necessary viz. floor sheet joints and mounting on floor etc.

14.6 Trap door of 580x 520 mm size must be provided in cabin flooring above gearbox with proper sealing and M6 tapping bolts.

14.7 Four drain holes of 25-mm diameter shall be provided in saloon flooring corners provided with bottom extension with 75 mm length ERW pipe below seat frames for draining of water while washing.

15.0 BODY PANELING:

15.1 The exterior portion of body i.e., sides; front end, rear end, and roof exterior should be in1.22 mm thick Aluminum sheet of alloy designation19000 and condition H2 of IS: 737 of 1986.

15.2 For Eicher and TATA vehicles front radiator grill is to be provided in 1.22 mm thick GI sheet as per drawing.

15.3 **Truss panel for body sides**: Full height truss panel between waist to crib rail for entire length of body and at rear end including corners shall be provided in stainless steel sheet of 0.7 mm thick and 430 Grade with scotch bright finish.
These panels shall be riveted with 5 mm Aluminum alloy solid rivets to the structural members at waist rail together with 5 bar Aluminum chequered sheet and Indal 3402 stiffener at a pitch of 100 mm in zigzag manner. The riveting pitch on seat rail and crib rail shall be 75 mm. The riveting pitch on pillars shall be 100 mm.

15.4 **Roof structure reinforcement**: The roof structure above the each door opening i.e., passenger entrances and driver door between roof longitude and Cant rail shall be reinforced with a truss panel of 0.91 mm thick GI sheet and shall cover three bays. The GI sheet in single piece has to be formed to the required contour of roof prior to the assembly and shall be riveted to the roof longitudes and to Cant rail lower flange and also to the MS angle 30x30x3 provided above Cant rail between 'C' brackets with MS flat head rivets at a pitch of 100mm.

15.5 The roof exterior sheet for center portion should be in full length of body and laid longitudinally in one single piece of 1220 mm wide. The riveting should be done on the roof longitudes in ZIG-ZAG manner. The exterior sides (LH & RH) of roof sheets have to be provided in single 915 mm piece as required. The riveting on Cant rail, front and rear end roof sticks should be with flat beading Indal 5505. The overlap of roof exterior panels should be equal to full width of roof longitude section and should be riveted with 5.0- mm

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dia. Aluminum alloy solid rivets (HR-30) at a pitch of 75 mm in two rows in ZIG-ZAG manner.

While riveting roof side sheet on Cant rail, an Aluminum sheet of 1.6 mm thick and 75 mm wide full length of Cant rail shall be provided on the Cant rail for pasting top fixed glasses. The sides of roof shall also be provided with water channel in Indal 6250 and shall be riveted along with flat beading of Indal 5505.

15.6 In order to avoid water leakage, overlapping portion of roof panels joints, overlapping portion of roof panels should be provided with white lead. The edges along the roof joints shall also be applied with white lead for filling up the gaps. Roof joints should be water leak proof. Approved make weather shield strip of 150 mm wide and 2 mm thick shall be laid longitudinally covering roof sheet joints from front end to rear end to avoid water leakage from roof.

15.7 Exterior top of roof stick and longitudes shall be provided with expanded polyurethane sheet (Heat lan) of 6 mm thick.

15.8 The interior roof up to Cant should be in Aluminum sheet 0.91 mm thick of alloy designation 19000, condition H2 of IS: 737 – 1986.

15.9 The interior vertical finishers for pillars, horizontal finishers for windows at Cant level, at waist level and finishers for intermediate rail shall be in 0.5 mm stainless steel of 304/430 grade and scotch bright finish. The finishers are to be pasted to structural members with PU sealants.

There should not be any waviness in finishers and the sealant should not ooze out through the joints. All the horizontal finishers shall be in single piece per two bays and the overlap joints on pillars only. To avoid the expose of sharp edges and waviness of the SS sheet used, the edge of the finisher is to be bent inside and to be provided with suitable PVC 'U' beading.

15.10 The overlap joint for roof interior ceiling panels should be on the roof sticks. The overlap of the roof panels should be equal to the full width of roof stick section and should be riveted by 4.76 mm dia. Aluminum alloy multi grip blind rivets at a pitch of 100 mm. Riveting should be done on roof longitudes and Cant rail also.

15.11 Interior ceiling panel joints on every roof stick, Cant rail and on all sides of door openings shall be provided with decorative beading as per drawing with plastic filler and end covers.

15.12 Aluminum sheet 1.22 mm formed to 'Z' section (size 25x45x25) shall be provided on waist rail which shall be riveted to waist rail at a pitch of 100 mm duly overlapping the exterior body panel. The ends of 'Z' section shall be bent vertically upwards to match the profile of the pillar web to avoid corner gap. Suitable 30x3mm thick balata packing shall be provided below the 'Z' section to match the height of rivet heads of waist rail. Ends and corners shall be applied with P.U.sealant to avoid seepage of water in to saloon.

15.13 A formed 'Z' section (30x8x30) with1.6mm thick Aluminum sheet shall be riveted to intermediate rail with Aluminum flat head rivets of 5 mm to facilitate bonding of top fixed glass.

15.14 Two rows of panel stiffeners in Indal 3405 should be provided at seat rail level and in between crib rail to skirt level.

15.15 In order to avoid rattling of exterior panels 6 mm Heat lan felt packing shall be provided on panel stiffeners.

15.16 The exterior body panels from waist to skirt should be without joints in1.22 mm thick Aluminum Sheets of alloy designation 19000, condition H2 of IS: 737 of 1986. The vertical butt joint of panels should be on Structural members and to be pasted with approved make sealant of 'Metal to Metal' type, Two sided VHB tape of 3M make shall be used on all sides i.e., vertical joint, on waist rail and on skirt rail. End portion of panels at wheel arches and skirt rail shall be folded inside by 20 mm and should be fixed with flat beading and Aluminum alloy head solid rivets of 5.0 mm dia. at a pitch of100 mm.

15.17 Rear end exterior paneling from waist to skirt and between rear end pillars shall be provided with Aluminum sheet 1.22 mm sheet in single piece. This panel shall be bonded to the rear end structure with PU sealant of Metal to Metal type. The rear end saloon glass frame shall be covered with 0.91mm finishers from outside and 0.5 mm stainless steel sheet from inside. Body structural members and Aluminum sheet surfaces where the sealant has to be applied shall be cleaned thoroughly for oil/dirt etc., before applying sealant.

15.18 Both sides of the body have to be provided with rub rail in Hindalco 6551(Volvo type)at crib level.

15.19 The front end exterior panels shall be provided with decorative beading of Indal 2721 at waist rail. The beading shall be anodized and fixed with blind rivets. The rear end waist level shall be provided with Aluminum flat beading (Indal 5505) with blind rivets.

15.20 The exterior corner dooms both at front and rear on off side and near side from Cant to waist rails and waist to skirt rails shall be provided with 0.91 mm GI sheet over laid with Aluminum sheet of 1.22mm thick and Indal5505 beading on full length of pillars.

15.21 The area between exterior and interior panels between waist rail to crib rail in side structure and between both side Cant rails in roof structure shall be provided with 40 mm thick thermocole insulation.

16.0 FOOT BOARD:

The foot board structure at front and rear as shown in the drawing shall be in three steps built with40x40x3 mm MS Angles and over laid with Aluminum 5-bar chequered sheet of 2.0 mm base thickness on side's and3.0 mm base thickness on tread and riser portion. The footboard should be given a support under the lowest tread by providing a 'U' type bracket made of MS angles 40x40x6 mm.

The arms of 'U' bracket should be 230 mm long and secured to pillars with M10boltswith 4numbers on each pillar. Step edge beading in Indal 5700 shall be provided along the edges. The bottom tread height from ground shall not be more than 400 mm. The tread depth should not be less than 300mm. Maximum step height allowed is 250 mm.

17.0 WHEEL ARCH FRAMES AND BOXES:

The front & rear wheel arch box frames should be fabricated in MS angles 40x40x6mm and M S flats 40x6 mm in rectangle shape. The height of box frame shall be 160 mm above top surface of the tyre. The boxes should be designed to accommodate 10.00 x 20 size tyres. The wheel arch box frames has to be covered with 1.6mm GI sheet and followed by 2mm Alu. 5-bar Chequered sheet in single piece instead of 3mm Aluminium 5-bar chequered sheet. Step edge beading shall be provided at the riser and along the edges of wheel arch. Mud guard shall be provided in1.22 mm thick Alu.Sheet round along wheel arch area with proper clamping and a clear gap of 100 mm from the edge of tyres.

18.0 DRIVER'S PARTITION:

The driver's partition shall be fabricated with stainless steel tube 30x30x1.6 mm as per drg.no.CB22DPG120. It should be fixed behind driver seat and shall be supported on structural members duly reinforced in the floor as well as roof. The minimum distance from the Bonnet to partition wall shall be as per seat layout drawing.

A timing board of size 450x300 mm shall be provided in Aluminum sheet 1.22mm duly painted white. The board should be provided in a sliding channel frame on 3 sides in

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inverted U shape made with Indal 3620 section and fixed to the partition facing saloon side.

19.0 DESTINATION BOXES AND BOARDS:

19.1 LED destination boards of size 270X960 mm of approved make Micro craft/MG Grey engine shall be provided **at front and rear** end of bus with proper tapping & secured clamping and as per UBS-II specification with built in controller and LCD display for front LED destination board with a provision of numbers from 0 to 9 and Up & Down buttons to select service number & route. Communication cable to be provided from Front master LED board to rear LED board for display of same route course details in both the boards.

19.2 The side destination box shall be in first 1130 mm bay on LH side at window top fixed glass area after passenger entrance.

19.3 One flap door in 0.7 mm stainless steel sheet in size 1180 mm x330 mm is to be riveted with Stainless Steel piano hinge for full length at bottom and to be blind riveted on intermediate rail in 1st1130 mm window after passenger entrance on LH side of body. Bracket in indal 3620 is to be fitted on inner face of the door for holding the destination board of size 910 mm x210 mm. LED type light to be provided for illumination. Two locking latches and chain in stainless steel are to be provided on both side for locking the door and to hold it at convenient angle to change board. E 1 tower bolt has to be provided at middle of top centre and E 1 at centre areas on both sides for side destination board door.

19.4 Six destination boards in 0.91 mm thick GI sheet have to be supplied along with the vehicle duly painted in white color.

19.5 The side destination board shall be illuminated by LED lights of 600-mm length of approved design and made with luminosity of 150 to 200 lux.

20.0 CONTINUOUS BEAM:

A longitudinal continuous beam in pressed top hat section of GI sheet of 2.0 mm thick similar to roof stick profile should be provided. This beam in inverted position shall connect all the roof sticks from front end to the rear as shown in the seat layout drawing. The joints for continuous beam should not be more than three and joints shall have reinforcement using 30x25x2 mm thick, 50 mm long 'U' channel welded from inside.

There should not be any mismatch at the joints, welded joints to be ground for even surface and ends should be tapered to a length of 150 mm. Reinforcement is to be provided in the beam with 30 x6mm in 200 mm length flats for fitment of stanchions. This beam shall be fitted with M6 tapping bolt at every roof stick on both sides and the remaining beam shall be riveted in Zig-Zag manner at 100 mm pitch.

21.0 STANCHIONS:

Four stainless steel tube stanchions in 304 grade of 38 mm OD x 1.6mm thickness as per IS: 6913-1992 should be provided in between the saloon continuous beam and saloon floor as per seat layout plan. SS Flat 4 mm with 3 mm balata packing shall be provided at bottom ends of the stanchions and SS 40x40x4 mm angle on roof continuous beam. The stanchions have to be fitted on floor longitudinal members and to roof continuous beam with M6 size through bolts. The stanchions shall be fitted rigidly with dome nuts.

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22.0 CONTINUOUS ROOF HAND RAIL:

Two rows of continuous roof hand rail (grab rails) in stainless steel tube of 25 mm OD x 1.6 mm thick in 304 grade has to be provided as shown in seat layout drawing. These hand rails are to be provided with 18 nos. Plastic molded swiveling type hand holds with nylon ribbon arm slings in green/Yellow color, one per bay. Ends of these pipes shall be joined together duly inserting a pipe of 100mm long. The intermediate support brackets in Indal 9638 powder coated in grey colour shall be used.

23.0 WINDOW GUARD RAIL:

Two rows of guard rails in stainless steel tube in 304 grade and 2B finish of 20mm OD x 1.6 mm thick as per IS: 6913-1992 has to be provided from outside on both sides of the vehicle at a height of 75 mm and 175 mm above waist level. The pipes shall be bolted to the pillars with intermediate support brackets, end sockets andM6 bolts as per drg.no.CB22LBG115. Tapping plates in GI flat 30x6 mm of 125-mm long shall be provided inside the pillar for fitment of guard rails.

24.0 CABIN FRONT WINDSCREEN, SALOON REAR GLASSES AND WINDOWS:

24.1 The cabin front-end shall be fitted with two-curved windscreen glasses of size 1220x1020 mm. The windshield glass frame assembly shall be made in MSL 25x25x3 mm to match the profile of the curved glasses. The windshield frame shall be provided between front Cant rail and dash structure duly welded on all sides.
A center post reinforcement of formed 'U' section in GI sheet 25x75x25x3.00 mm shall be provided with welding joint on the dash structure and front Cant. The complete frame including center post from inside shall be covered with 0.5 mm stainless steel in scotch bright finish and to be covered with 1.22 mm Alu. sheet from outside.
The curved laminated glasses shall be of 5.76 mm thick with minimum 0.76 mm PVB film, select float quality, safety, clear and WAVE FREE as per IS: 2553 – 1971 and to be fitted with 47.5 mm EPDM synthetic rubber extruded section. The approved brands for glasses are DURASAFE, DURATUF, ATULTEMP, REALSAFE, SEKURE, SEKURIT, GSC. All corners of windshield glasses shall be provided with clamps in1.6 mm Alu. Sheet with black powder coating.

24.2 The saloon rear end glass shall be bonded with P.U. Sealant to the MS angle 30x30x3 mm frame provided in the rear body structure . The single piece glass shall be of 1760 x 800 mm size in 5.0 mm thick, toughened safety clear glasses as per IS: 2553 – 1990 & IS: 2835 – 1987. The lettering work to be done on the glasses and at Cant level as mentioned below:

"BREAK ANYGLASS IN EMERGENCY FOR EXIT "

In Telugu:

" అత్యవసర పరిస్థితిలో ఏ అద్దమునైనను పగులగొట్టుము"

24.3 The window frames in Hindalco 6482 extruded section shall be provided between waist rail and intermediate rail . For a standard bay of1130 mm, the window frame size shall be 1125 x 673 mm. The window frame shall have two horizontal sliding glasses of 600x540 mm size assembled with flock channel of EPDM rubber quality. The area between Cant rails to intermediate rail shall be provided with a fixed glass of size 1127x450 mm.
The glass shall be bonded to the 1.6 mm Aluminum sheet on Cant rail and1.6 mm Aluminum sheet 'Z' flange on the intermediate rail by applying Metal to Glass type

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PU sealant of approved make/ brands. The window glasses and top fixed glasses shall be of 5.0 mm thick toughened float quality, safety clear glasses as per IS: 2553 - 1990 & IS: 2835 – 1987. Window frames shall be black powder coated.

24.4 The edges of all sliding glasses shall be ground, chamfered and polished to smooth surface.

24.5 All window frames to be provided with corner cleats with flat rivets besides welding the window frame corners. They should be fitted with M6x30mm CSK head screws-2 nos. on each vertical side on pillars. MS flat 30x6 mm tapping plates shall be provided on pillars. Four drain slots of 50X3 mm shall be punched on bottom side of window frame to drain out water collected in frame grooves.

24.6 All sliding shutters are to be provided with finger pulls of 100 mm long in Indal 1752 section and powder coated in black colour.

24.7 Vertical overlap of window frames on pillars shall be provided with a sealing rubber profile as shown in the drawing. Approved makes of EPDM rubber profiles, Rubber extrusions & Molding are ASP/ALP.

24.8 Approved makes of P.U sealants are Total seal / Sikaflex / 3M / India/Bostik /Anabond and Henkel.

25.0 PASSENGER ENTRANCE, ASSIST RAILS AND DRIVER'S DOOR:

25.1 Two passenger entrances cum exit on LHS side shall be provided as shown in the drawings.

25.2 At rear entrance on both sides of step well, assist rails in stainless steel tube of 304grade in 32 OD x 1.6 mm thick shall be fitted from roof stick to floor with approved make 50X6mm SS Flat with balata packing and tapped bolted to the tapping plates provided in roof sticks at top and on cross bearers at bottom.

Two horizontal support pipes and one diagonal support pipe in stainless steel tube of 304 grade in 32 OD x1.6 mm thick shall be provided on both sides of step well. The pipes shall be fitted with50X6 mm SS Flat with balata packing. If the bolts protruded outside of the sockets, they shall be provided with steel doom nuts.

25.3 DRIVER'S DOOR:

The driver's cabin door should be with a full drop type window duly extending up to floor level as per sketch no.CB22DRG119 The window frame shall be in Hindalco 6482 section as per the window design. The door shall have one heavy-duty door lock with outer handle of MSL make only, one locking latch from inside, striking plates and dovetail catches.

The door shall be fitted with two forged hinges on 'A' pillar. Driver door frame shall be provided with one horizontal bar in stainless steel 25OD x1.6 mm thick pipe from inside for holding.

25.4 PASSENGER SEATS:

The seat layout plan and seating arrangement shall be as per the respective drawings no.M2260SG22130 for AL, M2460SG22330 for TATA and M3058SG22230 for Eicher.

25.5 SEAT FRAMES :

The seat frames for single, twin and six seater shall be as per the drg.no.CB22SFE139.The legs of seat frames should be located on floor longitudes and seat rail only. Belting fabric 3 mm thick (one piece) shall be provided in between the floor and seat leg foot piece. The seat legs shall be fastened with M8X1.0 hexagonal head bolts using plain washers and Nyloc nuts. A provision for advertisement shall be provided on back side of seat back rest as shown in the drawing.

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25.6 SEAT BOTTOM CUSHIONS:

Seat bottom cushions shall be provided in P.U. molded foam conforming to grade "J" of IS: 8255 – 1976. The density of PU foam shall be between45 to 50 kg/cu.m and indentation hardness shall be between 15-17 Kgf at 25% deflection.

Sizes: Twin-seater : 840 x 406 x 100/75 mm
Six-Seater : 2440 x 406 x 100/75 mm
Single-seat : 420 x 406 x 100/75 mm
Conductor-seat : 500 x 400 x 100/75 mm

The cushions to be mounted on 8.0 mm thick ply wood conforming to Grade-MR, type-AA, as per IS: 303–1989. The upholstery shall be with expanded vinyl coated fabrics as per specifications at ANNEXURE-II. The color of Rexene shall be in charcoal grey with prior approval of CME(C&B) only.

25.7 The bottom plywood shall have 4vent holes of 10 mm dia. per passenger seat. The bottom of plywood should be pasted with 1.0 mm thick ABS panel. The bottom cushion should be fitted in a way, it should project 25 mm ahead of seat frame level.

25.8 SEAT BACK SQUABS:

The PU molded foam cushion of 30mm base thick ness shall be used for back rest as shown in the drawing. The cushion conforming to grade "E" of IS: 8255-1976 shall be mounted on 8.0 mm thick plywood of grade – MR, type-AA, of IS: 303-1989 and upholstered with same expanded vinyl coated fabric as mentioned above.

The back of plywood(8 mm) shall be pasted with 1.0 mm ABS sheet of matching shade and to be fitted with fiber grab handles on the back side of seat backrest. The size of the back rest for all types of seat frames are mentioned below.

Size: Twin-seater : 840x 545 x 30 mm
Single-seat :420x 545 x 30 mm
Conductor-seat :500 x 545 x 30 mm
Six-Seater :2440 x 545 x 30 mm

A sample seat shall be produced for approval of Chief Mech Engineer(C&B) before manufacturing in bulk and fitting in the vehicles.

25.9 All upholstery work shall be carried out with 3mm piping at all joints. A margin of 12 mm shall be provided for Rexene along the stitching lines and double stitching to be provided duly folding the Rexene edge by 6 mm. The tacking of Rexene to plywood to be done with nails at a pitch of 50mm in between the nails and folding the Rexene by 12 mm. The sewing threads make to be of "MODI/COATS", variety no.38 as per IS:1720-1978.

26.0 DRIVER'S SEAT:

The OE knitted type driver seats supplied with Chassis shall be retained. The driver seat frame mounting on cabin floor shall match the OE mounting position.

26.1 In case of non-supply of OE knitted driver seat with the Chassis, HDPE knitted driver seat of makes approved by corporation shall be fitted. The seat shall have fore and aft, up and down adjustment of100mm with reclining back and to be fitted 350 mm away from steering wheel edge when the seat is fully forwarded.

26.2 The height of driver seat bottom shall be 450 mm when measured in fully lowered position.

26.3 There shall be a thigh clearance of 200 to 260mm between steering wheel edge and driver seating position.

26.4 The driver seat shall be so located that the center line of driver seat shall be 705 mm away from the center line of body.

26.5 The driver seat shall be provided with "ELR" type safety belt of approved make conforming to AIS 05 standard.

26.6 The driver seat frame mounting on cabin floor shall match the OE mounting position.

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27.0 BATTERY BOX:

The battery box shall be provided on LHS side below floor level to accommodate two 12V batteries of size 521LX 292W X248H mm with slider arrangement. The battery box is to be fabricated with MSL 40 X 40 X6 mm and MS flat 40x6 and shall be paneled with 0.91 mm GI sheet on floor and three vertical sides. Interior of the battery box is to be overlaid with 0.5 mm stainless steel sheet of 430 grade.

The bottom of the batteries in cradle shall be provided with 12 mm-compressed plywood and acid resistant rubber mat. Batteries shall be provided with suitable clamping, wood packing to prevent vibrations when the vehicle is in operation. One cutout is to be done on longitudinal wall for passage of battery cables and is to be provided with 6 mm balata with an 'X' type cutting.

Four rows of full-length battery cables without joints shall be connected to the battery cut-off switch terminals and from cut-off switch to Self-starter. A guard shall be provided at front end of Battery box with SS pipe with SS hinge at one side and bolting at the other side. The terminals and cables should be firmly clipped in position. One LED light shall be provided in Battery Box.

28.0 ELECTRICAL WIRING AND OTHER FITMENTS:

The earth return system of wiring should be used. All automotive cables used shall be of IS: 2465 – 1984 quality covered with PVC sleeve as per IS:1951-1961. Wherever the cables have to pass through roof and side structures, PVC conduits of ½" dia shall be provided. There shall not be any loose or hanging cables, and if they pass through holes in panels or structural members other than roof and side structures, rubber grommets shall be provided in the holes of such panels and structural members and shall be securely clipped as near as practicable to such rubber grommets to avoid chaffing.

28.1 All wiring in saloon shall be carried through Aluminum extruded section wire casing Indal 2735 in two rows along the Cant rail offside and near side in such a way that it shall be easily accessible at all points without the need to strip major paneling of body. The extruded section shall be so located and fitted as not to affect the appearance of body.

Any wiring, which has to run along the Chassis frame shall be securely, clipped to ensure that there shall be no chaffing with any of the moving parts. Further care shall be taken to route such wiring in such a way that it is not affected by splashing of oil, water, mud etc.,

28.2 The battery main cable of size 398/0.40 mm shall be provided as required duly using good quality lugs with proper soldering, bolting and insulation etc., there shall be no joint in battery cables.

28.3 The saloon and cabin are to be provided with 8 nos. of 390 X130 mm long LED light assemblies of approved makes as per layout drawing.

28.4 All OE electrical fitments shall be retained and kept in working condition .Any extension of wiring harness should be done by providing male-female connectors only. Tapping of power for saloon lighting etc., shall be taken from the OE female sockets provided by the Chassis manufacturers. There should not be any tapping of power by slashing the main harness.

28.5 The OE wiper machine, arm and blade supplied with the Chassis shall be provided at Cant level. Washer tank, if included in the system and supplied with Chassis, is to be fitted on left side of front end structure at a convenient location. In case wiper assemblies are not supplied with the Chassis, 17 W Lucas TVS electrical wiper machine with blade of 610 mm length (min) shall be provided by the fabricator.

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28.6 One single tone Air horn of CEETEE model of Roots/ELGI make shall be provided. The noise levels of these horns should be between 93 dB to112dB.

28.7 Piano switches as per IS: 9433 –1980, 230Vx5 amps shall be used. A 6-pole disc type fuse box with independent fuse designated for every electrical circuit shall be fitted on switch board provided at Cant level. Maximum current capacity of a circuit shall not exceed 15 Amps. The current carrying capacity shall be 1.5 times the load current of the electrical circuit.

The fuses used shall conform to IS-4063 /1982. Switches and fuse box are to be fitted on hylam/decolam sheet of 3 mm thick and to be fitted on sunken tray located above the driver door with non-metallic shielding to avoid short circuits.

28.8 Cable ends shall be suitably crimped and soldered with lugs so as to with stand vehicle vibrations. The inter connections shall be made through couplers/ junction boxes / terminal blocks only. Weather proof connectors shall be used for connecting cables which are exposed to atmosphere to avoid water/moisture ingress during use.

28.9 Two additional head light assemblies of 8" dia with suitable reinforcement for fitment on front end structure, are to be provided with OE head lamp assemblies on AL buses. Two round type head lights of approved make similar to the headlights of Swaraj Mazda, shall be provided on Eicher and Tata vehicles. They shall be fitted at a distance not more than 400 mm from the extreme outer edge body and not more than 1200 mm height from the ground.

28.10 In Ashok Leyland buses, OE front direction indicator lamps shall be retained and to be provided below 1500 mm height on the outer edge of body in amber color. For TATA and Eicher buses, approved type front indicators shall be provided. In addition to this, four more LED type direction indicator lamps (flat type) in amber color shall be provided on the lateral side of the body at wheels and above 1500 mm height from the ground.

28.11 LED type height marker lamps in white color at front and in red at rear shall be provided. The marker lamps shall be above windshield glass at front and above Cant level at rear on maximum possible outer edges.

28.12 LED type tail lamps in 5" dia 3 nos on each side (one -red, one-white and one –amber) shall be provided. The mounting shall be above 1500 mm from ground and 400 mm from the outer edge. The red lights shall have individual circuits for parking and brake lights.

28.13 Front and rear number plates shall be provided with LED type light assembly of 300 mm length.

28.14 Electrical side flashers of LED type in amber color shall be provided at Cant level on all four corners.

28.15 OE battery cut-off switch supplied with Chassis shall be provided with separate fuse control. In case of non -supply of battery cut-off Switch along with the Chassis, IGSA-552 or part no. LP-134/3 of Lucas India Services Ltd., make shall be fitted in driver's cabin with a label "Battery Cut-off switch". The battery cut-off switch to be located 300mm above the cabin floor on 3.00 mm GI plate provided in side structure.

28.16 One 24V, 3-pin plug socket has to be provided on the dashboard in driver's cabin for connecting inspection lamp/ TIMS.

28.17 Six speakers of approved make shall be provided (one in cabin and five in saloon) along with approved make Amplifier. The speakers shall be fitted to roof duly mounting on FRP speaker box of approved design. Amplifier shall be fitted in FR grade wooden box with lid and locking arrangement is to be fitted in driver cabin at suitable location.

28.18 Conductor's buzzer with bell switches 4 nos. to be provided.

28.19 One reverse gear horn/alarm (4 tone) shall be provided with noise level not more than 100 dB if not supplied with the Chassis.

28.20 In the driver cabin Instrument panel with all gauges, OE switches &indicators with labels shall be provided at 45-degree angle and shall be in the reach of driver from his seat. The frame shall be fabricated in MS angle 25x25x3 mm covered with 0.91 mm thick GI sheet.

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28.21 Power for connecting Wiper, Indicators and Fog lamps shall be drawn from the OE fuse box supplied by Chassis manufacturer only, duly providing male / female sockets.

28.22 Never connect the circuits with twists & knots. Never tap power by slashing the main harness.

29.0 BODY PAINTING AND COLOR SCHEME:

29.1 Body to be painted on the exterior and interior with synthetic air-drying coat type enamel paints. The body under frame and Chassis shall be painted with anti-corrosive rubberized paint. The exterior painting process shall consist of carefully cleaning and etching followed by self-etch primer coat, an under coat, finish coat and glaze coat.

29.2 Approved paint brands are: 'Autostar' of Akzo Nobel Ltd/'Aspa' of Asian Paints/'Nova plus' of Kansai Nerolac.

29.3 Color Scheme - Color scheme should be as per sketch given:

a) Exterior portion

Shade	Shade reference
Crystal white	ICI -169037
Satin black	ICI-169003
Yellow	Dupont-CAS1023
Dark Blue	Dupont-CF 939

b) Interior portion

i. Interior roof, Cant to crib level	Franchoise white	ICI-169012
ii. Seat frames	SE black	ICI-169002
iii. Destination boards, inside portion of boxes	White	ICI-169001
iv. Number plates	Golden Yellow back ground and black color letters/numbers	size 65Hx10TH and 10 mm spacing

The color scheme may be modified or changed at the time of execution of bus body fabrication as per the orders of Chief Mechanical Engineer (C&B).

29.4 APSRTC monogram shall be provided on both sides of body at center portion as per SKETCH1916 in image transfer stickers.

30.0 MISCELLANEOUS FITTINGS TO BE PROVIDED:

30.1 Two Fiber handles of 100 mm size are to be provided at waist level of cabin front end. Two footsteps on the bumper shall be provided for cleaning of front windshield. Footsteps should not protrude outside the bumper.

30.2 Two OE fully adjustable rear view mirrors of convex type supplied with Chassis shall be fitted with brackets as per drawing No: CB22RVM140, one convex mirror to be fitted inside driver cabin and one convex type mirror to be fitted at outside of front end (center) for near vision of road at front. The location of rear view mirrors shall be so located to have at least 2500 mm wide vision from the body line of vehicle when viewed from driver seat.

30.3 The front registration number plate in Aluminum sheet 1.6 mm to be provided on the front bumper with Indal 5505 beading around registration number plate. The size of the number plate shall be 450x250 mm. The rear registration number plate shall be on rear bumper.

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30.4 Two fire extinguisher of approved make dry chemical type 2.0 kg capacity conforming to IS: 2171of 1985 suitable for B&C class of fires shall be provided with suitable SS clamping arrangement.

30.5 Rubber mud splashguards of size 650x456 mm for rear and front wheels to be provided.

30.6 First aid box of Stainless steel and in size 310x220x128 mm with leather straps and locking arrangement shall be provided in driver's cabin. First aid medicine kit containing the items mentioned under Rule 138(d)(4) of the latest M.V.Rules shall be provided in the box.

a. Antiseptic cream of 5.0% centrimide I.P In non-greasy base 5 ...2 pcs.
b. Sterile Surgical gauge dressing ...1 pack of 4 pcs.
c. Wash proof plaster ... 5 pcs.
d. Sterile elastic plaster – size 6cmx30 cm ... 1 pc.
e. Gauge rollede – size 7.5 cm x 2.5 mtr. ... 3 pcs.
f. Elastic bandage for wounds and burns Size – 8 cm x 1.5 mtr. ... 1 pc.

30.7 One pair of towing hooks with 36 mm eye dia. in MS flat 75x12 shall be provided at the rear end, to be attached to each Chassis long member with4nos(Two bolts each) of M12 bolts.

30.8 All lettering work in vinyl stickers shall be done as per the guidelines.

30.9 The rear bumper should be in GI sheet 3.0 mm thick-formed channel section of size 50x175x50 mm in single piece with brackets in MSL40x40x6mm and to be fitted to the Chassis long members. The ends of the bumper to be curved. The center portion of bumper shall be made sunken to accommodate a registration number plate with LED light of 300 mm.

30.10 The OE front bumper supplied with the Chassis shall be retained. Front bumper length shall be increased to suite the body width i.e., 2590 mm. If the Chassis is not supplied with front bumper, the bumper shall be fabricated in GI sheet 3 mm of size 40x300x40 mm to suite the body width. The mounting shall be attached to Chassis long members with MS angle 50x50x6 mm 400 mm long.

30.11 Two sunken footsteps of size 150x150mm shall be provided below the driver door one at 700 mm height from the ground and another at 950 mm.

30.12 The entrance and driver's door shall be provided with water drain canopies at Cant level in Aluminum sheet 1.22mm.

30.13 Pure rubber matting of 3.0mm thick shall be provided for foot control pedal in driver's cabin.

30.14 A footstool for driver to be provided in 3.00mm Aluminum5-bar cheq. Sheet with Indal 2651 as legs.

30.15 Tapping of compressed air for windscreen wiper and air horn should be from port no.24 of system protection valve with proper unions, 'T' joints. Metallic pipeline of 5.0-mm dia. with copper coating on inner wall shall be used for tapping. The pipeline shall be firmly clamped in position.

30.16 One roller type sun visor of 24" size of approved make to be provided in driver cabin.

30.17 Driver & engine bonnet to be separated from passengers by providing one row of stainless steel pipe of 304 grade25OD x 1.6 mm thick with vertical supports and with6 mm SS flat as base for mounting.

30.18 The seats earmarked for ladies, PHC persons, senior citizens are to be very clearly exhibited on seat back rests.

30.19 Retro-Reflective Conspicuity Marking tapes of Diamond grade 50 mm wide conforming to AIS :90 of approved make shall be bonded to the body sides as per the sketch provided. The cumulative length of tapes provided shall not be less than 80% of length of that side. These tapes shall be white in color at front, yellow on sides and in red at rear of the body. Red tape at rear end shall be provided along the circumference of the rear body.

30.20 One stainless steel assist rail of 25mm dia x1.6 OD up to a height of 600 mm from floor shall be provided on rear side pillar of driver door from inside.

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30.21 "Break any glass in emergency" sticker to be displayed on rear saloon glass both in English and Telugu.

30.22 G.I. sheet 0.50 mm thickness to be provided as inside layer to the bonnet.

30.23 One 200 mm SS handle to be provided on outer side on driver door rear pillar.

30.24 Support pipe of SS 25x1.6 mm at top of the 6 seater area to be provided.

30.25 Stainless steel sheets, tubes, pipes etc. should be of Jindal make/any other source approved by APSRTC.

30.26 One 200 mm SS handle to be provided on outer side of driver door.

30.27 One Amplifier of approved make i.e. AHUJA/SONY shall be provided.

30.28 On Dash board front area left side, where it is clearly visible to passengers, stickering can be provided as "Book Your Tickets Online@www.apsrtconline.in" in3" of letter size in lettering font "Times New Roman ".

30.29 Slogans in Telugu to be exhibited as follows

1. టికెట్టులేనిప్రయాణంనేరం, అంధుకురూ. 500/- వరకుజరిమానా.
2. ఈబస్సునమనందరిది!దీనినిపరిశుభ్రంగాఉంచుదాం!!

30.30 Tim machine Box, Water bottle holder are to be provided at conductor seat area to tress panel and a 3 pin socket with switch for Tim machine charging also to be provided.

30.31 Provision of Single seat to conductor instead of twin seater at specified area.

30.32 All Slogans & Stickering to be done as per the instructions from time to time given by APSRTC with size of 25 H X 6T.

30.33 If there are any modifications in specifications are proposed during fabrication, it will be communicated by APSRTC from time to time and to be implemented immediately.

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S.No	Drawing No	Description
1	CB22RVM140	Rear view mirror
2	CB22UBG114	Body U bolt
3	CB22AEG112	Extruded AL sections
4	CB22CTG132	Chart for Sheet Specs
5	CB22DRG119	Driver door
6	CB22LBG115	Window guard rail bracket
7	CB22SFE139	Seat frames
8	CB22DPG120	Driver Partition
9	SKETCH1916	Monogram
10	M2260SG22130	
11	M2260SL22127	
12	M2260SR22128	
13	M2260UF22129	
14	M2460SG22330	
15	M2460SL22327	
16	M2460SR22328	
17	M2460UF22329	
18	M3058SG22230	
19	M3058SL22227	
20	M3058SR22228	
21	M3058UF22229	

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AME(CBS)

SPECIFICATIONS FOR PALLE VELUGU BUS BODIES HIRE BUSES TENDERS - 2024

1.0 GENERAL DESIGN:

The general design shall be a streamlined body with pneumatically operated Two jackknife Passenger service doors on LH side within wheel base and passenger seats facing forward in 2x3 pattern.

2.0 REGULATION:

The general appearance, structure, seat layout etc., shall be in accordance with respective drawings. The bus body design should comply with the provisions of latest Central Motor Vehicle Rules, Andhra Pradesh Motor Vehicle Rules, AIS:052 and any other statutory requirement that may come in to force during execution of fabrication work order. The coach interior shall meet the standard of IS: 15061-2002or latest amended one.

2.1 The firms shall possess Bus Body Accreditation Certificate issued by CIRT/ARAI or any other Agency approved by GOI and shall be registered with APSRTC.

3.0 MAIN BODY DIMENSIONS: (ALL DIMENSIONS ARE IN MILLIMETERS)

SL NO	CHASSIS MODEL –DESCIPRTION	AL 222"WB	TATA 224"WB	EICHER 230"WB
	sis Suspension: Front & Rear Weveller Suspension			
1	Wheelbase	5639	5700	5840
2	Rear overhang	3383(60%)	3420(60%)	3504(60%)
3	Front overhang	2265	1845	2370
4	Overall length (excluding bumpers)	11287	10965	11714
5	Overall width (structure)	2590		
6	Pillar centers (standard)	1130		
7	Window sill(waist rail)height from top of the cross bearer	610		
8	Waist rail height from Skirt level	1200		
9	Cant rail height from waist level	1010		
10	Interior saloon clear height	1900		
11	Clear aperture of passenger service door (minimum when measured from the edge of door flap)	1100		
12	Clear aperture of Driver door	650		
13	Seating capacity	55+1 Driver		58+1 Driver
14	Emergency Door Dimensions	1250X762		

4.0 DRAWINGS: The list of drawings to be followed are shown at**ANNEXURE-I**

5.0 MATERIAL: The fabrication of bus bodies shall be as per the specifications and the material shall be procured from the recommended sources/brands of material as mentioned in **ANNEXURE-II.**

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6.0 CHASSIS POSITIONING:

6.1 All chassis received by the firm for fabrication of bus bodies should be kept safely in a covered area. The chassis should not be kept open to atmosphere without any protection to avoid damage to chassis and its units due to rain, dust and heat.

6.2 Before commencement of bus body fabrication, all important units of chassis viz. Alternator, Self-starter, Radiator, Tyres and Batteries should be protected by providing suitable covering and disconnect the wiring connections to Vehicle ECU, ABSECU, Vehicle Tracking Unit and wiring harness ends shall be protected to prevent from damages that may occur due to welding, drilling, cutting, hammering, riveting& falling of metal scrap or dust during the course of fabrication. Driver seat, Steering wheel, Hand brake valve etc., shall also be protected from any damage or paint spray.

6.3 Chassis number on long members and identification plates provided by the Chassis manufacturer shall be properly covered and protected before commencing the fabrication work.

6.4 The Ashok Leyland, TATA and Eicher chassis are supplied with following items as OE fitment.

1. Cabin floor
2. Bulk head structure (AL/EICHER)
3. Out riggers (AL/EICHER)
4. Anti-sag channel (TATA)
5. Bonnet and Front bumper (AL/TATA/EICHER)
6. Knitted Driver seat
7. Head lights E2
8. Front indicators E2
9. Tail Lamps E2
10. Battery cut off switch
11. Reflective warning triangles with stands
12. Wheel stoppers
13. Spare wheel carrier- Cage type/Rope Type
14. First aid kit
15. Tools as per CMVR
16. Rear view mirrors with brackets (E2 plus 1 small mirror)
17. Electrical horn
18. ELR safety belt

7.0 PROTECTIVE TREATMENT:

7.1 All Mild Steel components used for fabrication shall be carefully de-greased, de-rusted with three in one solution by dipping and wiped with dry cloth to remove all dirt/ oil etc. Then the material shall be applied immediately (without any time lag) with Zinc Phosphate epoxy primer "Rust-O-Cap" (part no.24570608320) of M/s. Asian Paints or **'60 *BT PRIME GREY'*** of M/sAkzo-Nobel Coatings before assembly.

7.2 All Aluminum Components shall be carefully cleaned with thinner. Bi-Metallic Paint shall be used at joints of dissimilar metals. The interior and exterior panels should be cleaned with thinner and then self-etching primer shall be applied.

8.0 BODY STRUCTURE:

8.1 Aluminum Structure: All principal structural members should be in Aluminum extruded sections of Alloy designation 64430, 63400 and 65032, condition WP as per IS: 733–1983. The structural joints shall be by riveting, bolting and combination of both. The rivets

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shall be of Aluminum alloy wire of IS: 740 – 1977. Alloy condition 64430 (HR-30)–OD.Aluminum 5-bar chequared plate with 3.0/2.0 mm base thickness shall conform to alloy designation 65032 and condition WP of IS:737 of 1986.All Aluminum sheets shall conform to alloy designation 19000, conditionH2 of IS: 737 of 1986.

8.2 Chart no. CB22CTG132 and Drg. no. CB22AEG112 (sheet 1&2) containing the details of specifications of Aluminum extruded sections and sheets to be used and it shall be followed.

8.3 Other Mild Steel Structural members:GalvanizedSteel sheets should be as per grade 175 of IS: 277- 2018. Rolled sections should be as per IS-2062 of 2006. The structural jointsshall be by riveting, bolting or combination of both and MIG welding in caseof GI structural members. The welding should be for full length of joint. Welding area has to be ground to smooth finish in order to avoid sharp edges.

8.4 All bolts used shall be of sizes reckoned in Metric system. The bolts shall be of high tensile hexagonal head bolts of fine thread, conforming to property clause 8.8 of IS: 1367 of 1979. The nuts shall be of approved anti-vibrate type such as nyloc conforming to IS: 1364 of 1983. All boltsnuts and washers should be galvanized. Each bolt and nut shall beprovided with a flat washer. A spring washer should accompany everytapped bolt. The approved brands of bolts are TVS/STL/HINDUSTAN FASTENERS/KFL/UNBRAKO/IMPERIAL FASTENERS brands only.

9.0 PARTICULARS OF IMPORTANT STRUCTURAL MEMBERS:

Sl.no.	Description	Material
1	Cross bearers	Rolled steel channel ISMC 100x50x6 mm
2	Anti-sag bar	Rolled steel channel ISMC 75x40x6 mm
3	Floor longitudes	G.I 'U'section25x75x25x3 mm thick (5 rows)
4	Pillars and Horizontal supports	Indal 2654 section, All pillars including wheel arch horizontal supports shall be reinforced with formed 'U' inserts of GI sheet 3.0 mm thick.
5	Roof sticks & roof longitudes	Indal 2651 Sections (5 rows roof longitudes)
6	Crib rail and seat rail	Indal 1756 section
7	Cant rail	Indal 2800 section
8	Waist rail	Indal 2613 section
9	Waist rail stiffener	Indal 3402 section & 3.0 mm Aluminium 5-bar chequared plate 100 mm wide with minimum joints one LH side and two on RH side with in wheel base
10	Panel stiffener	Indal 3405 section
11	Skirt rail	MS Angle 40x40x3 mm
12	Water channel a) On cant rail b) Front & rear end	 a) Indal 6250 section b) Hindalco WC-695 section
13	Step edge beading	Indal 5700 section
14	Flat beading	Indal 5505 section
15	Decorative beading a) Exterior waist level front b) interior waist level and ceiling	As per Drawing. a) Indal 2721 section b) Indal 2684 Aluminium section with plastic filler and ends
16	Window sections a. Window guide b. Split section 1.	 a. Hindalco 6482 section b. 'T' section

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	c. Split section 2 d. Sweep rubber section e. Finger pull	c. 'F' section d. Hindalco 2691 section e. Indal 1752 section
17	Wire casing	Indal 2735 section
18	Rub rail on body side	Hindalco 2676 on G.Iformed"U"section2.0 mm
19	Cleats &Brackets a) Roof structure b) Cant to roof stick and cant to pillar c) Side structure	a) Indal 1760 section b) 'C' bracket formed in GI sheet 2.5 mm c) 'C'bracket formed in GI sheet 2.5 mm at wheel arches and Indal 1760 cleats
20	Roof grab rail brackets	Indal 9638 of 30 mm wide
21	Gussets for Cross bearer to Pillar joint	ISMC 100 X50 mm
22	JK door frame	Indal 9124 section
23	Parcel rack tube	Stainless steel tube of 16 mm diameter

10.0 PRECAUTIONS:

10.1 Aluminum extrusions such as Seat rail, Crib rail, Cant rail shall be joined within the wheelbase only.

10.2 "NEGATIVE TOLERANCES" arenotallowed either forAluminumExtrudedsections,Aluminum sheets and GI sheets/tubes.However,toleranceswithin the limits of IS standards may be allowed subject to prior approval of Chief Mechanical Engineer(Chassis and Bodies)and subjected to the recovery of difference of cost .

10.3 All welding shall be done with MIG weldingprocess only. Under any circumstances, arc welding shall not be allowed. Welding of Stainless steelComponents shall be done with TIG welding process only with same gradeStainless Steel filler rod.

10.4 All holes in cleats and roof longitudes shall be PUNCHED to close tolerances. Under any circumstances, drilling of holes is not allowed.

10.5 The following workmanship must be carefully followedduringthefabrication.

i. All castings must be truly formed and free from blow holes.
ii. All bolts and rivets should be well fastened.
iii. Rigid water test shall be carried before fixing the interior ceiling without applying any sealant and tapes using pressurized water spray system. The fabricator shall equip water leaktest facility confirming to IS: 11865-1982 at the firm forconductingleak test in two stages i.e., before fixing the interior ceiling and before dispatch of vehicle.
iv. All welded joints must be well ground to get assmoothsurfaceand applied with Epoxy primer without any delay.
v. Sharp corners shall be grounded and made smooth.
vi. Wherever pitch for rivets / bolts is not specified, it shall be 100 mm.
vii. Bolt ends shall protrude at least 2 to 3 threads length above the nuts.
viii. Roof stick, roof longitude, floor longitude and waist rail membersshallbutt properly at mating joints and shall not have gaps at the joints.
ix. All tapping bolts atrub rail, handles andassist rail bolts etc., shall be tightened using thread lock adhesive of approved makes.
x. Roof stick, roof longitude, floor longitude and waist rail notching to bedone on power press only.
xi. All fixed glasses shall be provided with ceramic coating of suitable width on periphery.

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11.0 CAB UNDERFRAME STRUCTURE:

11.1 Cab under frame of Ashok Leyland 222" WB chassis shall be fabricated as per the drg.no.P2260UF22103. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side of cabin shall be connected to the 1st cross bearer by providing a 'Z' riser in GI sheet3.00 mm. On LH Side, a raised wheel arch box shall be provided on front wheel duly fabricating in MS flats 40x6 mm and MS angles 40x40x6 mm. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.2 The Tata 224" WB chassis shall befabricated as perthe drg.no.P2460UF22303.The cabin floor longitudinal members shall be connected to a 'Z' raiser in GI sheet 3.00 mm provided on 1st cross bearer to make up the height difference of cabin and saloon floor. Suitable wheel arch boxes in rectangle shape fabricated in MS flat 40x6 mm and MS angles 40x40x6 mm shall be provided. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.3 The Eicher 230" WB chassis will be supplied with OE cab floor, bulk head structure, out riggers, driver seat and engine bonnet. The cab under frame shall be fabricated as per the drg.no.P3060UF22203.The OEstructureshallberetained and modifiedaccordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side of cabin shall be connected to the 1stcross bearer by providing a 'Z' riser in GI sheet 3.00 mm. On LH Side, a raised wheel arch box shall be provided on front wheel duly fabricating in MS flats 40x6 mm and MS angles 40x40x6 mm. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.4 The dashboard frame shall be fabricated in MS angle 40x40x6 mm to the required profile and covered with GI sheet of 0.91mm thick. Flap door with suitable stainless steel hinges and stainless steel tower bolts shall be provided for easy access to fuse box, radiator, power steering reservoir and clutch oil container.

12.0 BODY FRAME STRUCTURE:

The bus body frame structure should be fabricated as per the followingdrawings.

ASHOK LEYLAND 222" WB chassis	– P2260SL22101 and P2260SR22102.
TATA 224"WB chassis	–P2460SL22301 and P2460SR22302.
EICHER 230" WB chassis	– P3060SL22201 and P3060SR22202.

12.1 The Cant rail at the passenger entrance, driver door and emergency door area shall be reinforced with GI sheet formed channel in 2.0 mm thick and the joint of cant rail should not be exactly on any pillar or within door bay.

12.2 A & B pillars on both sides shall be provided in GI 3 mm thick formed section similar to Indal 2654. First and second roof sticks connecting A& B pillars shall also be provided in GI formed section similar to Indal 2651 in 3 mm thick. All the structural members in this bay (Waist rail, Intermediate rail and roof longitudes) shall be in GI formed sections of 3 mm thick with dimensions of corresponding Aluminum Sections.

12.3 An opening of size 250mm x 250 mm, fabricated in MS Angles 40x40x6 mm finished with beading in Indal 5505 and a flap shall be provided at fuel oil tank mouth.

12.4 One Peep window frame in first bay of left side structure is to be provided with MSL 40x40x3 mm. One fixed clear glass of 5.0 mm thick shall be provided in the size 490mm(H)X290mm(W) along with frame in Indal 6482.

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12.5 MS tapping plates in 30x6 mm flat of 200 mm length shall be provided wherever tapping is to be done for fixing body components such as roof continuous beam, roof hand grab rail, window guard rail, assist rail, driver partition, windows etc.

12.6 Pillars on both sides of Passenger entrance shall be reinforced with MS angle 25x25x3 mm and riveted to the inner flange of pillars.

12.7 Cant rail on both sides full length shall be reinforced with M.S angle30x30x3 mm. This angle shall be riveted to pillars flanges at cant level and connected to the cant rail duly providing two GI plates of size 75x30 mm of 2 mm thick welded to the angle and riveted to cant rail in every bay.

12.8 Luggage booths from crib level to skirt level are to be provided on both sides duly providing E 2 LED Lights& Guard railsin SS of size25x1.6 mmas indicated in structural drawings with flap doors in 1.6 mm thick Alu. Sheet and locks.

12.9 Rear luggage booth and right-side luggage booth from Crib level to Skirt level are to be provided with door seal rubber. Right side luggage booth E2 flap doors are to be provided with Hindalco 9389 and 9390 hinges.

12.10 Rear luggage booth door shall be fabricated with MS angular 40X40X3 mm and to be provide with 550N E2 gas springs.

12.11 Rear luggage booth and side luggage booths inside area should covered with 0.91 GI sheet with Hammer tone paint.

12.12 Luggage booth flooring area to be covered with 2.00 mm thick Alu. Chq.sheet.

12.13 Rear luggage booth to be fabricated as per drawings mentioned in side and rear structures.

12.14 Rear luggage booth to be provide with E 3LED lights for proper illumination.

12.15 Chassis long member cutting is not allowed and they shall be retained as supplied by the manufacturer as shown in the respective drawings while fabricating the rear luggage booth.

13.0 CABIN AND BODY MOUNTING:

13.1 The OE Cabin floor and mounting arrangement shall be retained. The remaining portion of cabin floor connecting 1st Cross bearer and OE floor shall be fabricated as per drg.no.P2260UF22103 for AL 222" WB, P2460UF22303 for TATA 224" WB and P3060UF22203 for Eicher 230" WB chassis.

13.2 The OE anti-sag members shall be retained. If the chassis are not supplied with the anti-sag members , a 3-piece anti sag channel in ISMC 75x40x6 shall be provided at front end of the chassis bottom frame connecting to the 'A' pillars on both sides with welding (or) bolting (TATA).

13.3 Additional Out riggers in MS angles 50x50x6 mm shall be provided connecting 'B' pillars to the Chassis long members with suitable fitment.

13.4 The body should be mounted on the Chassis web duly providing 6 mm (inverted pressed "L" type) MS plate as per the size shown in the respective drawings over the Chassis long members. These "L" plates shall be bolted together at every cross bearer mounting to Long member web with M12x 50 H.T. bolts at least 4 nos. per plate. OE holes on the chassis long members shall only be picked up for mounting this plate. Wherever the OE holes are not available for bolting of web mounting plate, matching holes shall be drilled on the web 40 mm below the top level of long member with prior approval of competent authority. Over these plates, cross bearers in ISMC 100x50 x 6 mm channels shall be provided as per the respective drawings. If the web mounting plate position at rear wheels coincide with rear spring bracket, the cross bearers shall be fastened with 16 mm dia. "U" bolts of approved make and with 150mm x 6 mm thick base plate welded to the bottom of cross bearer. Spacers made of Aluminum casting

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shall be placed between bottom flanges of chassis long member and "U" bolts. The "U" bolts are to be made out of EN-15/14B steel as per IS 5517-1978(Tensile strength80 kg/Sq.mm minimum). The "U" bolts should be galvanized and fitted with galvanized nylocnuts as per Drg.no. CB22UBG114. The length of bolt shall suit the depth of Chassis long member and should not project more than 6 mm after tightening the nuts.

13.5 In ASHOK LEYLAND and EICHER vehicles the front bulkhead ends are to be connected to the A-pillar of the body duly giving suitable support to the members. A tie bar in front of radiator in 3-piece in ISMC 75x40X6 connecting A-pillars on both sides and chassis long members shall be provided. This tie-bar to be mounted on MSL 50x50x6 mm angle 'L' brackets connected to the chassis long members.

13.6 The body mounting must be easily detachable from the chassis during major overhauls. Pillar gussets on four sides of the body shall be provided with 32 mm dia hole to facilitate lifting of the body during major overhauls as per drawing CB22LB115.

14.0 CABIN AND SALOON FLOOR:

14.1 The cabin and saloon floor shall be in Aluminum5-bar cheq.plate of 3.0 mm base thickness conforming to alloy designation 65032, Temper WP of IS: 737-1986. The cheq. Plateshould be riveted with M.S rivets of 5mm dia. to the floor longitudes at a pitch of 100 mm and in Zigzag manner at joints. The cabin area and wheel arch boxes shall be riveted at 75 mm pitch. The riveting on crib rail shall be done with 6 mm Aluminum alloy solid rivets of HR –30 and condition OD as per IS: 740-1977. Intermediate bolting with M8 bolts shall be done on cross bearers and at wheel arch frames.

14.2 The wheel arches shall be made rectangle shape. The height of rear wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

14.3 The number of cheq. plates used for cabin and saloon flooring should be least in order to keep the joints at minimum possible. Thefloorcheq. plate shall be joggled at crib level to get proper seating on crib rail.

14.4 In TATA and EICHER vehicles, an inspection cover fitted to a frame in under frame with tapped bolts, to be provided in saloon floor over fuel tank suction pipe of size 250x250 mm.

14.5 The floor longitudes should be in five rows excluding crib rails. They should be arranged in such a way that the seat legs are fixed on the floor longitudes. Dust proof rubber packing of 2mm EPDM quality shall be provided at the joints and ends of chequered sheet to avoid entry of water/dust in to the saloon from the joints. The floorcheq. plate laying shall ensure dust proof. Additional floor longitudes shall be providedwherever necessary for floor plate joints and stanchions mounting on floor etc.

14.6 Trap door of 580x 520 mm size must be provided in cabin flooring above gearbox with proper sealing and M6 tapping bolts.

14.7 Four drain holes of 25-mm diameter shall be provided in saloon flooring corners below seat frames, provided with bottom extension of 75 mm length ERW pipe for draining of water while washing.

15.0 BODY PANELING:

15.1 The exterior portion of body i.e. sides, front end, rear end, mud wings and roof exterior should be in Aluminum sheet 1.22 mm thick of alloy designation 19000 and condition H2 of IS: 737 of 1986.

15.2 Front radiator grill is to be provided in 1.22mm GIsheet (AL type) as per drawing for Eicher and TATA vehicles.

15.3 **TRUSS PANEL FOR BODY SIDES**: Full height truss panel between waist to crib rail for entire length of body and at rear end including corners shall be provided in stainless steel sheet of 0.7 mm thick of 430 Grade and in scotch bright/mirror finish. These

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panels shall be riveted with 5 mm Aluminum alloy solid rivets to the structural members at waist rail together with 5 bar Aluminum chequared sheet and Indal 3402 stiffener at a pitch of 100 mm in zigzag manner. The riveting pitch on seat rail and crib rail shall be 75 mm. The riveting pitch on pillars shall be 100 mm.

15.4 ROOF STRUCTURE REINFORCEMENT:The roof structure above on each door opening i.e. passenger entrances, driver door and emergency doorbetween roof longitude and cant rail shall be reinforced with a truss panel of 0.91 mm thick GI sheet and shall cover three baysin single piece. The GI sheet has to be formed to the required contour of roof prior to the assembly and shall be riveted to the roof longitudes and cant rail lower flange and also to the MS angle 30x30x3 provided above cant rail between 'C' brackets with MS flat head rivets at a pitch of 100mm.

15.5 The roof exterior sheet with 1.22 mm thick Alfor center portion should be in full length of body and laid longitudinally in one single piece of 1220 mm wide. The riveting should be done on the roof longitudes in ZIGZAG manner. The exterior sides (LH & RH) of roof sheets with 1.22 mm thick Al have to be provided in single piece as required. The riveting on cant rail, front and rear end roof sticks should be with flat beading Indal 5505. The overlap of roof exterior panels should be equal to full width of roof longitude section and should be riveted by 5 mm dia. Aluminum alloy solid rivets (HR-30) at a pitch of 75 mm in two rows ZIG-ZAG manner. While riveting roof side sheet on cant rail, an Aluminum sheet of 1.6 mm thick and 75 mm wide full length of cant rail shall be provided on the cant rail for pasting top fixed glasses. The sides of roof shall also be provided with water channel in Indal 6250 and shall be riveted along with flat beading Indal 5505.

15.6 PU sealant has to be provided at overlapping portion of roof panel jointsto avoid water leakages. Theedges along the roof joints shall also be applied with PU sealant for fillingup the gaps. Roof joints should be water leak proof. Approved make weather shield strip of 150 mm wide and 2 mm thick shall be laid longitudinally covering roof center joints from front end to rear end to avoid water leakage from roof.

15.7 Exterior of roof sticks and longitudes shall be pasted with expanded polyurethane sheet (heatlan) of 6mm thick.

15.8 The interior roof up to Cant rail should be in Aluminum sheet 0.91 mm thick of alloy designation 19000, condition H2 of IS: 737 – 1986.

15.9 The interior vertical finishers for pillars, horizontal finishers for windows at cant level, waist level and finishers for intermediate rail shall be in 0.5 mm stainless steel of 430 grade and Scotch bright finish. The finishers are to be pasted to structural members with 'Metal to Metal' type PU sealants. There should not be any waviness in finishers and the sealant should not drip through the joints. All the horizontal finishers shall be in single piece per two bays and the overlap joints on pillars only. To avoid the expose of sharp edges and waviness of the SS sheet used, the inner edge of the finisher is to be bent inside.

15.10 The overlap joint for roof interior ceiling panels should be on the roof sticks. The overlap of the roof panels should be equal to the full width of roof stick section and should be riveted by 4.76 mm dia. Aluminum alloy multi grip blind rivets at a pitch of 100 mm. Riveting should be done on roof longitudes and cant rail also.

15.11 Interior ceiling panel joints on every roof stick, cant rail and on all sides of door openings shall be provided with decorative beading Indal 2684 with plastic filler and end covers.

15.12 Formed 'Z' section (size 25x45x25 mm) of 1.22 mm Aluminum sheet shall be provided on waist rail which shall be riveted to waist rail duly overlapping the exterior body panel at a pitch of 100 mm. The ends of 'Z' section shall be bent vertically upwards to overlap the pillar web. Suitable 30x3mm thick balata packing shall be provided below the 'Z' section to match the height of rivet heads of waist rail. Ends and corners shall be applied with P.U.sealant to avoid seepage of water in to saloon.

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15.13 A formed 1.6mm thick Aluminum 'Z' section (30x8x30 mm) shall be riveted to Intermediate rail with Aluminum flat head rivets of 5 mm to facilitate bonding of top fixed glass.

15.14 Two rows of Panel stiffeners in Indal 3405 should be provided at Seat Rail level and in between Crib rail to Skirt level.

15.15 The exterior body panels from Waist to Skirt should be without joints in1.22 mm thick Aluminum Sheets of alloy designation 19000, condition H2 of IS: 737 of 1986. The vertical butt joint of panels should be on Structural members and to be pasted with approved make sealant of 'metal to metal' type and two sided VHB tape of 3M make on all sides i.e., vertical joint, on waist rail and on skirt rail. End portion of panels at wheel arches and skirt rail shall be folded inside by 20 mm and should be fixed with flat beading and Aluminum alloy head solid rivets of 5.0 mm dia. at a pitch of100 mm.

15.16 Rear end exterior paneling from Waist to Skirt and between rear end pillars shall be provided with Aluminum sheet 1.22 mm sheet in single piece. This panel shall be bonded to the rear end structure with PU sealant of 'Metal to Metal' type and two sided VHB tape of 3M make. The rear end Saloon glass frame shall be covered with 0.91mm finishers from outside and 0.5 mm stainless steel from inside. Body structural members and Aluminum sheet surfaces where the sealant has to be applied shall be cleaned thoroughly for oil/dirt etc., before applying sealant.

15.17 The body sides have to be provided with rub rail in Indal 2676 with EPDM rubber insert with end covers on 2mm GI sheet formed U section of 30x60x30x2 size. The rub rail ends shall be black powder coated.

15.18 The front end exterior panels shall be provided with decorative beading Indal 2721 at waist rail. The beading shall be anodized and fixed with blind rivets. The rear end waist level shall be provided withAluminum flat beading in Indal 5505 with blind rivets.

15.19 The exterior corner dooms both at front and rear on off side and near side from Cant rail to Waist and Waist to Skirt rail shall be provided in 0.91 mm G.I sheet over laid with Aluminum sheet of 1.22mm thick and Indal5505 beading on full length of pillars.

15.20 The area between exterior and interior panels of Waist rail to Crib rail in side structure, Cant rail to Cant rail in roof structure shallbe provided with 40 mm thick FR grade Thermocole insulation.

16.0 FOOT BOARD:

The wider foot boardof 1390 mm within wheel base structure as shown in the drawing to suite two Jack Knife doors shall be in three steps built in MS. Angles 40x40x3 mm and over laid with Aluminum 5-bar chequared sheet of 2.0 mm base thickness on sides and 3.0 mm base thickness on tread and riser portion. The footboard should be given a support under the lowest tread by providing a 'U' type bracket made of MS angles 40x40x6 mm. The arms of 'U' bracket should be 230 mm long and secured to pillars with M10x 4numbers bolts on each pillar. Step edge beading in Indal 5700 shall be provided along the edges. The bottom tread height from ground shall not be more than 400 mm. The tread depth should not be less than 300mm. Maximum step height allowed is 250 mm.

17.0 WHEEL ARCH FRAMES AND BOXES:

The front &rear wheel arch box frames should be fabricated in MS angles 40x40x6mm and M S flats 40x6 mm in rectangle shape. The height of box frame shall be 160 mm above top surface of the tyre. The boxes shouldbe designed to accommodate 10.00 x 20 size tyres. The wheel arch box frames has to be covered with 1.6mm GI sheet and followed by 2mm Alu. 5-bar Chequered sheet in single piece instead of 3mm Aluminium 5-bar

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chequeredsheet. Step edge beading shall be provided at the riser and along the edges of wheel arch.Mudguard shall be provided in1.22 mm thick Alu.Sheetroundlyalong wheel arch area with proper clamping and a clear gap of 100 mm from the edge of tyres.

18.0 DRIVER'S PARTITION:

The driver's partition shall be fabricated with stainless steel tubes30x30x1.6 mm as per drg.no.CB22DRG119. It should be fixed behind driverseat and shall be supported on structural members duly reinforced in thefloor as well as roof. The minimum distance from the Bonnet to partition wall shall be as per seat layout drawing. A timing board of size 500 X 500 mm shall be provided in Aluminum sheet 1.22mm duly painted white. The board should be provided in a sliding channel frame on 3 sides made of Indal 3620 section and fixed to the partition on saloon side.

19.0 DESTINATION BOXES AND BOARDS:

19.1 LED destination boards of size 270X960 mm of approved make Micro Craft/MG Grey Engine shall be provided **at front and rear** end of bus with proper tapping & secured clamping and as per UBS-II specification with built in controller and LCD display for front LED destination board with a provision of numbers from 0 to 9 and Up & Down buttons to select service number & route. Communication cable to be provided from Front master LED board to rear LED board for display of same route course details in both the boards.

19.2 The side destination box shall be in first 1130 mm bay on LH side at window top fixed glass area after passenger entrance.

19.3 One flap door in 0.7 mm stainless steel sheet in size 1180 mm x330 mm isto be riveted with Stainless Steel piano hinge for full length at bottom and to be blind riveted on intermediate rail in 1st1130 mm window after passenger entrance on LH side of body. Bracket inindal 3620 is to be fitted on inner face of the door for holding the destination board of size 910 mm x210 mm. LED type lighttobe provided forillumination. Two locking latches and chain in stainless steel are to be provided on both sidefor locking the door and to hold it at convenient angle to change board. E 1 tower bolt has to be provided at middle of top centre and E 1 at centre areas on both sides for side destination board door.

19.4 Six destination boards in 0.91 mm thick GI sheet have to be supplied along with the vehicle duly painted in white color.

19.5 The side destination boardshall be illuminated byLEDlights of 600-mm length of approved design and made with luminosity of 150 to 200 lux.

20.0 PARCEL RACKS:

Tubular type Parcel racks shall be provided on both sides of saloon above windows. The parcel rack tubes should be provided in 16 mm dia. & 1.6 mm thick stainless-steel tubes of 304 grade placed longitudinally at a pitch of 65 mm in the Stainless Steel (304 grade) rectangular tube brackets of 40x20x1.6 mm provided at each pillar. The pipes shall be spot welded to the rectangular tube brackets.

20.1 Intermediate brackets in same material, shall be provided in between two main brackets.These brackets shall be connected to the Cant reinforced MS angle 30x30x3 mm and roof sticks.

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20.2 The interior width of the racks shall not be less than 460 mm. There shall be a clear vertical gap of 230 mm between roof ceiling and parcel rack end tube. Parcel rack end brackets shall be provided with a stay bar in same tube.

20.3 TheCourier box to be provided at left side of Parcel rack in first bay in front of entrance doorwith suitable locking system as perdrawing no CB22CRB140.

21.0 CONTINUOUS BEAM:

A longitudinal continuous beam in pressed top hat section of GI sheet of2.0 mm thick similar to roof stick profile should be provided. This beam in inverted position shall connect all the roof sticks from front end to the rear as shown in the seat layout drawing. The joints should not be more than three with reinforcement using 30x25x2 mm thick 50 mm long 'U' channel welded at joints from inside. The cross sectional dimensions of each extended top hat section should coincide without mismatching. Welded joints to be ground for even surface and ends should be tapered to a length of 150 mm. Reinforcement is to be provided in the beam with M.S.30X6mm in 200 mm length flats for fitment of stanchions.This beam shall be fitted with M6 tapping bolt at every roof stick on both sides and the remaining beam shall be riveted in Zigzag manner at 100 mm pitch.

22.0 STANCHIONS:

Four stainless steel tube stanchions in 304 grade of 38 mm OD x 1.6mm thickness as per IS: 6913-1992 should be provided in between the saloon continuous beam and saloon floor as per seat layout plan. SS Flat 4 mm with 3 mm balata packing shall be provided at bottom ends of the stanchions and SS 40x40x4 mm angle on roof continuous beam .The stanchions have to be fitted on floor longitudinal members and to roof continuous beam with M6 size through bolts. The stanchions shall be fitted rigidly with dome nuts.

23.0 CONTINUOUS ROOF HAND RAIL:

Two rows of continuous roof hand rails (grab rails) in stainless steel tube of 25 mm OD x 1.6 mm thick in 304 grades and 2B finish has to be provided as shown in seat layout drawing. The intermediate support brackets to be in Aluminum extruded section Indal 9638 of 30mm width. These brackets are to be grey powder coated. These hand poles are to be provided with18 nos. plasticmolded swiveling type hand holds with nylon ribbon arm slings in Green/Yellow colour, one per bay. Ends of these pipes shall bejoined together duly inserting a pipe of 100mm long.

24.0 WINDOW GUARD RAIL:

Two rows of window guard rails ofstainless steel tube in 304 grade and 2B finish of 20mm OD x 1.6 mm thick as perIS: 6913-1992 has to be provided at a height of 75 mm and 175 mm above waist levelfrom outside on both sides of the vehicle. The pipes shall be bolted to the pillars with intermediate support brackets, end sockets and M6 bolts as per drg.no.CB22LBG115. Tapping plates in M.S. flat 30x6 mm x 125-mm long shall be provided inside the pillar for fitment of guard rails.

25.0 CABIN FRONT WINDSCREEN, SALOON REAR GLASSES AND WINDOWS:

25.1 The cabin front-end shall be fitted with two-curved windscreen glasses of size 1220x1020 mm. The windshield glass frame assemblies shall be madein MSL 25x25x3 mm to match the profile of the curved glasses. Thewind shield frame shall be provided

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between front cant rail anddashstructure duly welded on all sides. A center post reinforcement of formed'U' section in GI sheet 25x75x25x3 mm shall be provided duly welding on the dash structure and front cant. The complete frame including center post from inside shall be coveredwith1.22 mm Aluminum sheet from outside and 0.5 mm stainless steel sheet in scotchbright finish from inside. The curved laminated glasses shall be of 5.76 mmthick with minimum 0.76 mm PVB film, select float quality, safety clearWAVE FREE as per IS: 2553 – 1971 and to be fitted with 47.5 mm EPDMsynthetic rubber extruded section. The approved brandsfor glasses are DURASAFE, DURATUF, ATULTEMP, REALSAFE, SEKURE, SEKURIT, and GSC. All corners of windshield glasses shall be provided with clamps in Aluminum sheet 1.6 mm in black powder coating.

25.2 The saloon rear end glass shall be bonded to the MS angle 30x30x3 mm frame provided in the rear body structure with P.U. sealant. The single piece glass shall be of 1760(L) x 800(H) mm size in 5.0 mm thick, toughened safety bronze tinted glasses as per IS: 2553 – 1990 & IS: 2835 –1987. The lettering work to be done on the glasses and at cant level as mentioned belowwith 50mm size.

"BREAKANY GLASSES IN EMERGENCY FOR EXIT"

In Telugu:

" అత్యవసర సమయంలో ఏ అద్దమునైనను పగులగొట్టుము"

25.3 The window frames in Hindalco 6482 extruded section as per drg no: CB22WDG128shall be provided between waist rail and intermediate rail. For a standard bay of 1130 mm, the window frame size shall be 1125 x673 mm. The window frame shall have two horizontal sliding glasses of600(H)x540(L)mm size with flock channel of EPDM rubber quality. The area between cant rail to intermediate rail shall be provided with 5.0 mmtoughened bronze tinted fixed glass of size 1127x330 mm. The glass shallbe bonded to the 1.6 mm Aluminum sheet on cant rail and 1.6 mm Aluminum sheet 'Z' flange on the intermediate rail by applying PU sealant of approved make/ brands. The window glasses shall be of 5.0 mm thick toughened float quality, safety bronze tinted glasses as per IS:2553 - 1990 & IS: 2835 – 1987. Window frames shall be black powder coated.

25.4 All window frames to be provided with corner cleats with flat rivets besides welding to the window frame corners. They should be fitted with M6x30 mm CSK head screws-E 2 nos. on each vertical side on pillars Galvanized M.S. flat 30x6 mm tapping plates shall be provided on pillars. Four drain slots of 50X3 mm shall be punched on bottom side of window frame to drain out water collected in frame grooves.

25.5 All the edges of all sliding glasses shall be ground, chamfered and polished to smooth surface.

25.6 All Seat frames MS pipe at welding portion should be cup cutting in order to facilitate full welding at joints instead of pressing.

25.7 All sliding shutters are to be provided with finger pulls in Indal 1752 section 100 mm longpowder coated in black colour.

25.8 Vertical overlap of window frames on pillars shall be provided with a sealing rubber profile as shown in the drawing. The fixed glasses are to be secured intact.

25.9 Approved makesof EPDM rubber profiles are Rubber Extrusions &Molding/ASP/ALP/ Sri Venkateswara Rubbers, BNGLR and any other approved by APSRTC.

25.10 Approved makes of P.U sealants are Total seal/Sikaflex/3M India/Bostik/ Anabond and Henkeland any other approved by APSRTC.

26.0 PASSENGER ENTRANCE, ASSIST RAILS AND DRIVER'S DOOR:

26.1 The passenger entrance cum exit on LH side as shown in the drawings shall be provided with two pneumaticallyoperatedJack knife doors.E-2Pneumatic cylindersareto be provided

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for opening & closing of passenger doors. These are to be mounted at both sides of center wider foot board at floor level without obstructing the passenger movement at entrance door and also to take necessary arrangement for safety of passengers.

26.2 The Jack Knife doorsdesign with pneumatic operation should be as perdrawingNo.CB22JKG121 has to be provided. The door glasses shall be 5.0 mm cleartoughened float glass in 1500 mm x 190 mm size and to be pasted with PUsealant to the door frame. Two railway type latches in MS flat 30x6 mm shall be provided from inside for locking the door in closed and openposition. The latch items shall be galvanized. Two SShandlesof100mm long shall also be provided for the JK doors. The JK doors mounting shall be with 3 forged hinges on both side pillars. Two flaps shall be joined with 3 forged hinges with reinforcement of 3.00 mm GI sheet.E 4 No's of GI 25X25X2mm Tubes are to be inserted in JK Door end flap vertical indal sections 9124 for additional strength and to with stand the pneumatic cylinders force while operating the door with pneumatic mechanism.

26.3 At entrance on both sides of step well, assist rails in stainless steel tube in 304 grade 32 OD x 1.6 mm thick shall be fitted from roof stick to floor SS Flat 50X4 mm with 3 mm balata packing provided in roof sticks at top and on cross bearers at bottom. Two horizontal support pipes and one diagonal support pipe in stainless steel tube 304 grade 32 OD x1.6 mm thick shall be provided on both sides of step well. One additional stanchion in 304 grade 38 OD x 1.6 mm thick is to be provided at center of step well on floor. One assist rail in 32mm diaX1.6 mm is to be provided on 2nd step and to be connected to step well middle stanchion as per the design given. The pipes shall be fitted withapproved make with suitable SS flat 50X4 mm. The joints of stanchions and assist rails shall be provided with M6 steel bolts and steel doom nuts. Passenger door should be provided with E 2 pneumatically operated JK doorswhich are operated by 63 mm dia pneumatic cylinders.

26.4 DRIVER'S DOOR:

The driver's cabin door shall be provided with a full drop type window duly extending up to floor level as per sketch no.CB22DRG119. The window frame shall be in Hindalco 6482 section as per the window design. The door shallbeprovidedwithone heavy-duty door lockof MSL makeonlywith outer handle, one locking latch from inside, striking plates and dovetail catches. The door shall be fitted with two forged hinges on 'A' pillar. Driver door frame shall be provided with one horizontal bar in stainless steel 25x1.6 pipe from inside for holding.

26.5 EMERGENCY DOOR:

One Emergency door of min 1250 mm height X 715 mm widthextending from intermediate cant rail to saloon floor on right sideshall be provided as per the layout and drawings. Thedoor is to be provided with one horizontal sliding window and one heavyduty lock operable from inside, dovetail catches. The location of the emergency door is to be exhibited from inside& outside with vinyl stickers and outer periphery is to be provided with red color reflective radium sticker.Redcolour LED light has to be provided at Emergency door areainsidethesaloon. It should have railway type latch made of Stainless steel apart from Stainless steel/Brass tower bolt.

26.6 LUGGAGE CARRIER AND LANDING PLATFORM:

A luggage carrier fabricated on the lines of drawing no. CB22LCG124covering four bays including a landing platform up to rear end shall be provided on the roof top. The Luggage carrier frame and side railing shall be provided in MS angle 30x30x3 mm. The cat walk arrangement in 270 mm wide is to be provided on the LH side. The floor of luggage carrier and catwalk should be covered with 2.0mm base thickness 5-bar Aluminum cheq.sheet conforming to alloy 65032, Temper WP of IS: 737-1986 and riveted to

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Cross members and frame of luggage carrier with MS solid rivets . The luggage carrier legs to be mounted on the galvanized MS 6mm base plates attached to the roof sticks. The mounting of the luggage carrier shall be by means of bolting to the galvanized formed 'L' bracket that is welded to the base plate. PU sealant shall be applied around mounting legs to prevent water entry.

26.7 Landing Platform: A landing platform on the rear side of roof top should be provided as per drawing no.CB22LDG113. The platform floor should bein 5-bar Aluminum cheq.Plate of 2.0 mm base thickness.

26.8 Access Ladders:Access ladder should be in two pieces from luggage carrier to RLB top side and a foldable piece up to skirt level with two railway locks provision in folding position has to be provided.

26.9 Unloader Grill:An un-loader grill on LH side above rear wheel arch area has to be provided in ERW 19 OD x 1.6 mm as per drawing no. CB22LDG113. Itshall be covered with1.22 mm AL chequered sheet, duly covering the half of top fixed glass.

27.0 PASSENGER SEATS:

Theseatlayout plan andseatingarrangementshallbeasperthe respective drawingsno.P2260SG22104for AL, P2460SG22304for TATA and P3060SG22204 for Eicher.

27.1 SEAT FRAMES: The seat frames for single, twin and triple seater shall be as per the drg.no.CB22SFT130& CB22SFP130.The legs of seat frames should be located on floorlongitudes and seat rail only. Belting fabric 3 mm thick (one piece) shallbe provided in between the floor and seat leg foot piece. The seat legs shall be fastened with M8 X 1.0 mm hexagonal head H.T. bolts using plain washers and Nyloc nuts. Provision to be made for advertisement on seat back rests as shown in the drawing.The seat frames should be black powder coated. Ladies seat frames should be yellow powder coated.All Seat frames MS pipe at welding portion should be cup cutting in order to facilitate full welding at joints instead of pressing.

27.2 SEAT BOTTOM CUSHIONS: Seat bottom cushions shall be provided in P.U. molded foam conforming to grade "J" of IS: 8255 – 1976. The density of P.U.foam shall be between45 to 50 kg/cu.m. and indentation hardness shall be between 15-17 Kgf at25% deflection.

Sizes:	Three seater	:1200x 380x 90/65 mm
	Twin seater	: 813 x 380 x 90/65 mm
	Single seat	: 406 x 380 x 90/65 mm
	Conductor seat	: 500 x 400 x 90/65 mm

The cushions to be mounted on 8.0 mm thick ply wood conforming to Grade-MR, type-AA, as per IS: 303 – 1989. The upholstery shall be with expanded vinyl coated fabrics as per RDSO specifications at Annexure-II. The color of Rexene shall be in charcoal greywith prior approval of CME(C&B) only. The bottom plywood shall have 4 vent holes of 10 mm dia. Perpassenger seat. The bottom of plywood should be pasted with 1.0 mm thick ABS panel. The bottom cushion should be fitted 25 mm ahead of seat frame front end.

27.3 SEAT BACK SQUABS: TheP.U.molded foam back cushion of 30mm base thickness as shown in the drawing and conforming to grade "E" of IS: 8255-1976 shall bemounted on 8.0 mm thick plywood of grade – MR, type-AA, of IS: 303-1989and upholstered with same expanded vinyl coated fabric mentioned above.

Sizes:	Three seater	:1200x455 x 30 mm
	Twin seater	: 813 x 455 x 30 mm
	Single seat	: 406 x 455 x 30 mm
	Conductor seat	: 500 x 455 x 30 mm

The back of plywood (8 mm) shall be pasted with 1.0mm ABS sheet of matching shade.

27.4 A sample seat shall be produced for approval of Chief MechanicalEngineer (C&B) before manufacturing in bulk and fitting in the vehicles.

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27.5 All upholstery work shall be carried out with 3mm piping at all joints. A margin of 12 mm shall be provided for Rexene along the stitching lines and double stitching to be provided duly folding the Rexene edge by6 mm. The tacking of Rexene to Plywood to be by folding the Rexene by 12 mm with a pitch of 50mm in between nails.

27.6 The sewing thread makes to be of "MODI/ COATS", Variety No.38 as per IS: 1720-1978.

28.0 DRIVER'S SEAT:

The OE knitted type driver seat supplied with chassis shall be retained. The driver seat frame mounting on cabin floor shall match the OE mounting position.

28.1 In case of non-supply of OE knitted driver seat with the chassis, HDPE knitted driver seat of approved make shall be fitted. The seat shall have fore and aft, up and down adjustment of 100mm with reclining back and to be fitted 350 mm away from steering wheel edge when the seat is fully forwarded.

28.2 The height of driver seat bottom shall be 450 mm when measured in fully lowered position.

28.3 There shall be a thigh clearance of 200 to 260mm between steering wheel edge and driver seating position.

28.4 The driver seat shall be so located that the center line of driver seat shall be 705 mm away from the center line of body.

28.5 The driver seat shall be provided with "ELR" type safety belt of M/s.Autoliv or Ranemake / any other make approved by APSRTC. (Conforming to AIS 052).The middle seat in sixseater and single seat shall be provided with static type seat belts.

29.0 BATTERY BOX:

The battery box shall be provided on LH side below floor level to accommodate two no's 12V batteries of size521Lx292Wx248H mm with slider arrangement. The battery box is to be fabricated with MSL 40X40X6mm and MS Flat 40x6 mm and is to be paneled with 0.91 mm GI sheet on floor and three vertical sides followed by Hammertone coating. The bottom of the batteries shall be provided with 12 mm-compressed plywood and acid resistant rubber mat.

Complete Interior surface(except bottom side) of the battery box is to be overlaid with 0.5 mm stainless steel sheet of 430 grade. Batteries shall be provided with suitable clamping, wood packing to prevent vibrations when the vehicle is in operation. One cutout is to be done on longitudinal wall for passage of battery cables and is to be provided with 6 mm balata with an 'X' type cutting. Four rows of full-length battery cables without joints shall be connected to the battery cut-off switch terminals to self-starter and batteries. The terminals and cables should be firmly clipped in position with cable tie and soldered. One LED light shall be provided in Battery Box for illumination. One guard rail of SS 25 X 1.6mm pipe with brackets to be provided at front side to safeguard them.

30.0 ELECTRICAL WIRING AND OTHER FITMENTS:

30.1 The earth return system of wiring should be used. All automotive cables used shall be of IS: 2465 – 1984 quality covered with PVC sleeve as per IS: 1951-1961. Wherever the cables have to pass through roof and side structures, PVC conduits of ½" dia. shall be provided. There shall not be any loose or hanging cables, and if they pass through holes in panels or structural members other than roof and side structures, rubber

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grommetsshallbe provided in the holes of such panels and structural members and shall be securely clipped as near as practicable to such rubber grommetsto avoid chaffing.

30.2 All wiring shall be carried through Aluminum extruded section wire casing Indal 2735 in two rows along the cant rail offside and near side in such a way that it shall be easily accessible at all points without the need to strip major paneling of body. The extruded section shall be so located and fitted as not to affect the appearance of body. Any wiring, which has to run alongthe chassis frame shall be securely, clipped to ensure that there shall be no chaffing with any of the moving parts. Further care shall be taken to route such wiring in such a way that it is not subjected to splashing of oil, water, mud etc.

30.3 The battery main cable of size 398/0.40 mm shall be provided as required duly using good quality lugs with proper soldering, bolting and insulation etc., there shall be no joint in battery cables.

30.4 The saloon and cabin are to be provided with 8 nos. of 390x130 mm long LED light assemblies of approved makes as per layout drawing. Out of these, two shall be with in-built night lamp of blue colour.

30.5 All OE electrical fitments shall be retained and kept in working Condition.Any extension of wiring harness should be done by providing male female connectors only. Tapping of power for saloon lighting etc., shall be taken from the OE female socketsprovided by the chassis manufacturers. There should not be anytapping of power by slashing the main harness.

30.6 The OE wiper machine, arm and blade supplied with the chassis shall be provided at Cant level. Washer tank, if included in the system and supplied with chassis, is to be fitted on left side of front end structure at a convenient location. In case wiper assemblies are not supplied with the chassis,17 W Lucas TVS electrical wiper machine with E 2 blades of 610 mm length (min) shall be provided by the fabricator.

30.7 One single tone Air horn of Roots/ELGI make shall be provided. In addition to the OE electrical horn, one more electrical horn conforming to type -3 of IS 1884- 1993 shall be provided for AL vehicles. The noise levels of these horns should be between 93 dB to 112dB.

30.8 Modular switches as per IS: 9433 –1980, 230Vx5 amps shall be used. A 6-pole disc type fuse box with independent fuse designated for every electrical circuit shall be fitted on switch board provided at cant level. Maximum current capacity of a circuit shall not exceed 15 Amps. The current carrying capacity shall be 1.5 times the load current of the electrical circuit. The fuses used shall conform to IS-4063 /1982. Switches and fuse box are to be fitted on hylam/decolam sheet of 3 mm thick and to be fitted on sunken tray located above the driver door with nonmetallic shielding to avoid short circuits.

30.9 Cable ends shall be suitably crimped with lugs/soldered so as to with stand vehicle vibrations. The inter connections shall be made through couplers/junction boxes/ terminal blocks only. Weather proof connectors shall be used for connecting cables which are exposed to atmosphere to avoid water/moisture ingress during use.

30.10 Two additional head light assemblies of "8" dia with suitable reinforcement for fitment on front end structure, are to be provided with OE head lamp assemblies on AL buses. Four round type head lights of approved make shall be provided on Eicher and Tata vehicles with proper reinforcement structure for fitment. They shall be fitted at a distance not more than 400 mm from the extreme outer edge body and not more than 1200 mm height from the ground.

30.11 In Ashok Leyland buses, OE front direction indicator lamps shall be retained and to be provided below 1500 mm height on the outer edge of body in amber color. For TATA and Eicher buses, approved type front indicators shall be provided. In addition to this, four LED type direction indicator lamps (flat type) in amber color shall be provided on the lateral side of the body at wheels and below 1500 mm height from the ground. E1 AMW type indicator light to be provided on both sides at front wheel arch top area.

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30.12 LED type height marker lamps in white color at front and in red at rear shall be provided. The marker lamps shall be above windshield glass at front and above cant level at rear on maximum possible outer edges.

30.13 LED type tail lamps in 5" dia of 4no'sshall be provided on each side (Two -red, one-white and one –amber) .The mounting shall be below 1500 mm from ground and 400 mm from the outer edge. The red lights shall have individual circuits for parking and brake lights.

30.14 Rear number plate shall be provided with LED type light assembly of 300 mm length in rear bumper.

30.15 Electrical side flashers of LED type (Flat type)blinkers in amber colour shall be provided at cant level on all four corners.

30.16 OE battery cut-off switch supplied with chassis shall be provided withseparate fuse control. In case of non-supply of battery cut-off switch along with the chassis, IGSA-552 or part no. LP-134/3 of Lucas India Services Ltd., make shall be fitted in driver's cabin with a label "Battery Cut-off switch". The battery cut-off switch to be located 300mm above the cabin floor on 3.00 mm GI plate provided in side structure.

30.17 Six 6" dia speakers of Boston (Si-600) or Pioneer (TS 1641 GS) make shall be provided in parcel racks with FRP speaker boxes with separate switch control for LH/RH side speakers.

30.18 One 12V converter has to be provided at conductor seat area on intermediate rail for connecting TIMS. One LED type light with separate switch of approved design shall be provided at conductor seat.

30.19 Conductor's buzzer with bell switches 4 nos. to be provided.

30.20 One reverse gear Horn / alarm (with 4 tones) shall be provided with noise level not more than 100 dB if not supplied with the chassis.

30.21 In the driver cabin, Instrument panel with all gauges, OE switches& indicators with labels shall be provided at 45-degree angle and shall be within the reach of driver from his seat. The frame shall be fabricated in MS angle 25x25x3 mm covered with 0.91 mm thick GI. Sheet.

30.22 Power for connecting Wiper, Indicators and Fog lamps shall be drawnfromtheOEfuse box supplied by Chassis manufactureronly duly providing male/female sockets.

30.23 Never connect the circuits with twists & knots. Never tap power by slashing the main harness.

30.24 LED Lights of 12 leads, 5W capacity shall be provided in luggage booths (04nos), in battery box(01 no) and in Sparewheelcarrier area (01 no).

31.0 BODY PAINTING AND COLOR SCHEME:

31.1 Bodyto be painted on the exterior and interior with synthetic air-drying coat type enamel paints. The body under frame and chassis shall be painted with anti-corrosive rubberized paint of approved make only. The exterior painting process shall consist of carefully cleaning and etching followed by self-etch primer coat, an under coat, finish coat and glaze coat.

31.2 Approved paint(SE) brands are: 'Autostar' ofAkzo Nobel Ltd / 'Aspa' of AsianPaints/'Nova plus' of Kansai Nerolac or any other approved brand by APSRTC.

31.3 Color Scheme - Color scheme should be as per Sketch furnished. The paints shade reference is given below:

a) Exterior portion

Shade	Shade reference
Crystal white	ICI-199037
Satin black	ICI-169003
Eco green	ASPA-0G185
Tata Gray	ASPA-0636

b) Interior portion

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i. Interior roofincluding front and rear destination boxes from cant to crib level	Francoise white	ICI-169012
ii. Seat frames	Powder coating	
iii. Destination boards, inside portion of boxes	White	ICI-169001
iv. Number plates	Golden Yellow back ground with black color letters/numbers	Size 65Hx10TH and 10 mm spacing

The color scheme may be modified or changed at the time of execution of bus body fabrication as per the instructionsof Chief Mechanical Engineer (C&B).

31.4 APSRTCmonogram shall be provided on both sides of body as perSKETCH1916 in image transfer stickers.

32.0 MISCELLANEOUS FITTINGS TO BE PROVIDED:

32.1 Two Fiber handles of 100 mm size are to be provided at waist level of cabin front end. Two footsteps on the bumper shall be provided for giving feasibility to clean the front windshield glasses. Footsteps should not protrude outside the bumper.

32.2 Two OE fully adjustable rear view mirrors of convex type shall be fitted with brackets of as per drawing CB22RVM140,One convex mirror to be fitted inside driver cabin at center pillar between front glasses &one convex type mirror to be fitted at outside (at top side between two wind screen glasses) of front end for near vision of road in front of bus. The location of rear view mirrors shall be so located to have at least 2500 mm wide vision from the body line of vehicle when viewed from driver seat.

32.3 The front Registration number plate in Aluminum sheet 1.6 mm to be provided on the front bumper at right side with Indal 5505 beading around registration number plate. It shall be exhibited in black alphabets/numerals with golden yellow back ground. The size of the number plate shall be 450x250 mm. The rear registration number plate shall be at rear bumpercenter area.

32.4 Two fire extinguishers of approved make and dry chemical type of 5.0 kg capacity each conforming to IS: 2171of 1985 suitable for A,B&C class of fires shall be provided with suitable MS clamping arrangement.

32.5 Rubber mud splashguards of size 650x456 mm are to be provided for front and rear wheels.

32.6 First aid box in Stainless steel and size 310X220X128mm with leather straps andlocking arrangement shall be provided in driver's cabin. First aid medicine kit containing the items mentioned under Rule 138(4)(d) of the latest M.V.Rules shall be provided in the box.

a. Antiseptic cream of 0.5 % Centrimide I.P.in non-greasy base 5 mg – 2pcs
b. Sterile Surgical Gauge dressing - 1 pack of 4 pcs.
c. Wash proof plaster - 5 pcs.
d. Sterile elastic plaster - Size: 6 cm x 30 cm - 1 pc.
e. Gauge rolled - Size:7.5 cm x 2.5 mtrs. - 3 pcs.
f. Elastic bandage for wounds and Burns Size: 8 cm x 1.5 mtrs. - 1 pc.

32.7 One pair of towing hooks with 36 mm eye dia.punched in MS flat 75x12 shall be provided at the rear end, to be attached to chassis long member with04nos.ofM12 bolts.

32.8 All lettering works in Vinyl Radium stickers shall be done as per the guidelines with 25H X 6T.

32.9 The rear bumper should be in GI sheet 2.0 mm thick-formed channel section of size 50x175x50 mm in single piece with brackets in MSL40x40x6mm and to be fitted to the chassis long members. The ends ofthebumpertobe curved. The center portion of

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the bumper shall be made sunken to accommodate a registration number plate and Number plate light.

32.10 The OE front bumper supplied with the chassis shall be retained. Front bumper length shall be increased to suite the body width i.e., 2590 mm. If the chassis is not supplied with front bumper, the bumper shall befabricated in GISheet2.0 mm of size 40x300x40 mm to suite thebody width by the fabricator.

32.11 The mounting shall be attached to chassis long members withMS angle50x50x6 mm 400 mm long.

32.12 Two sunkenoffsetfootsteps of size 150x150mm shall be provided in offset below the driver door one at 700 mm height from the ground and another at950 mm.

32.13 The entrancedoor,emergencydoorand driver door shall be provided with water drain canopies at cant level with 1.22 mm Aluminum sheet .

32.14 Pure rubber matting of 3.0mm thick shall be providedforfootcontrol pedal in driver's cabin.

32.15 A footstool for driver to be provided in 3 mm Aluminum 5-bar cheq.SheetandIndal 2651 used for legs preparation.

32.16 Tapping of compressed air for windscreen wiper and air horn should be from port no.24 of system protection valve with proper unions, 'T' joints. Polyamide pipe of 6 mm shall be used for tapping of air. The pipeline shall be firmly clamped in position.

32.17 One safe locker for keeping conductor's cash, tickets etc., with locking arrangement shall be provided at1sttwinseater immediately after middle passenger entrance.

32.18 One roller type Sun Visor of 24" size to be provided in driver cabin.

32.19 The OE Spare wheel carrier if supplied with the chassis shall be located as shown in the structural drawing. In case of non-supply of carrier type bracket, one Spare wheel carrier arrangement shall be provided as per Drg.no.CB22SWG131 on LHS at rear of rear wheels. If the chassis are not supplied with carrier type bracket, the firm shall provide one Spare wheel carrier fabricated in MS flat 75x12 mm and 6.0 mm MS sheet.

32.20 Care shall be taken to avoid fouling of Spare tyre with any of chassis units/parts under any circumstances. The Spare Wheel carrier shall be provided with flap door with full length stainless steel hinge 1.6 mm thick and 30 mm wide from the bottom of the cross bearer to skirt rail with locks and 6 mm MS stay rods. The Spare wheel carrier shall suit 10R20 size Tyre.E1 LED light shall be provided at spare wheel carrier.

32.21 Driver & engine bonnet to be separated from passengers by providing one partition with a row of stainless steel pipe in 304 grade,32 OD x 1.6 mm thick vertical supports andStainlessSteelFlats with balata packing.

32.22 The seats earmarked for Ladies, PHC persons, Senior citizens are to be very clearly exhibited on seat back rests and at Intermediate rail.

32.23 Retro-Reflective Conspicuity Marking tapes of Diamond grade 50 mm wide conforming to AIS: 90 of approved make shall be bonded to the body sides as per the sketch provided. The cumulative length of tapes provided shall not be less than 80% of length of that side. These tapes shall be white in color at front, yellow on sides and in red at rear of the body.

32.24 One Stainless steel assist rail of 25x1.6 OD (304 grade) up to a height of 600 mm from floorlevelshall be provided on rear pillar from inside at driver door bay.

32.25 Guard rails in SS of size 25x1.6 mm shall be provided in side luggage booths.

32.26 G.I. sheet 0.50 mm thickness shall be provided inside the bonnet to avoid heat dissipation.

32.27 Provision of Single seat to conductor instead of twin seater at specified area as per drawing no. CB22CND001.

32.28 Rear Luggage Booth & a luggage booth behind ROS tyres to be provided asper the drawing.

32.29 One 200 mmSS handle to be provided on outer side of driver door.

32.30 Stainless steel sheets, tubes, pipes etc. should be of Jindal make/any other source approved by APSRTC.

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32.31 "Break any glass in Emergency" stickering to be displayed on rear saloon glass both in English and Telugu.

32.32 JK doors with pneumatically operated 63mm boredia cylinders of Janaticmake should be provided. The cylinders are to be placed on both sides of center foot boardatSaloonfloorareawhich are covered withAluminumchequared sheet box with trap doors fastened by tapping bolts.

32.33 On Dash board area front left side, where it is clearly visible to passengers, provide stickering of "Book Your Tickets Online @www.apsrtconline.in"in 3" of font size with "Times New Roman" lettering font.

32.34 One Amplifier of approved make i.e. AHUJA/SONY shall be provided.

32.35 Support pipe of SS 25x1.6 mm has to be provided at top of the 6seater area.

32.36 LED Lights of 12 leads, 5W capacity are provided at luggage booths.

32.37 REMI make one electric fan of 24Vx 8" dia. shall be provided in cabin for driver.

32.38 A slogan in Telugu to be exhibited as follows on the back side of Front destination box flap door. Slogans in Telugu to be exhibited as follows

1. టిక్కెట్టులేనిప్రయాణంనేరం, అందుకురూ. 500/- వరకుజరిమానా

2.ఈబస్సుమనందరిది!దీనినిపరిశుభ్రంగాఉంచుదాం!!

32.39 Tim machine Box, Water bottle holder are to be provided at conductor seat area to Truss panel and a 3 pin socket with switch for Tim machine charging also to be provided.

32.40 Peep window of size 250 X 250mm with sliding glasses to be provided in front of driver door at crib level.

32.41 All Slogans &Stickering to be done as per the instructions from time to time given by APSRTC with size of 25H X6T.

32.42 If there are any modifications in specifications are proposed during fabrication, it will be communicated by APSRTC from time to time and to be implemented immediately.

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S.No	Drawing No	Description
1	CB22CTG132	Chart for sheet specs
2	CB19LDG113	Ladder unloading platform
3	CB22AEG112	Extruded AL sections
4	CB22DRG119	Driver door
5	CB22JKG121	JK door
6	CB22LBG115	Window guard rail bracket
7	CB22LCG124	Luggage carrier
8	CB22RVM140	Rear view mirror bracket
9	CB22SFT130	Seat Frames
10	CB22SFP130	Seat frames
11	CB22SWG131	Spare wheel carrier
12	CB22UBG114	Body U bolt
13	CB22CRB140	Courier box
14	CB22LB115	Body lifting brackets
15	CB22WDG128	Window assy
16	CB22CND001	Conductor Seat
17	SKETCH1916	Monogram
18	P2260SG22104	
19	P2260SL22101	
20	P2260SR22102	
21	P2260UF22103	
22	P2460SG22304	
23	P2460SL22301	
24	P2460SR22302	
25	P2460UF22303	
26	P3060SG22204	
27	P3060SL22201	
28	P3060SR22202	
29	P3060UF22203	

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SPECIFICATIONS FOR ULTRA PALLE VELUGU BUS BODIES
HIRE BUSES TENDERS - 2024

1.0 GENERAL DESIGN:

The general design shall be a streamlined body with pneumatically operated two jack knife passenger service doors on LH side within wheel base, and passenger seats facing forward in 2x3 pattern.

2.0 REGULATION:

The general appearance, structure, seat layout etc., shall be in accordance with respective drawings. The bus body design should comply with the provisions of latest Central Motor Vehicle Rules, Andhra Pradesh Motor Vehicle Rules, AIS:052 and any other statutory requirement that may come in to force during execution of fabrication work order. The coach interior shall meet the standard of IS: 15061-2002or latest amended one.

2.1 The firms shall possess Bus Body Accreditation Certificate issued by CIRT /ARAI/or any other Agency approved by GOI and shall be registered with APSRTC.

3.0 MAIN BODY DIMENSIONS: (ALL DIMENSIONS ARE IN MILLIMETERS)

SL NO	CHASSIS MODELDESCIPRTION	AL 222"WB	TATA 224"WB	EICHER 230"WB
	Chassis Suspension : Front & Rear Weveller Suspension			
1	Wheel base	5639	5700	5840
2	Rear overhang	3383(60%)	3420(60%)	3504 (60%)
3	Front overhang	2265	1845	2370
4	Overall length	11287	10965	11714
5	Overall width	2590		
6	Pillar centers (std)	1130		
7	Window sill(waist rail)height from top of the cross bearer	610		
8	Waist rail height from Skirt level	1200		
9	Cant rail height from waist level	1010		
10	Interior saloon clear height (Minimum) after finishing	1900		
11	Clear aperture of passenger service door(minimum when measured from the edge of door flap)	1100		
12	Clear aperture of Driver door	650		
13	Seating capacity	55+1 Driver		58+1 Driver
14	Emergency Door Dimensions	1250X715		

4.0 DRAWINGS: The list of drawings to be followed are shown at **ANNEXURE- I**

5.0 MATERIAL: The fabrication of bus bodies shall be as per the specifications and the material shall be procured from the recommended sources/brands of material as mentioned in **ANNEXURE-II.**

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6.0 CHASSIS POSITIONING:

6.1 All chassis received by the firm for fabrication of bus bodies should be kept safely in a covered area. The chassis should not be kept open to atmosphere without any protection to avoid damage to chassis and its units due to rain, dust and heat.

6.2 Before commencement of bus body fabrication, all important units of chassis viz. Alternator, Self-starter, Radiator, Tyres and Batteries should be protected by providing suitable covering and disconnect the wiring connections to Vehicle ECU, ABSECU, Vehicle Tracking Unit and wiring harness ends shall be protected to prevent from damages that may occur due to welding, drilling, cutting, hammering, riveting & falling of metal scrap or dust during the course of fabrication. Driver seat, Steering wheel, Hand brake valve etc., shall also be protected from any damage or paint spray.

6.3 Chassis number on long members and identification plates provided by the chassis manufacturer shall be properly covered and protected before commencing the fabrication work.

6.4 The Ashok Leyland, TATA and Eicher chassis are supplied with following items as OE fitment.

1. Cabin floor
2. Bulk head structure (AL/EICHER, TATA)
3. Out riggers (AL/EICHER)
4. Anti-sag channel (TATA)
5. Bonnet and Front bumper (AL/TATA/EICHER)
6. Knitted Driver seat
7. Head lights E2
8. Front indicators E2
9. Tail Lamps E2
10. Battery cut off switch
11. Reflective warning triangles with stands
12. Wheel stoppers
13. Spare wheel carrier rope type / cage type
14. First aid kit
15. Tools as per CMVR
16. Rear view mirrors with brackets E2 plus 1 small mirror
17. Electrical horn
18. ELR safety belt

7.0 PROTECTIVE TREATMENT:

7.1 All Mild Steel components used for fabrication shall be carefully de- greased, de-rusted with three in one solution by dipping and wiped with dry cloth to remove all dirt/oil etc., Then the material shall be applied immediately (without any time lag) with Zinc Phosphate epoxy primer "Rust-O-Cap" (part no.24570608320) of M/s. Asian Paints or ***'60 BT PRIME GREY'*** of M/s.Akzo-Nobel Coatings before assembly.

7.2 All Aluminum Components shall be carefully cleaned with thinner. Bi metallic paint shall be used at joints of dissimilar metals. The interior and exterior panels should be cleaned with thinner and then self etching primer shall be applied.

8.0 BODY STRUCTURE:

8.1 **Aluminum Structure:** All principal structural members should be in Aluminum extruded sections of Alloy designation 64430, 63400 and 65032, condition WP as per IS: 733– 1983.

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The structural joints shall be by riveting, bolting and combinationof both. The rivets shall be of Aluminum alloy wire of IS: 740 – 1977. Alloy condition 64430 (HR-30) – OD.
Aluminum 5-bar Chequered plate with 3.0/2.0 mm base thickness shall conform to alloy designation 65032 and condition WP of IS:737 of 1986.All Aluminum sheets shall conform to alloy designation 19000, conditionH2 of IS: 737 of 1986.

8.2 Chart no. CB22CTG132 and Drg.no. CB22AEG112 (sheet 1&2) containing the details of specifications of Aluminum extruded sections and sheets to be used and it shall be followed.

8.3 **Other Mild Steel structural members**:Galvanized steel sheets should be as per grade 175 of IS: 277- 2018. Rolled sections should be as per IS-2062 of 2006. The structural jointsshall be by riveting, bolting, combination of both and MIG welding in caseof GI structural members. The welding should be for full length of joint. Welding slag to be removed and ground to smooth finish in order to avoid sharp edges.

8.4 All bolts used shall be of sizes reckoned in Metric system. The bolts shall be of high tensile hexagonal head bolts of fine thread, conforming to property clause 8.8 of IS: 1367 of 1979. The nuts shall be of approved anti-vibrate type such as nyloc conforming to IS: 1364 of 1983. All boltsnuts and washers should be galvanized. Each bolt and nut shall beprovided with a flat washer. A spring washer should accompany everytappedbolt.The approved brands of bolts are TVS/STL/HINDUSTAN FASTENERS/KFL/UNBRAKO/IMPERIAL FASTENERS brands only.

9.0 PARTICULARS OF IMPORTANT STRUCTURAL MEMBERS

Sl.no.	Description	Material
1	Cross bearers	Rolled steel channel ISMC 100x50x6 mm
2	Anti sag bar	Rolled steel channel ISMC 75x40x6 mm
3	Floor longitudes	G.I 'U'section25x75x25x3 mm thick (5rows)
4	Pillars and Horizontal supports	Indal 2654 section, All pillars including wheel arch horizontal supports shall be reinforced with formed 'U' inserts of GI sheet 3.0 mm thick.
5	Roof sticks & roof longitudes	Indal 2651 Sections (5 rows)
6	Crib rail and seat rail	Indal 1756 section
7	Cant rail	Indal 2800 section
8	Waist rail	Indal 2613 section
9	Waist rail stiffener	Indal 3402 section & 3.0 mm Aluminium 5-bar Chequeredplate 100 mm wide with minimum joints one LH side and two on RH side with in wheel base
10	Panel stiffener	Indal 3405 section
11	Skirt rail	MS Angle 40x40x3 mm
12	Water channel a) On cant rail b) Front & rear end	 a) Indal 6250 section b) Hindalco WC-695 section
13	Step edge beading	Indal 5700 section
14	Flat beading	Indal 5505 section
15	Decorative beading a) Exterior waist level front b) interior waist level and ceiling	As per Drawing. a) Indal 2721 section b) Indal 2684 Aluminum section with plastic filler and ends

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16	Window sections a. Window guide b. Split section 1. c. Split section 2 d. Sweep rubber section e. Finger pull	a. Hindalco 6482 section b. 'T' section c. 'F' section d. Hindalco 2691 section e. Indal 1752 section
17	Wire casing	Indal 2735 section
18	Rub rail on body side	Hindalco 6551 Volvo type on G.I U FORMED 2.00MM
19	Cleats &Brackets a) Roof structure b) Cant to roof stick and cant to pillar c) Side structure	a) Indal 1760 section b) 'c' bracket formed in GI sheet 2.5 mm c) 'c'bracket formed in GI sheet 2.5 mm at wheel arches and Indal 1760 cleats
20	Roof grab rail brackets	Indal 9638 of 30 mm wide
21	Gussets for Cross bearer to Pillar joint	ISMC 100 X50
22	JK door frame	Indal 9124 section
23	Parcel rack tube	Stainless steel tube of 16 mm diameter

10.0 PRECAUTIONS:

10.1 Aluminum extrusions such as seat rail, crib rail, cant rail shall be joined within wheelbase only.

10.2 "NEGATIVE TOLERANCES "are not allowed either for Aluminum Extruded sections or Aluminum sheets and GI sheets/tubes.

10.3 All welding shall be done with MIG welding process only. Under any circumstances, arc welding shall not be allowed. Welding of Stainless steelComponents shall be done with TIG welding process only with same gradeStainless Steel filler rod.

10.4 All holes in cleats and roof longitudes shall be PUNCHED to close tolerances. Under any circumstances drilling of holes is not allowed.

10.5 The following workmanship must be carefully followed during thefabrication.

i. All castings must be truly formed and free from blow holes.

ii. All bolts and rivets should be well fastened

iii. Rigid water test shall be carried before fixing the interior ceiling without applying any sealant and tapes using pressurized water spray system. The fabricator shall equip water leaktest facility confirming to IS: 11865-1982 at the firm forconductingleak test in two stages i.e., before fixing the interior ceiling and before dispatch of vehicle.

iv. All welded joints must be chipped and well ground to get a smooth surface and applied with Epoxy primer without any delay.

v. Sharp corners shall be grounded and made smooth

vi. Wherever pitch for rivets / bolts is not specified, it shall be 100 mm.

vii. Bolt ends shall protrude at least 2 to 3 threads length above the nuts.

viii. Roof stick, roof longitude, floor longitude and waist rail members shallbutt properly at mating joints and shall not have gaps at the joints.

ix. All tapping bolts such as grab rail, handles and assist rail bolts etc., shall be tightened using thread lock adhesive of approved makes.

x. Roof stick, roof longitude, floor longitude and waist rail notching to bedone on power press only.

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xi. All fixed glasses shall be provided with ceramic coating of 50 mmwidth on periphery.

11.0 CAB UNDERFRAME STRUCTURE:

11.1 Cab under frame of Ashok Leyland 222" WB chassis shall be fabricated as per the drg.no.UT2260UF22103. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side of cabin shall be connected to the 1st cross bearer by providing a 'Z' riser in GI sheet3.00 mm. On LH Side, a raised wheel arch box shall be provided on front wheel duly fabricating in MS flats 40x6 mm and MS angles 40x40x6 mm. Gap between the top surface of the tyre and bottom of the wheel arch box shall be minimum 160 mm.

11.2 The Tata 224" WB chassis shall be fabricated as per the drg.no.**UT**2460UF22303. The cabin floor longitudinal members shall be connected to a 'Z' raiser in GI sheet 3.00 mm provided on 1st cross bearer to make up the height difference of cabin and saloon floor. Suitable wheel arch boxes in rectangle shape fabricated in MS flat 40x6 mm and MS angles 40x40x6 mm shall be provided. Ga between the top surface of the tyre and bottom of the wheel arch box shall be minimum160 mm.

11.3 The Eicher 230" WB chassis will be supplied with OE cab floor, bulk head structure, out riggers, driver seat and engine bonnet. The cab under frame shall be fabricated as per the drg.no.UT3060UF22203. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side of cabin shall be connected to the 1st cross bearer by providing a 'Z' riser in GI sheet 3.00 mm. On LH Side, a raised wheel arch box shall be provided on front wheel duly fabricating in MS flats 40x6 mm and MS angles 40x40x6 mm. Gap between the top surface of the tyre and bottom of the wheel arch box shall be minimum160 mm.

11.4 The dashboard frame shall be fabricated in MS angle 40x40x6 mm to the required profile and covered with GI sheet of 0.91mm thick. Flap door with suitable stainless steel hinges and stainless steel tower bolts shall be provided for easy access to fuse box, radiator , power steering reservoir and Clutch oil container.

12.0 BODY FRAME STRUCTURE:

The bus body frame structure should be fabricated as per the followingdrawings.

ASHOK LEYLAND 222" WB chassis –UT2260SL22101 and UT2260SR22102.
TATA 224" WB chassis –UT2460SL22301 and UT2460SR22302.
EICHER 230" WB chassis –UT3060SL22201 and UT3060SR22202.

12.1 The cant rail at the passenger entrance, driver door and emergency door area shall be reinforced with GI sheet formed channel in 2.0 mm thick and the joint of cant rail should not be exactly on any pillar or within door bay.

12.2 A & B pillars on both sides shall be provided in GI 3 mm thick formed section similar to Indal 2654. First and second roof sticks connecting A& B pillars shall also be provided in GI formed section similar to Indal 2651 in 3 mm thick. All the structural members in this bay (Waist rail, Intermediate rail and roof longitudes) shall be in GI formed sections of 3 mm thick with dimensions of corresponding Aluminum Sections.

12.3 An opening of size 250-mm x 250 mm, fabricated in MS Angles 40x40x6 mm finished with beading in Indal 5505 and a flap with Aluminum tower bolt shall be provided at fuel oil tank mouth.

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12.4 One peep window frame in first bay of left side structure is to be provided with MSL 40x40x3 mm. One fixed clear glass of 5.0 mm thick shall be provided in the size 490mm(H)X290mm(W) along with frame in Indal 6482.

12.5 MS tapping plates in 30x6 mm flat of 200 mm length shall be provided wherever tapping is to be done for fixing body components such as roof continuous beam, roof hand grab rail, window guard rail, assist rail, drivers' partition, windows etc.

12.6 Pillars on both sides entrance shall be reinforced with MS angle 25x25x3 mm and riveted to the inner flange of pillars.

12.7 Cant rail on both sides full length shall be reinforced with M.S angle30x30x3 mm. This angle shall be riveted to pillars flanges at cant level and connected to the cant rail duly providing two GI plates of size 75x30 mm of 2 mm thick welded to the angle and riveted to cant rail in every bay.

12.8 Chassis long member cutting is not allowed and they shall be retained as supplied by the manufacturer as shown in the respective drawings while fabricating the rear luggage booth.

12.9 Luggage booths from crib level to skirt level are to be provided on left sides of vehicle as indicated in structural drawings with flap doors in 1.6mm thick Aluminum sheet and locks.

i. Rear luggage booth and right side luggage booth from crib level to skirt level are to be provided with door seal rubber. right side luggage booth E2 flap doors are to be provided with hindalco 9389 and 9390 hinges.

ii. Rear luggage booth door fabricated with MS angular 40X40X3 mm and to be provide with 550N E2 gas springs.

iii. Rear luggage booth and side luggage booths inside area should covered with 0.91 GI sheet with Hammer tone paint.

iv. Rear luggage booth to be fabricating as per drawings mentioned in side and rear structures.

v. Rear luggage booth to be provide with E2 led lights for proper illumination.

13.0 CABIN AND BODY MOUNTING:

13.1 The OE Cabin floor and mounting arrangement shall be retained. The remaining portion of cabin floor connecting Ist-cross bearer and OE floor shall be fabricated as per drg.no. UT2260UF22103 for AL 222" WB, UT2460UF22303for TATA 224" WB and UT3060UF22203 for Eicher 230" WB chassis.

13.2 The OE anti-sag members shall be retained. If the chassis are not supplied with the anti-sag members a 3-piece anti sag channel in ISMC 75x40x6 shall be provided at front end of the chassis bottom frame connecting to the 'A' pillars on both sides.

13.3 Additional Out riggers in MS angles 50x50x6 mm shall be provided connecting 'B' pillars to the chassis long members with suitable fitment.

13.4 The body should be mounted on the chassis web duly providing 6 mm (inverted pressed "L" type) MS plate as per the size shown in the respective drawings over the chassis long members. These "L" plates shall be bolted together at every cross bearer mounting to Long member web with M12x 50 H.T. bolts at least 4 nos. per plate. OE holes on the chassis long members shall only be picked up for mounting this plate. Wherever the holes are not matching holes shall be drilled on the web 40 mm below the top level of long member with prior approval of competent authority. Over these plates, cross bearers in ISMC 100x50 channels shall be provided as per the respective drawings. At rear wheels the cross bearers shall be fastened with 16 mm dia. "U' bolts of approved make and with 150mm x 6 mm thick base plate welded to the bottom of cross bearer. Spacers made of Aluminum casting shall be placed between bottom flanges of

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chassis long member and "U" bolts. The "U" bolts are to be made out of EN-15/14B steel as per IS 5517-1978 (Tensile strength 80 kg/Sq.mm minimum). The "U" bolts should be galvanized and fitted with galvanized nyloc nuts as per drg.no. CB22UBG114. The length of bolt shall suit the depth of chassis long member and should not project more than 6 mm after tightening the nuts.

13.5 In ASHOK LEYLAND and EICHER vehicles the front bulkhead ends are to be connected to the A-pillar of the body duly giving the support members. A tie bar in front of radiator in 3-piece in ISMC 75x40 connecting A-pillars on both sides and chassis long members shall be provided. This tie-bar to be mounted on MSL 50x50x6 mm angle 'L' brackets connected to the chassis long members.

13.6 The body mounting must be easily detachable from the chassis during major overhauls. Pillar gussets on four sides of the body shall be provided with 32 mm dia hole to facilitate lifting of the body during major overhauls as per drawing no CB22LB115.

14.0 CABIN AND SALOON FLOOR:

14.1 The cabin and saloon floor shall be in Aluminum5-bar cheq.plate of 3.0 mm base thickness conforming to alloy designation 65032, Temper WP of IS: 737-1986. The cheq. Plateshould be riveted with M.S rivets of 5mm dia. to the floor longitudes at a pitch of 100 mm and in Zig-Zag manner at joints. The cabin area and wheel arch boxes shall be riveted at 75 mm pitch. The riveting on crib rail shall be done with 6 mm Aluminum alloy solid rivets of HR –30 and condition OD as per IS: 740-1977. Intermediate bolting with M8 bolts shall be done on cross bearers and wheel arch frames.

14.2 The wheel arches shall be made rectangle shape. The height of rear wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

14.3 The number of cheq. plates used for cabin and saloon flooring should be least in order to keep the joints at minimum possible. Thefloorcheq. plate shall be joggled at crib level to get proper seating.

14.4 In TATA and EICHER vehicles an inspection cover to be provided in saloon floor over fuel tank suction pipe of size 250x250 mm.

14.5 The floor longitudes should be in five rows excluding crib rails. They should be arranged in such a way that the seat legs are fixed on the floor longitudes. Dust proof rubber packing of 2mm EPDM quality shall be provided at the joints and ends of Chequered sheet to avoid entry of water/dust in to the saloon from the joints. Thefloorcheq. plate laying shall ensure dust proof. Additional floor longitudes shall be providedwherever necessary for floor plate joints and stanchions.

14.6 Trap door of 580x 520 mm size must be provided in cabin flooring above gearbox with proper sealing and M6 tapping bolts.

14.7 Four drain holes of 25-mm diameter and 75 mm length ERW pipe shall be provided in saloon flooring corners below seat frames for draining of water while washing.

15.0 BODY PANELING:

15.1 The exterior portion of body i.e., sides; front end, rear end, mud wings and roof exterior should be in Aluminum sheet 1.22 mm thick of alloy designation 19000 and condition H2 of IS: 737 of 1986.

15.2 Front radiator grill is to be provided in 1.22mm GI(AL type) as per drawing for Eicher and TATA vehicles.

15.3 **Truss panel for body sides**: Full height truss panel between waist to crib rail for entire length of body and at rear end including corners shall be provided in stainless steel sheet of 0.7 mm of 430 Grade and in scotch bright/mirror finish. These panels shall be riveted with 5 mm Aluminum alloy solid rivets to the structural members at waist

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rail together with 5 bar Aluminum Chequered sheet and Indal 3402 stiffener at a pitch of 100 mm in zig-zag manner. The riveting pitch on seat rail and crib rail shall be 75 mm. The riveting pitch on pillars shall be 100 mm.

15.4 **Roof structure reinforcement**: The roof structure above on each door opening i.e., passenger entrances, driver door and emergency doorbetween roof longitude and cant rail shall be reinforced with a truss panel of 0.91 mm thick GI sheet and shall cover three baysin single piece. The GI sheet has to be formed to the required contour of roof prior to the assembly and shall be riveted to the roof longitudes and cant rail lower flange and also to the MS angle 30x30x3 provided above cant rail between 'C' brackets with MS flat head rivets at a pitch of 100mm.

15.5 The roof exterior sheet with 1.22 mm thick Alu. for center portion should be in full length of body and laid longitudinally in one single piece of 1220 mm wide. The riveting should be done on the roof longitudes in ZIGZAG manner. The exterior sides (LH & RH) of roof sheets have to be provided with 1.2 mm thick Alu in single piece as required. The riveting on cant rail, front and rear end roof sticks should be with flat beadingIndal 5505. The overlap of roof exterior panels should be equal to full width of roof longitude section and should be riveted by 5.0- mm dia. Aluminum alloy solid rivets (HR-30) at a pitch of 75 mm in two rows ZIG-ZAG manner. While riveting roof side sheet on cant rail, an Aluminum sheet of 1.6 mm thick and 75 mm wide full length of cant rail shall be provided on the cant rail for pasting top fixed glasses. The sides of roof shall also be provided with water channel in Indal 6250 and shall be riveted along with flat beading Indal 5505.

15.6 PU sealant has to be provided at overlapping portion of roof panel joints to avoid water leakages. The edges along the roof joints shall also be applied with PU sealant for filling up the gaps. Roof joints should be water leak proof. Approved make weather shield strip of 150 mm wide and 2 mm thick shall be laid longitudinally covering roof center joints from front end to rear end to avoid water leakage from roof.

15.7 Exterior of roof sticks and longitudes shall be pasted with expanded polyurethane sheet (heatlan) of 6mm thick.

15.8 The interior roof up to cant rail should be in Aluminum sheet 0.91 mm thick of alloy designation 19000, condition H2 of IS: 737 – 1986.

15.9 The interior vertical finishers for pillars, horizontal finishers for windows at cant level, waist level and finishers for intermediate rail shall be in 0.5 mm stainless steel of 430 grade and scotch bright finish. The finishers are to be pasted to structural members with 'Metal to Metal' type PU sealants. There should not be any waviness in finishers and the sealant should not drip through the joints. All the horizontal finishers shall be in single piece per two bays and the overlap joints on pillars only. To avoid the expose of sharp edges and waviness of the SS sheet used, the inner edge of the finisher is to be bent inside.

15.10 The overlap joint for roof interior ceiling panels should be on the roof sticks. The overlap of the roof panels should be equal to the full width of roof stick section and should be riveted by 4.76 mm dia. Aluminum alloy multi grip blind rivets at a pitch of 100 mm. Riveting should be done on roof longitudes and cant rail also.

15.11 Interior ceiling panel joints on every roof stick, cant rail and on all sides of door openings shall be provided with decorative beading Indal 2684 with plastic filler and end covers.

15.12 Formed to 'Z' section (size 25x45x25) of 1.22 mmAluminum sheet shall be provided on waist rail which shall be riveted to waist rail duly overlapping the exterior body panel at a pitch of 100 mm. The ends of 'Z' section shall be bent vertically upwards to overlap the pillar web. Suitable 30x3mm thick balata packing shall be provided below the 'Z' section to match the height of rivet heads of waist rail. Ends and corners shall be applied with P.U.sealant to avoid seepage of water in to saloon.

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15.13 An Aluminum sheet formed 1.6mm thick 'Z' section (30x8x30) shall be riveted to intermediate rail with Aluminum flat head rivets of 5 mm to facilitate bonding of top fixed glass.

15.14 Two rows of panel stiffeners in Indal 3405 should be provided at seat rail level and in between crib rail to skirt level.

15.15 The exterior body panels from waist to skirt should be without joints in1.22 mm thick Aluminum Sheets of alloy designation 19000, condition H2 of IS: 737 of 1986. The vertical butt joint of panels should be on Structural members and to be pasted with approved make sealant of 'metal to metal' type and two sided VHB tape of 3M make on all sides i.e., vertical joint, on waist rail and on skirt rail. End portion of panels at wheel arches and skirt rail shall be folded inside by 20 mm and should be fixed with flat beading and Aluminum alloy head solid rivets of 5.0 mm dia. at a pitch of100 mm.

15.16 Rear end exterior from waist to skirt and between end pillars shall be provided with Aluminum sheet 1.22 mm sheet in single piece. This panel shall be bonded to the rear end structure with PU sealant of 'Metal to Metal' type and two sided VHB tape. The rear end saloon glass frame shall be covered with 0.91mm finishers from outside and 0.5 mm stainless steel from inside. Body structural members and Aluminum sheet surfaces where the sealant has to be applied shall be cleaned thoroughly for oil/dirt etc., before applying sealant.

15.17 The body sides have to be provided with rub rail in Hindalco 6551 Volvo typeon 2mm GI sheet formed in U 30x60x30x2 size.

15.18 The front end exterior panels shall be provided with decorative beading Indal 2721 at waist rail. The beading shall be anodized and fixed with blind rivets. The rear end waist level shall be provided withAluminum flat beading in Indal 5505 with blind rivets.

15.19 The exterior corner dooms both at front and rear on off side and near side from cant rail to waist and waist to skirt rail shall be provided in 0.91 mm G.I sheet over laid with Aluminum sheet of 1.22mm thick and Indal5505 beading on full length of pillars.

15.20 The area between exterior and interior panels of waist rail to crib rail in side structure, cant rail to cant rail in roof structure shall be provided with 40 mm thick FR grade Thermocole insulation.

16.0 FOOT BOARD:

The wider foot boardof 1390 mm within wheel base structure as shown in the drawing to suite two Jack Knife doors shall be in three steps built in MS. Angles 40x40x3 mm and over laid with Aluminum 5-bar chequered sheet of 2.0 mm base thickness on sides and 3.0 mm base thickness on tread and riser portion. The footboard should be given a support under the lowest tread by providing a 'U' type bracket made of MS angles 40x40x6 mm. The arms of 'U' bracket should be 230 mm long and secured to pillars with M10x 4numbers bolts on each pillar. Step edge beading in Indal 5700 shall be provided along the edges. The bottom tread height from ground shall not be more than 400 mm. The tread depth should not be less than 300mm. Maximum step height allowed is 250 mm.

17.0 WHEEL ARCH FRAMES AND BOXES:

The front &rear wheel arch box frames should be fabricated in MS angles 40x40x6mm and M S flats 40x6 mm in rectangle shape. The height of box frame shall be 160 mm above top surface of the tyre. The boxes shouldbe designed to accommodate 10.00 x 20 size tyres. The wheel arch box frames has to be covered with 1.6mm GI sheet and followed by 2mm Alu. 5-bar Chequered sheet in single piece instead of 3mm Aluminium 5-bar chequered sheet. Step edge beading shall be provided at the riser and along the edges of wheel

arch.Mudguard shall be provided in1.22 mm thick Alu.Sheetroundlyalong wheel arch area with proper clamping and a clear gap of 100 mm from the edge of tyres.

18.0 DRIVER'S PARTITION:

The driver's partition shall be fabricated with stainless steel tube 30 x30x1.6 mm as per drg.no.CB22DRG119. It should be fixed behind driverseat and shall be supported on structural members duly reinforced in thefloor as well as roof. The minimum distance from the Bonnet to partition wall shall be as per seat layout drawing. A timing board of size 450x300 mm shall be provided in Aluminum sheet 1.22mm duly painted white. The board should be provided in a sliding channel frame on 3 sides made of Indal 3620 section and fixed to the partition on saloon side.

19.0 DESTINATION BOXES AND BOARDS

19.1 LED destination boards of size 1800x220 mm & 900x220 mm of approved shall be provided **at front and rear** end of bus with proper tapping & secured clamping and as per UBS-II specification with built in controller and LCD display for front LED destination board with a provision of numbers from 0 to 9 and Up & Down buttons to select service number & route. Communication cable to be provided from Front master LED board to rear LED board for display of same route course details in both the boards.

19.2 The side destination box shall be in first 1130 mm bay on LH side at window top fixed glass area after passenger entrance.

19.3 One flap door in 0.7 mm stainless steel sheet in size 1180 mm x330 mm isto be riveted with Stainless Steel piano hinge for full length at bottom and to be blind riveted on intermediate rail in 1st1130 mm window after passenger entrance on LH side of body. Bracket inindal 3620 is to be fitted on inner face of the door for holding the destination board of size 910 mm x210 mm. LED type lighttobe provided forillumination. Two locking latches and chain in stainless steel are to be provided on both sidefor locking the door and to hold it at convenient angle to change board. E 1 tower bolt has to be provided at middle of top centre and E 1 at centre areas on both sides for side destination board door.

19.4 Six destination boards in 0.91 mm thick GI sheet have to be supplied along with the vehicle duly painted in white color.

19.5 The side destination boardshall be illuminated by LEDlights of 600-mm length of approved design and made with luminosity of 150 to 200 lux.

20.0 PARCEL RACKS:

Tubular type Parcel racks shall be provided on both sides of saloon above windows. The parcel rack tubes should be provided in 16 mm dia. & 1.6 mm thick stainless-steel tubes of 304 grade placed longitudinally at a pitch of 65 mm in the Stainless Steel (304 grade) rectangular tube brackets of 40x20x1.6 mm provided at each pillar. The pipes shall be spot welded to the rectangular tube brackets.

20.1 Intermediate brackets in same material, shall be provided in between two main brackets.These brackets shall be connected to the Cant reinforced MS angle 30x30x3 mm and roof sticks.

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20.2 The interior width of the racks shall not be less than 460 mm. There shall be a clear vertical gap of 230 mm between roof ceiling and parcel rack end tube. Parcel rack end brackets shall be provided with a stay bar in same tube.

1.1 One parcel courier box to be provided at left side of Parcel rack in first bay in front of entrance door with suitable locking system as perdrawing no CB22CRB140.

21.0 CONTINUOUS BEAM:

A longitudinal continuous beam in pressed top hat section of GI sheet of2.0 mm thick similar to roof stick profile should be provided. This beam in inverted position shall connect all the roof sticks from front end to the rear as shown in the seat layout drawing. The joints should not be more than three with reinforcement using 30x25x2 mm thick, 50 mm long 'U' channel welded at joints from inside. The cross section dimensions of each extended top hat section should coincide without mismatching. Welded joints to be ground for even surface and ends should be tapered to a length of 150 mm. Reinforcement is to be provided in the beam with M.S. 30x6mm in 200mm length flats for fitment of stanchions.This beam shall be fitted with M6 tapping bolt at every roof stick on both sides and the remaining beam shall be riveted in Zig-Zag manner at 100 mm pitch.

22.0 STANCHIONS:

Four stainless steel tube stanchions in 304 grade of 38 mm OD x 1.6mm thickness as per IS: 6913-1992 should be provided in between the saloon continuous beam and saloon floor as per seat layout plan. SS Flat 4 mm with 3 mm balata packing shall be provided at bottom ends of the stanchions and SS 40x40x4 mm angle on roof continuous beam .The stanchions have to be fitted on floor longitudinal members and to roof continuous beam with M6 size through bolts. The stanchions shall be fitted rigidly with dome nuts.

23.0 CONTINUOUS ROOF HAND RAIL:

Two rows of continuous roof hand rails (grab rails) in stainless steel tube of 25 mm OD x 1.6 mm thick in 304 grades and 2B finish has to be provided as shown in seat layout drawing. The intermediate support brackets to be in Aluminum extruded section Indal 9638 of 30mm width. These brackets are to be grey powder coated. These hand poles are to be provided with18 nos. plastic molded swiveling type hand holds with nylon ribbon arm slings in green/Yellow color, one per bay. Ends of these pipes shall bejoined together duly inserting a pipe of 100mm long.

24.0 WINDOW GUARD RAIL:

Two rows of guard rails in stainless steel tube in 304 grade and 2B finish of 20mm OD x 1.6 mm thick as perIS: 6913-1992 has to be provided from outside on both sides of the vehicle at a height of 75 mm and 175 mm above waist level. The pipes shall be bolted to the pillars with M6 bolts and intermediate, end sockets as per drg.no.CB22LBG115. Tapping plates in M.S. flat 30x6 mm x 125-mm long shall be provided inside the pillar for fitment of guard rails.

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25.0 CABIN FRONT WINDSCREEN, SALOON REAR GLASSES AND WINDOWS:

25.1 The cabin front-end shall be fitted with single laminated windscreen glasses of size 2620(W)X1300(H) mm as per drawing No.CB22WSG138. The curved laminated glass shall be of 7.76 mm thick with minimum 0.76 mm PVB film, select float quality, safety clear WAVE FREE as per IS: 2553–1971 and to be fitted with EPDM quality synthetic rubber extruded section in single molded piece as per drawing No:CB22ERG122. The windshield glass frame assembly shall be made in MSL 25x25x3 mm to match the profile of the curved glasses. The windshield frame shall be provided between front cant rail and dash structure welded on all sides. The approved brands for glasses are Bangalore safety, South Glass, GSC. All corners of windshield glass shall be provided with clamps in Alu.sheet 1.6mm in black powder coating.

25.2 The saloon rear end glass shall be bonded to the MS angle 30x30x3 mm frame provided in the rear body structure with P.U. sealant. The single piece glass shall be of 1760(L) x 800(H) mm size in 5.0 mm thick, toughened safety bronze tinted glasses as per IS: 2553 – 1990 & IS: 2835 –1987. The lettering work to be done on the glasses and at cant level as mentioned below in 50mm size.

"BREAK ANY GLASSES IN EMERGENCY FOR EXIT "

In Telugu:

" అత్యవసర పరిస్థితిలో ఏ అద్దమునైనను పగులగొట్టుము"

25.3 The window frames in Hindalco 6482 extruded section as per drg no: CB22WDG128 shall be provided between waist rail and intermediate railFor a standard bay of 1130 mm, the window frame size shall be 1125 x673 mm. The window frame shall have two horizontal sliding glasses of600(H)x540(L)mm size with flock channel of EPDM rubber quality. The area between cant rail to intermediate rail shall be provided with 5.0 mmtoughened bronze tinted fixed glass of size 1127x330 mm. The glass shallbe bonded to the 1.6 mm Aluminum sheet on cant rail and 1.6 mm Aluminum sheet 'Z' flange on the intermediate rail by applying PU sealant of approved make/ brands. The window glasses shall be of 5.0 mm thick toughened float quality, safety bronze tinted glasses as per IS:2553 - 1990 & IS: 2835 – 1987. Window frames shall be black powder coated.

25.4 All window frames to be provided with corner cleats with flat rivets besides welding to the window corners. They should be fitted with M6x30 mm CSK head screws-2 nos. on each vertical side on pillars and -3nos. on intermediate rail.Galvanized M.S. flat 30x6 mm tapping plates shall be provided on pillars and intermediate rail. Four drain slots of 50X3 mm shall be punched on bottom side of window frame to drain out water collected in frame grooves.

25.5 The edges of all sliding glasses shall be ground, chamfered and polished to smooth surface.

25.6 All sliding shutters are to be provided with finger pulls in Indal 1752 section 100 mm long.

25.7 All Seat frames MS pipe at welding portion should be cup cutting in order to facilitate full welding at joints instead of pressing.

25.8 Vertical overlap of window frames on pillars shall be provided with a sealing rubber profile as shown in the drawing. The fixed glasses are to be secured intact.

25.9 ApprovedmakesofEPDM rubber profiles or RubberExtrusions&Molding are ASP/ALP/ Sri Venkateswara Rubbers, BNGLR and any other approved by APSRTC.

25.10 Approved makes of P.U sealants are Total seal/Sikaflex/3M India/Bostik/ Anabond and Henkel and any other approved by APSRTC.

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26.0 PASSENGER ENTRANCE, ASSIST RAILS AND DRIVER'S DOOR:

26.1 The passenger entrance cum exit on LHS side as shown in the drawings shall be provided with two pneumatically operated Jack knife doors. E 2 Pneumatic cylinders are to be provided for opening & closing of passenger doors. These are to be mounted at both sides of center wider foot board at floor level without obstructing the passenger movement at entrance door and also to take necessary arrangement for safety of passengers.

26.2 The Jack Knife door design with pneumatic operation should be as per drawing No.CB22JKG121 has to be provided. The doorglassesshallbe 5.0 mm cleartoughened float glass in 1500 mm x 190 mm size and to be pasted with PUsealant to the door frame. Two railway type latches in MS flat 30x6 mm shall be provided from inside for locking the door in closed and openposition. The latch items shall be galvanized. Two SS handles 100mm long shall also be provided for the JK doors. The JK doors mounting shall be with 3 forged hinges on both side pillars. Two flaps shall be joined with 3 forged hinges with reinforcement of 3.00 mm GI sheet.E4 No's of GI 25X25X2mm Tubes are to be inserted in JK Door end flap vertical indal sections 9124 for additional strength to with stand the pneumatic cylinders force while operating the door with pneumatic mechanism.

26.3 At entrance on both sides of step well, assist rails in stainless steel tube in 304 grade 32 OD x 1.6 mm thick shall be fitted from roof stick to floor SS Flat 50X4 mm with 3 mm balata packing provided in roof sticks at top and on cross bearers at bottom. Two horizontal support pipes and one diagonal support pipe in stainless steel tube 304 grade 32 OD x1.6 mm thick shall be provided on both sides of step well. One additional stanchion in 304 grade 38 OD x 1.6 mm thick is to be provided at center of step well on floor. One assist rail in 32mm diaX1.6 mmis to be provided on 2ndstep and to be connected to step well middle stanchion as per the design given. The pipes shall be fitted withapproved make suitable SS flat 50X4 mm. The joints of stanchions and assist rails shall be provided with M6 steel bolts and steel doom nuts. Passenger door should be provided with pneumatically operated JK doorswhich are of 63 mm dia pneumatic cylinders.

26.4 **DRIVER'S DOOR:**The driver's cabin door shall be provided with a full drop type window duly extending up to floor level as per sketch no.CB22DRG119. The window frame shall be in Hindalco 6482 section as per the window design. The door shall be provided with one heavy-duty door lock of MSL make onlywith outer handle, one locking latch from inside, striking plates and dovetail catches. The door shall be fitted with two forged hinges on 'A' pillar. Driver door frame shall be provided with one horizontal bar in stainless steel 25x1.6 pipe from inside for holding.

26.5 **EMERGENCY DOOR:**One Emergency door of min. 1250 mm height X 715 mm width extending from intermediate cant rail to saloon floor on right side shall be provided as per the layout and drawings. Thedoor is to be provided with one horizontal sliding window and one heavyduty lock operable from inside, dovetail catches. The location of the emergency door is to be exhibited from inside& outside with Vinyl stickers and outer periphery is to be provided with red color reflective radium sticker. Emergency door provided with Redcolor LED light from inside saloon. It should have railway type latch made of Stainless steel apart from Stainless steel/Brass tower bolt.

26.6 **LUGGAGE CARRIER AND LANDING PLATFORM:**A luggage carrier fabricated on the lines of drawing no. CB22LCG124covering four bays including a landing platform up to rear end shall be provided on the roof top. The Luggage carrier frame and side railing shall be provided in MS angle 30x30x3 mm. The cat walk arrangement 270 mm wide to be on the LH side. The floor of luggage carrier and catwalk should be covered with 2.0mm base thickness 5-bar Aluminumcheq.sheet conforming to alloy 65032, Temper WP of IS: 737-1986 and riveted to Cross members and frame work of luggage carrier with MS

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solid rivets . The luggage carrier legs to be mounted on the galvanized MS 6mm base plates attached to the roof sticks. The mounting of the luggage carrier shall be by means of bolting to the galvanized formed 'L' bracket that is welded to the base plate. PU sealant to be applied around mounting legs to prevent water entry.

26.7 LandingPlatform: A landing platform on the rear side of roof top should be provided as per drawing no.CB22LDG113. The platform floor should bein 5-bar Aluminum cheq.plate of 2.0 mm base thickness.

26.8 Access Ladders: Access ladder should be in two pieces from luggage carrier to RLB top side and a foldable piece up to skirt level with two railway locks provision in folding position.

26.9 Unloader Grill: An un-loader grill on LH side above rear wheels has to be provided in ERW 19 OD x 1.6 mm as per drawing no. CB22LDG113 .Itshall be covered with1.22 mm chequered sheet, duly covering the half of top fixed glass.

27.0 PASSENGER SEATS:

The seat layout plan and seating arrangement shall be as per the respective drawing .no.UT2260SG22104 for AL, UT2460SG22304 for TATA and UT3060SG22204 for Eicher.

27.1 HIGH BACK SEAT FRAMES: The seat frames for single, twin and triple seater are of high back frames as per the drg.no.CB22SFUT131& CB22SFUP131 .The legs of seat frames should be located on floorlongitudes and seat rail only. Belting fabric 3 mm thick (one piece) shallbe provided in between the floor and seat leg foot piece. The seat legs shall be fastened with M8 X 1.0 mm hexagonal head bolts using plain washers and Nyloc nuts. provision to be made for advertisement on back of the seat as shown in the drg.The seat frames should be powder coated. Ladies seat frames should be yellow powder coated. All Seat frames MS pipe at welding portion should be cup cutting in order to facilitate full welding at joints instead of pressing.

27.2 SEAT BOTTOM CUSHIONS: Seat bottom cushions shall be provided in P.U. molded foam conforming to grade "J" of IS: 8255 – 1976. The density of P.U.foam shall be between45 to 50 kg/cu.m. and indentation hardness shall be between 15-17 Kgf at25% deflection.

Sizes:
- Three seater: :1200x 380x 90/65 mm
- Twin seater :813 x 380 x 90/65 mm
- Single seat : 406 x 380 x 90/65 mm
- Conductor seat : 500 x 400 x 90/65 mm

The cushions to be mounted on 8.0 mm thick ply wood conforming to Grade-MR, type-AA, as per IS: 303 – 1989. The upholstery shall be with expanded vinyl coated fabrics as per RDSO specifications. The
color of Rexene shall be in charcoal greywith prior approval of CME(C&B) only. The bottom plywood shall have 4 vent holes of 10 mm dia.perpassenger seat. The bottom of plywood should be pasted with 1.0 mm thick ABS panel. The bottom should be fitted 25 mm ahead of seat frame level.

27.3 SEAT BACK SQUABS: The P.U. molded foam individual back cushion of size 580(H)X370/320(W)X50mm(T) as shown in the drawing and conforming to grade "E" of IS: 8255-1976 shall be mounted on 6mm plywood and upholstered with expanded vinyl coated fabric as mentioned above. The back side of plywood shall be provided with 0.5mm GI sheet.

27.4 A sample seat shall be produced for approval of Chief MechanicalEngineer (C&B) before manufacturing in bulk and fitting in the vehicles.

27.5 All upholstery work shall be carried out with 3mm piping at all joints. A margin of 12 mm shall be provided for Rexene along the stitching lines and double stitching to be provided duly folding the Rexene edge by 6 mm. The tacking of Rexene to plywood to be by folding the Rexene by 12 mm with a pitch of 50mm in between nails.

27.6 The sewing thread makes to be of "MODI/COATS", variety No.38 as per IS: 1720-1978.

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28.0 DRIVER'S SEAT:

The OE knitted type driver seat supplied with chassis shall be retained. The driver seat frame mounting on cabin floor shall match the OE mounting position.

28.1 In case of non-supply of OE knitted driver seat with the chassis, HDPE knitted driver seat of approved make shall be fitted. The seat shall have fore and aft, up and down adjustment of 100mm with reclining back and to be fitted 350 mm away from steering wheel edge when the seat is fully forwarded.

28.2 The height of driver seat bottom shall be 450 mm when measured in fully lowered position.

28.3 There shall be a thigh clearance of 200 to 260mm between steering wheel edge and driver seating position

28.4 The driver seat shall be so located that the center line of driver seat shall be 705 mm away from the center line of body.

28.5 The driver seat shall be provided with "ELR" type safety belt of M/s.Autoliv or Ranemake. (Conforming to AIS 05). The middle seat in sixseater and single seat shall be provided with static type belts.

29.0 BATTERY BOX:

29.1 The battery box with flap door shall be provided on LHS side below floor level at rear of front wheel to accommodate two 12V batteries of size521Lx292Wx248H mm with slider arrangement. The battery box is to be fabricated with MSL 40X40X6mm and MS Flat 40x6 and is to be paneledwith 0.91 mm GI sheet on floor and three vertical sides followed by Hammertonecoating.The bottom of the batteries shall be provided with 12 mm-compressed plywood and acid resistant rubber mat.

29.2 Complete Interior surface(except bottom side) of the battery box is to be overlaid with 0.5 mm stainless steel sheet of 430grade. Wood packing shall be provided between holding clamps and batteries to prevent vibrations while the vehicle is in operation. Fourrowsof single -length battery cables to be connected to the battery cut- off switch terminals to self starter and batteries. The terminals andcables should be firmly clipped in position with cable tie.One LED light shall be provided. One guard rail of SS 25 X 1.6mm pipe with brackets to be provided at front side to safeguard them.

30.0 ELECTRICAL WIRING AND OTHER FITMENTS:

30.1 The earth return system of wiring should be used. All automotive cables used shall be of IS: 2465 – 1984 quality covered with PVC sleeve as per IS: 1951-1961. Wherever PVC sleeves carrying the cables have to passthrough panels suitable rubber grommets of EPDM quality shall be inserted in the holes of such panels and structural members and shall be securely clipped as near as practicable to such rubber grommets to minimize chaffing.

30.2 All wiring shall be carried through Aluminum extruded section wire casing Indal 2735 in two rows along the cant rail offside and near side in such a way that it shall be easily accessible at all points without the need to strip major paneling of body. The extruded section shall be so located and fitted as not to affect the appearance of body. Any wiring, which has to run along the chassis frame shall be securely, clipped to ensure that there shall be no chaffing with any of the moving parts. Further care shall be taken to route such wiring in such a way that it is not subjected to splashing of oil, water, mud etc.,

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30.3 The battery main cable of size 398/0.40 mm shall be provided as required duly using good quality lugs with proper soldering, bolting and insulation etc., there shall be no joint in battery cables.

30.4 The saloon and cabin are to be provided with 8 nos. of 390x130 mm long LED light assemblies of approved makes as per layout drawing. Out of these two shall be with in-built night lamp of blue colour.

30.5 All OE electrical fitments shall be retained and kept in workingCondition.Any extension of wiring harness should be done by providing male female connectors only. Tapping of power for saloon lighting etc., shall be taken from the OE female socketsprovided by the chassis manufacturers. There should not be anytapping of power by slashing the main harness.

30.6 One electrical radial type New (Camoflex) wiper machine of 80W capacity and 50 NM with twin blades of 815 mmlengthshall be provided for front wind shield glass below the front waist rail on left side .The mounting bracket(formed 'L" in MS 60mm plate) shall be welded to the structural members in such a way that it shall not interfere while removing radiator. Washer tank should be provided on left side of front end structure at a convenient location.

30.7 One single tone Air horn of Roots/ELGI make shall be provided. In addition to the OE electrical horn one more electrical horn conforming to type -3 of IS 1884- 1993 shall be provided for AL vehicles. The noise levels of these horns should be between 93 dB to 112dB.

30.8 Modular switches as per IS: 9433 –1980, 230Vx5 amps shall be used. A 6-pole disc type fuse box with independent fuse designated for every electrical circuit shall be fitted on switch board provided at cant level. Maximum current capacity of a circuit shall not exceed 15 Amps. The current carrying capacity shall be 1.5 times the load current of the electrical circuit. The fuses used shall conform to IS-4063 /1982. Switches and fuse box are to be fitted on hylam/decolam sheet of 3 mm thick and to be fitted on sunken tray located above the driver door with non-metallic shielding to avoid short circuits.

30.9 Cable ends shall be suitablycrimped/soldered with lugs so as to withstandvehicle vibrations. The inter connections shall be made through couplers/junction boxes/ terminal blocks only. Weather proof connectors shall be used for connecting cables which are exposed to atmosphere to avoid water/moisture ingress during use.

30.10 Two additional head light assemblies of "8" dia with suitable reinforcement for fitment on front end structure, are to be provided with OE head lamp assemblies on AL buses. Four round type head lights of approved make shall be provided on Eicher and Tata vehicles. They shall be fitted at a distance not more than 400 mm from the extreme outer edge body and not more than 1200 mm height from the ground.

30.11 In Ashok Leyland buses, OE front direction indicator lamps shall be retained and to be provided below 1500 mm height on the outer edge of body in amber color. For TATA and Eicher buses, approved type front indicators shall be provided. In addition to this, four more LED type direction indicator lamps (flat type) in amber color shall be provided on the lateral side of the body at wheels and below 1500 mm height from the ground. E 1 AMW type indicator light to be provided on both sides at front wheel arch top area.

30.12 LED type height marker lamps in white color at front and in red at rear shall be provided. The marker lamps shall be above windshield glass at front and above cant level at rear on maximum possible outer edges.

30.13 LED type tail lamps in 5" dia4no's on each side (Two -red, one-white and one –amber) shall be provided. The mounting shall be below 1500 mm from ground and 400 mm from the outer edge. The red lights shall have individual circuits for parking and brake lights.

30.14 Rear number plates shall be provided with LED type light assembly of 300 mm length

30.15 Flat type LED blinkers in amber colour shall be provided at cant level on all four corners.

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30.16 OE battery cut-off switch supplied with chassis shall be provided with separate fuse control. In case of non-supply of battery cut-off switch along with the chassis, IGSA-552 or part no. LP-134/3 of Lucas India Services Ltd., make shall be fitted in driver's cabin with a label "Battery Cut-off switch". The battery cut-off switch to be located 300mm above the cabin floor on 3.00 mm GI plate provided in side structure.

30.17 Six 6" dia speakers of Boston (Si-600) or Pioneer (TS 1641 GS) make shall be provided in parcel rack with FRP speaker boxes with separate switch control for LH/RH side speakers

30.18 TIMS: One12V Converter has to be provided at conductor seat area on intermediate for connecting TIMS. One LED type light with separate switch of approved design shall be provided at conductor seat.

30.19 Conductor's buzzer with bell switches 4 nos. to be provided.

30.20 One reverse gear horn / alarm (4 tone) shall be provided with noise level not more than 100 dB if not supplied with the chassis.

30.21 In the driver cabin Instrument panel with all gauges, OE switches& indicators with labels shall be provided at 45-degree angle and shall be within the reach of driver from his seat. The frame shall be fabricated in MS angle 25x25x3 mm covered with 0.91 mm thick GI. Sheet.

30.22 Power for connecting Wiper, Indicators and Fog lamps shall be drawnfromthefuse box provided by Chassis manufacturer withmalefemale connectors.

30.23 Never connect the circuits with twists & knots. Never tap power by slashing the main harness.

30.24 LED Lights of 12 leads, 5W capacity shall be provided in luggage booths (4 nos), in battery box(one no) and in sparewheelcarrier (one no).

31.0 BODY PAINTING AND COLOR SCHEME:

31.1 Body to be painted on the exterior with premium quality PU paints. The body under frame and chassis shall be painted with anti-corrosive rubberized paint. The exterior painting process shall consist of carefully cleaning and etching followed by surface leveling with polyester putty application, P.U primer surface coats, finish coat and glaze coat as per the recommendations of paintmanufacturer.

31.2 Approved paint brands are 'Sikkens' of Akzo Nobel, 'Imron 9100' ofDupont(Axalta) or any other approved brand by APSRTC.

31.3 **Color Scheme**: As per the approved Color scheme. The paints shade reference is given below:

A. Exterior portion

Shade	Shade reference
Crystal white	APSRTC 09 White
Franchoise white	
Blue	BS904 –DUPONT
Golden Yellow	YM-039 -DUPONT

31.4 The color scheme may be modified or changed at the time of execution of bus body fabrication as per the orders of Chief Mechanical Engineer(C&B).

31.5 Lettering and Sticker work is to be done as detailed below:

a) Front wind screen glass is to be provided with sun control film up to 300mm from top side edge.

b) c. 'APSRTC' in white radium sticker with Times New Roman font in 6" size is to be provided on front wind screen glass on top side.

c) d. Labeling is to be done red radium sticker for battery box, luggage booth, diesel tank, air cleaner and spare wheel carrier.

d) e. 'Suswagatham' and 'Happy Journey' are to be provided in radium sticker of suitable color at top side of entrance door

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31.6 APSRTCmonogram shall be provided on both sides of body asPerSKETCH1916 in image transfer stickers.

32.0 MISCELLANEOUS FITTINGS TO BE PROVIDED:

32.1 Two Fiber handles of 100 mm size are to be provided at waist level of cabin front end. Two footsteps on the bumper shall be provided for cleaning of front windshield. Footsteps should not protrude outside the bumper.

32.2 Two OE fully adjustable rear view mirrors of convex type shall be fitted with brackets of as per drawing CB22RVM140, one convex mirror to be fitted inside driver cabin and one convex type mirror shall be fitted at outside of front end (center) for near vision of road at front. The location of rear view mirrors shall be so located to have at least 2500 mm wide vision from the body line of vehicle when viewed from driver seat.

32.3 The front Registration number plate in Aluminum sheet 1.6 mm to be provided on the front bumper with Indal 5505 beading around registration number plate. The size of the number plate shall be 450x250 mm. The rear registration number plate shall be on rear bumper.

32.4 Two fire extinguishers of approved make and dry chemical type 5.0 kg capacity conforming to IS: 2171of 1985 suitable for ABC class of fires shall be provided with suitable MS clamping ,arrangement.

32.5 Rubber mud splashguards of size 650x456 mm for rear and front wheels to be provided.

32.6 First aid box of stainless steel in size 310x220x128 mm with leather straps and locking arrangement shall beprovided in driver cabin. First aid medicine kit containing the items mentioned under Rule 138(d)(4) of the latest M.V.Rules shall be provided in the box.

a) Antiseptic cream of 5.0% centrimideI.PIn non-greasy base 5 mg...2 pcs.
b) Sterile Surgical gauge dressing ...1 pack of 4 pcs.
c) Wash proof plaster ... 5 pcs.
d) Sterile elastic plaster – size 6cmx30 cm ...1 pc.
e) Gauge rollede – size 7.5 cm x 2.5 mtr. ... 3 pcs.
f) Elastic bandage for wounds and burnsSize – 8 cm x 1.5 mtr .... 1 pc.

32.7 One pair of towing hooks with 36 mm eye dia.punched in MS flat 75x12 shall be provided at the rear end, to be attached to chassis long member with4nos.M12 bolts.

32.8 All lettering works in Radium stickers shall be done as per the guidelines.

32.9 The rear bumper should be in GI sheet 2.0 mm thick-formed channel section of size 50x175x50 mm in single piece with brackets in MSL40x40x6mm and to be fitted to the chassis long members. The ends ofthebumpertobe curved. The center portion of bumper shall be made sunken to accommodate a registration number plate and Number plate light.

32.10 The OE front bumper supplied with the chassis shall be retained. Front bumper length shall be increased to suite the body width i.e., 2590 mm. If the chassis is not supplied with front bumper, the bumper shall be fabricated in GI. Sheet2.0mm of size 40x300x40 mm to suite thebody width.

32.11 The mounting shall be attached to chassis long members withMS angle50x50x6 mm 400 mm long.

32.12 Two sunkenoffsetfootsteps of size 150x150mm shall be provided in offset below the driver door one at 700 mm height from the ground and another at950 mm.

32.13 Theentrance,emergencyand driver's doors shall be provided with water drain canopies at cant level in Aluminum sheet 1.22mm.

32.14 Pure rubber matting of 3.0mm thick shall be provided forfootcontrol pedal in driver's cabin.

32.15 A footstool for driver to be provided in Aluminum 5-bar cheq.sheet3.00mm and Indal 2651 as legs.

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32.16 Tapping of compressed air for windscreen wiper and air horn should be from port no.24 of system protection valve with proper unions, 'T' joints. Polyamide pipe of 6 mm shall be used for tapping of air. The pipeline shall be firmly clamped in position.

32.17 One safe locker for keeping conductor's cash, tickets etc., with locking arrangementshallbe provided at 1st twc seater immediately after middle passenger entrance.

32.18 One roller type sun visor of 24" size to be provided in driver cabin.

32.19 The OE spare wheel carrier if supplied with the chassis shall be located as shown in the structural drawing. In case of non-supply of carrier type bracket, one Spare wheel carrier arrangement shall be provided as per Drg.no.CB22SWG131 on LHS at rear of rear wheels. If the chassis are not supplied with carrier type bracket, the firm shall provide one spare wheel carrier fabricated in MS flat 75x12 mm and 6.0 mm MS sheet. Care shall be taken to avoid fouling of spare tyre with any of chassis units/parts under any circumstances. The Spare Wheel carrier shall be provided with flap door with full-length stainless-steel hinge 1.6 mm thick and 30 mm wide from the bottom of the cross bearer to skirt rail with locks and stay rod in MS rod 6 mm. The spare wheel carrier shall suit 10R20 size Tyre.

32.20 Driver & engine bonnet to be separated from passengers by providing one row of stainless steel pipe in 304grade,32 OD x 1.6 mm thick vertical supports andStainlessSteel Flats with balata packing.

The seats earmarked for Ladies, PHC persons, Senior citizens are to be very clearly exhibited on seat back rests.

32.21 Retro-Reflective Conspicuity Marking tapes of Diamond grade 50 mm wide conforming to AIS: 90 of approved make shall be bonded to the body sides as per the sketch provided. The cumulative length of tapes provided shall not be less than 80% of length of that side. These tapes shall be white in color at front, yellow on sides and in red at rear of the body.

32.22 One stainless steel assist rail of 25x1.6 OD up to a height of 600 mm from floor shall be provided on rear pillar from inside at driver door bay.

32.23 E1- side luggage booth should be provided. One Guard rail in SS of size 25x1.6 mm shall be provided in side luggage booths.

32.24 G.I. sheet 0.50 mm thickness shall be provided inside the bonnet.

32.25 Provision of single seat to conductor instead of twin seater at specified area.

32.26 Rear Luggage Booth & a luggage booth behind ROS tyres to be provided as per the drawing.

32.27 One 200 mmSS handle to be provided on outer side of driver door.

32.28 Stainless steel sheets, tubes, pipes etc. should be of Jindal make/any other source approved by APSRTC.

32.29 "Break any glass in Emergency "stickering to be displayed on rear saloon glass both in English and Telugu.

32.30 A slogan in Telugu to be exhibited as follows on the back side of Frontdestinationbox flap door.

1. టిక్కెట్టులేనిప్రయాణంనేరం, అందుకురూ. 500/- వరకుజరిమానా
2. ఈబస్సుమనందరిది!దీనినిపరిశుభ్రంగాఉంచుదాం!!

32.31 JK doors with pneumatically operated 63mm bore dia cylinders of Janatic make should be provided. The cylinders are to be placed on both sides of center foot board at Saloon floor area which are covered with Aluminum Chequered sheet box with trap doors fastened by tapping bolts.

32.32 On Dash board area front left side, where it is clearly visible to passengers, provide stickering of "Book Your Tickets Online @www.apsrtconline.in" in 3" of font size with "Times New Roman" lettering font.

32.33 One Amplifier of approved make i.e. AHUJA/SONY shall be provided.

32.34 Support pipe of SS 25x1.6 mm has to be provided at top of the 6seater area.

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32.35 LED Lights of 12 leads, 5W capacity are provided at luggage booths.

32.36 REMI make one electric fan of 24Vx 8" dia. shall be provided in cabin for driver.

32.37 Pneumatic operated JK doors with 63mmboredia cylinders of Janaticmake, should be on the flooring with Aluminum chequered sheet box having trap doors fastened by tapping bolts.

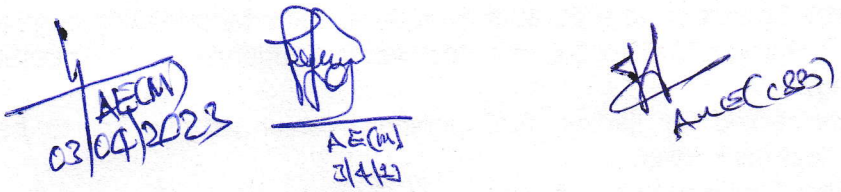
32.38 Dash board area visible to passengers, can be used for Book Your Tickets Online, www.apsrtconline.in

32.39 Tim machine box, Water bottle holders are to be provided at conductor seat area to Tress panel.

32.40 Peep window of size 250 X 250mm with sliding glasses at in front of driver door at crib level.

32.41 All Slogans &Stickering to be done as per the instructions from time to time given by APSRTC with in size of 25HX6T.

32.42 If there are any modifications in specifications are proposed during fabrication, it will be communicated by APSRTC from time to time and to be implemented immediately.



S.No	Drawing No	Description
1	CB22AEG112	Extruded AL sections
2	CB22CTG132	Chart for Sheet Specs
3	CB22DRG119	Driver door
4	CB22ERG122	EPDM rubber profiles
5	CB22JKG121	JK door
6	CB22LB115	Body lifting brackets
7	CB22LCG124	Luggage carrier
8	CB22LDG113	Ladder, unloader, platform
10	CB22CRB140	Courier box
11	CB22RVM140	Rear view mirror bracket
12	CB22SFUT131	Seat Frames
13	CB22SFUP131	Seat frames
14	CB22SWG131	Spare wheel carrier
15	CB22UBG114	Body U bolt
16	CB22WDG128	Window assy
17	CB22WSG138	Wind screen glass
18	CB22LBG115	Window guard rail bracket
19	SKETCH1916	Monogram
20	UT2260SG22104	
21	UT2260SL22101	
22	UT2260SR22102	
23	UT2260UF22103	
24	UT2460SG22304	
25	UT2460SL22301	
26	UT2460SR22302	
27	**UT**2460UF22303	
28	UT3060SG22204	
29	UT3060SL22201	
30	UT3060SR22202	
31	UT3060UF22203	

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SPECIFICATIONS FOR CITY ORDINARY BUS BODIES
HIRE BUS TENDER – 2024

1.0 GENERAL DESIGN:

The general design shall be a streamlined body with two passenger entrances on LH side i.e. one at front of front wheels another at rear of rear wheels without doors and passenger seats in 2x2 pattern.

2.0 REGULATION:

The general appearance, structure, seat layout etc., shall be in accordance with respective drawings. The bus body design should comply with the provisions of latest Central Motor Vehicle Rules, Andhra Pradesh Motor Vehicle Rules, Bus Body Code AIS:052 and any other statutory requirement that may come in to force during execution of fabrication work order. The coach interior shall meet the standard of IS: 15061-2002or latest amended one.

2.1 The firms shall possess Bus Body Accreditation Certificate issued by CIRT/ARAI/or any other Agency approved by GOI and shall be registered with APSRTC.

3.0 MAIN DIMENSIONS: (ALL DIMENSIONS ARE IN MILLIMETERS)

SL NO	CHASSIS MODEL –DESCIPRTION	AL 222"WB	TATA 224"WB	EICHER 230"WB
	Chassis Suspension : Front & Rear Weveller Suspension			
1	Wheelbase	5639	5700	5840
2	Rear overhang	3383(60%)	3420(60%)	3504(60%)
3	Front overhang	2265	1845	2370
4	Overall length (excluding bumpers)	11287	10965	11714
5	Overall width (structure)	2590		
6	Pillar centers (standard)	1130		
7	Window sill(waist rail)height from top of the cross bearer	610		
8	Waist rail height from Skirt level	1200		
9	Cant rail height from waist level	1130		
10	Interior saloon clear height	1900		
11	Clear aperture of passenger service door	650		
12	Clear aperture of Driver door	650		
13	Seating capacity	48+1 Driver	46+1 Driver	49+1 Driver

4.0 DRAWINGS: The list of drawings to be followed are shown at **ANNEXURE – I.**

5.0 MATERIAL: The fabrication of bus bodies shall be as per the specifications and the material shall be procured from the recommended sources/brands of material as mentioned in **ANNEXURE-II.**

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6.0 CHASSIS POSITIONING:

6.1 All chassis received by the firm for fabrication of bus bodies should be kept safely in a covered area. The Chassis should not be kept open to atmosphere without any protection to avoid damage to chassis and its units due to rain, dust and heat.

6.2 Before commencement of bus body fabrication, all important units of Chassis viz. Alternator, self-starter, radiator, tyres and batteries should be protected by providing suitable covering and disconnecting the wiring connections to Vehicle ECU and ABS ECU, Vehicle tracking unit protecting the wiring harness connection ends to prevent from damages that may occur due to welding, drilling, cutting, hammering, riveting, falling of metal scrap or dust entry during the course of fabrication. Driver seat, steering wheel, hand brake valves etc., shall also be protected from any damage or paint spray.

6.3 Chassis number on long members and identification plates provided by the chassis manufacturer shall be properly covered and protected before commencing the fabrication work.

6.4 The Ashok Leyland, TATA and Eicher chassis are supplied with following items as OE fitment.

1. Cabin floor
2. Bulk head structure (AL/EICHER)
3. Out riggers (AL/EICHER)
4. Anti-sag channel (TATA)
5. Bonnet and Front bumper(AL/TATA/EICHER)
6. Knitted Driver seat
7. Head lights E2
8. Front indicators E2
9. Tail Lamps E2
10. Battery cut off switch
11. Reflective warning triangles with stands
12. Wheel stoppers
13. Spare wheel carrier cage type/rope type
14. First aid kit
15. Tools as per CMVR
16. Rear view mirrors with brackets E2 plus 1 small mirror
17. Electrical horn
18. ELR safety belt

7.0 PROTECTIVE TREATMENT:

7.1 All Mild Steel components used for fabrication shall be carefully de- greased, de-rusted with three in one solution by dipping and wiped with dry cloth to remove all dirt/oil etc., Then the material shall be applied immediately (without any time lag) with Zinc Phosphate epoxy primer "Rust-O-Cap" (part no.24570608320) of M/s. Asian Paints or "*60 BT PRIME GREY*" of M/s.Akzo-Nobel Coatings before assembly.

7.2 All Aluminum Components shall be carefully cleaned with thinner. Bi-Metallic paint shall be used at joints of dissimilar metals. The interior and exterior panels should be cleaned with thinner and then self-etching primer shall be applied.

8.0 BODY STRUCTURE:

8.1 **Aluminum Structure**: All principal structural members should be in Aluminum extruded sections of Alloy designation 64430, 63400 and 65032, condition WP as per IS: 733– 1983. The structural joints shall be by riveting, bolting and combination of both. The rivets shall

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be of Aluminum alloy wire of IS: 740 – 1977. Alloy condition 64430 (HR-30) – OD.Aluminum 5-bar chequered plate with 3.0/2.0 mm base thickness shall conform to alloy designation 65032 and condition WP of IS:737 of 1986. All Aluminum sheets shall conform to alloy designation 19000, conditionH2 of IS: 737 of 1986.

8.2 Chart no. CB22CTG132 and Drg.no. CB22AEG112 (sheet 1&2) containing the details of specifications of Aluminum extruded sections and sheets to be used, shall be followed.

8.3 **Other Mild Steel / GI structural members**:Galvanized steel sheets should be as per grade 175 of IS: 277- 2018. Rolled sections should be as per IS - 2062 of 2006. The structural jointsshall be by riveting, bolting, combination of both and MIG welding in caseof MS/GI structural members. The welding should be for full length of joint. Welding slag to be removed and ground to smooth finish in order to avoid sharp edges.

8.4 All bolts used shall be of sizes reckoned in Metric system. The bolts shall be of high tensile hexagonal head bolts of fine thread, conforming toproperty clause 8.8 of IS: 1367 of 1979. The nuts of approved anti-vibrate type such as Nyloc conforming to IS: 1364 of 1983. All bolts nuts and washers should be galvanized. Each bolt and nut shall be provided with a flat washer. A spring washer should accompany every tapped bolt. The approved brands of bolts are TVS / STL / HINDUSTAN FASTENERS / KFL/ UNBRAKO/ IMPERIAL FASTENERS brands only.

9.0 PARTICULARS OF IMPORTANT STRUCTURAL MEMBERS:

Sl.no.	Description	Material
1	Cross bearers	Rolled steel channel ISMC 100x50x6 mm
2	Anti-sag bar	Rolled steel channel ISMC 75x40x6
3	Floor longitudes	GI'U'section25x75x25x3 mm thick(5 rows)
4	Pillars and horizontal supports	Indal 2654 section, All pillars including wheel arch horizontal supports shall be reinforced with formed 'U' inserts of GI sheet 3.0 mmthick.
5	Roofsticksandroof longitudes	Indal 2651 section (5 rows roof longitudes)
6	Crib rail and Seat rail	Indal 1756 section
7	Cant rail	Indal 2800 section
8	Waist rail	Indal 2613 section
9	Waist rail stiffener	Indal 3402 section & 3.0 mm Aluminum5-bar chequered plate 100mm wide with minimum joints one on LH side and two on RH side with in Wheel base
10	Panel stiffener	Indal 3405 section
11	Skirt rail	MS Angle 40x40x3 mm
12	Water channel a) On cant rail b) Front & rear-end	a) Indal 6250 section b) Hindalco WC-695 section
13	Step edge beading	Indal 5700 section
14	Flat beading	Indal 5505 section
15	Decorative beading at a) Exterior waist level front b) Interior ceiling	a) Indal 2721 section b) Indal 2684 section with plastic filler and ends
16	Window sections a. Window guide b. Split section 1 c. Split section 2 d. Sweep rubber	f. a. Hindalco 6482 section g. b. 'T' section h. c. 'F' section i. d. Hindalco 2691 section e. Indal 1752 section

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	Section e. Finger pull	j. Indal 1752 section
17	Wire casing	Indal 2735 section
18	Rub rail on body side	Hindalco SP-6551 on G.I formed "U" 2.00MM
19	Cleats & Brackets a) Roof structure b) Cant to roof stick and cant to pillar c) Side Structure	a) Indal 1760 section b) 'C'bracket formed in GI sheet 2.5 mm c) 'C'bracket formed in GI sheet 2.5 mm at wheel arches and Indal 1760 cleats
20	Roof grab rail brackets	Indal 9638 of 30 mm wide powder coated in grey colour
21	Gussets for Cross bearer to Pillar joint	ISMC 100 X50 GI

10.0 PRECAUTIONS:

10.1 Aluminum extrusions such as seat rail, crib rail, cant rail shall be joined with in wheelbase only.

10.2 "NEGATIVE TOLERANCES"are not allowed either for Aluminum Extruded sections, Aluminum sheets and GI sheets/tubes.

10.3 All holes in cleats and roof longitudes shall be PUNCHED to close tolerances. Under any circumstances drilling of holes is not allowed.

10.4 All welding shall be done with MIG welding process only. Under any circumstances, arc welding shall not be allowed. Welding of Stainless steel components shall be done with TIG welding process only with same grade Stainless Steel filler rod.

10.5 The following workmanship must be carefully followed during the fabrication.

- **i.** All castings must be truly formed and free from blow holes.
- **ii.** All bolts and rivets should be well fastened.
- **iii.** Rigid water test shall be carried before fixing the interior ceiling using pressurized water spray system. The fabricator shall equip water leak test facility confirming to IS: 11865-1982 at the firm for conducting leak test in two stages i.e., before fixing the interior ceiling and before dispatch of vehicle.
- **iv.** All welded joints must be chipped and well ground to get a smoothsurface and applied with Epoxy primer without any delay.
- **v.** Sharp corners shall be grounded and made smooth
- **vi.** Wherever pitch for rivets / bolts are not specified, it shall be 100 mm.
- **vii.** Bolt ends shall protrude at least 2 to 3 threads length above the nuts.
- **viii.** Roof stick, roof longitude, floor longitude and waist rail members shall butt properly at mating joints and shall not have gaps at the joints.
- **ix.** All tapping bolts such as grab rail, handles and assist rails etc., shall be tightened using thread lock adhesive of approved makes.
- **x.** Roof stick, roof longitude, floor longitude and waist rail notching to be done on power press only.
- **xi.** All fixed glasses shall be provided with ceramic coating of suitable width on periphery.

11.0 CAB UNDERFRAME STRUCTURE:

11.1 Cab under frame of Ashok Leyland 222" WB chassis shall be fabricated as per the drg.no.C2260UF22124. The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side of cabin shall be connected to the 1st cross bearer by providing a

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'Z' riser in GI sheet 3.00 mm. On LH Side, a raised wheel arch box shall be provided on front wheel duly fabricating in MS flats 40x6 mm and MS angles 40x40x6 mm. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.2 The Tata 224" WB chassis shall be fabricated as per the drg.no.C2460UF22324. The cabin floor longitudinal members shall be connected to a 'Z' raiser in GI sheet 3.00 mm provided on 1st cross bearer to make up the height difference of cabin and saloon floor. Suitable wheel arch boxes in rectangle shape fabricated in MS flat 40x6 mm and MS angles 40x40x6 mm shall be provided. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.3 The Eicher 230" WB chassis will be supplied with OE cab floor, bulk head structure, out riggers, driver seat and engine bonnet. The cab under frame shallbefabricated as per the drg.no.C3060UF22224.The OE structure shall be retained and modified accordingly to suit the fabrication. The cabin floor shall be made in line with saloon floor except at wheels. The OE floor on RH Side of cabin shall be connected to the first cross bearer by providing a 'Z' riser in 3.00 mmGI sheet. On LH Side, a raised wheel arch box shall be provided on front wheel duly fabricating in MS flats 40x6 mm and MS angles 40x40x6 mm. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

11.4 The dashboard frame shall be fabricated in MS angle 40x40x6 mm to the required profile and covered with GI sheet of 0.91mm thick. Flap door with suitable stainless steelhinges and stainless steel tower bolts shall be provided for easy access to fuse box, radiator,power steering reservoir and clutch oil container.

12.0 BODY FRAME STRUCTURE:

The bus body frame structure should be fabricated as per the following drawings.

ASHOK LEYLAND 222" WB chassis – C2260SL22127 and C2260SR22128.
TATA 224" WB chassis– C2460SL22327 and C2460SR22328.
EICHER 230" WB chassis– C3060SL22227 and C3060SR22228.

12.1 The cant rail at the passenger entrances and driver door area shall be reinforced with GI sheet formed channel in 2.0 mm thick and the joint of cant rail should not be exactly on any pillar or within door bay.

12.2 A & B pillars on both sides shall be provided in GI 3 mm thick formed section similar to Indal 2654. First and second roof sticks connecting A& B pillars shall also be provided in GI formed section similar to Indal 2651 in 3 mm thick. All the structural members in this bay (Waist rail, Intermediate rail and roof longitudes) shall be in GI formed sections of 3 mm thick with dimensions of corresponding Aluminum Sections.

12.3 An opening of size 250 mm x 250 mm, fabricated in MS angles 40x40x6 mm, finished with flat beading in Indal 5505 and a flap with ball catcher shall be provided at fuel oil tank mouth.

12.4 MS tapping plates in 30x6 mm flat of 200 mm length shall be provided wherever tapping is to be done for fixing body components such as roof continuous beam, roof hand grab rail, window guard rail, assist rail, drivers' partition, windows etc..

12.5 Cant rail on both sides full length shall be reinforced with MS angle30x30x3 mm. This angle shall be riveted to pillars flanges at cant level and connected to the cant rail duly providing two GI plates of size 75x30 mm of2 mm thick welded to the angle and riveted to cant rail in every bay.

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13.0 CABIN AND BODY MOUNTING:

13.1 The OE Cabin floor and mounting arrangement shall be retained. The remaining portion of cabin floor has to be fabricated by connecting 1st cross bearer and OE floor shall be fabricated as per drg. no. C2260UF22129for AL 222" WB, C2460UF22329 for TATA 224" WB and C3060UF22229for Eicher 230" WB chassis.

13.2 The OE anti-sag members shall be retained. If the chassis are not supplied with the anti-sag members, a 3-piece anti sag channel in ISMC75x40x6 mm shall be provided at front end of the chassis bottom frame connecting to the 'A' pillars on both sides.

13.3 Additional Out riggers in MS angles 50x50x6 mm shall be provided connecting 'B' pillars to the chassis long members with properfitment. The body should be mounted on the chassis web duly providing 6 mm(inverted pressed "L" type) MS plate as per the size shown in the respective drawings over the chassis long members. These "L" plates shallbe bolted together at every cross bearer mounting to Long member webwith M12x 50 H.T. bolts at least 4 nos. per plate. OE holes on the chassis long members shall only be picked up for mounting this plate. Wherever the OE holes are not available for bolting of web mounting plate, holes shall be drilled on the web 40 mm below the top level of long member with prior approval of competent authority.

13.4 Over these plates, cross bearers in ISMC 100x50 channels shall be provided as per the respective drawings. If the web mounting plate position at rear wheels coincide with rear spring bracket, the cross bearers shall be fastened with 16 mm dia. "U' bolts of approved make and with 150mm x 6 mm thick base plate welded to the bottom of cross bearer. Spacers made of Aluminum casting shall be placed between bottom flanges of chassis long member and "U" bolts. The "U" bolts are to be made out of EN-15/14B steel as per IS 5517-1978 (Tensile strength 80 kg/Sq.mm minimum). The "U" bolts should be galvanized and fitted with galvanized nyloc nuts as per drg.no. CB22UBG114. The length of bolt shall suit the depth of chassis long member and should not project more than 6 mm after tightening the nuts.

13.5 In ASHOK LEYLAND and EICHER vehicles the front bulkhead ends are to be connected to the A-pillar of the body duly giving the support. In ASHOK LEYLAND and EICHER vehicles a tie bar in front of radiator in 3-piece in ISMC 75x40 connecting A-pillars on both sides and chassis long members shall be provided. This tie-bar to be mounted on MSL 50x50x6 mm angle 'L' brackets connected to the chassis long members.

13.6 The body mounting must be easily detachable from the chassis during major overhauls. Pillar gussets on four sides of the body shall be provided with 32 mm dia hole to facilitate lifting of the body during major overhauls as per drawing no CB22LB115.

14.0 CABIN AND SALOON FLOOR:

14.1 The cabin and saloon floor shall be in Aluminum5-bar cheq.plate of 3.0 mm base thickness conforming to alloy designation 65032, Temper WP of IS: 737-1986. The cheq.plate should be riveted with MS rivets of 5mm dia. to the floor longitudesatapitch of 100 mm and in Zigzag manner atjoints. The cabin area and wheel arch boxes shall be riveted at 75 mm pitch. The riveting on crib rail shall be done with 6 mm Aluminum alloy solid rivets of HR – 30 and condition OD as per IS: 740-1977.Intermediate bolting with M8 bolts shall be done on cross bearers and wheel arch frames.

14.2 The wheel arches shall be made rectangle shape. The height of wheel arch box frame shall be 160 mm minimum from top surface of the tyre.

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14.3 The number of cheq.plates used for cabin and saloon flooring should be least in order to keep the joints at minimum possible. The floorcheq.plate shall be joggled at crib level to get proper seating.

14.4 In TATA and EICHER vehicles an inspection cover fitted to a frame in under frame with tapped bolts to be provided in saloonfloor over fuel tank suction pipe of size 250x250 mm.

14.5 The floor longitudes should be in five rows excluding crib rails. They should be arranged in such a way that the seat legs are fixed on the floor longitudes. Dust proof rubber packing of EPDM quality, in 2 mm thick shall be provided at the joints and ends of chequered sheet to avoid entry of water / dust in to the saloon from the joints. The floor cheq.plate laying shall ensure dust proof. Floor longitudes shall be provided wherever necessary for floor plate joints and stanchions.

14.6 Trap door of 580x 520 mm size must be provided in cabin flooring above gearbox with proper sealing and M6 tapping bolts.

14.7 Four drain holes of 25-mm diameter shall be provided in saloon flooring corners below seat frames, provided with bottom extension of 75 mm length ERW pipe for draining of water while washing.

14.8 In TATA Vehicles, an Inspection cover has to be provided in saloon under frame with tapping bolts for Water separator with a size of 250 X 250 mm.

15.0 BODY PANELING:

15.1 The exterior portion of body i.e., sides, front end, rear end, mud wings and roof exterior should be in Aluminum sheet 1.22 mm thick of alloy designation19000 and condition H2 of IS: 737 of 1986.

15.2 Front radiator grill is to be provided in 2 mm thick GISheet (A/Leyland type) for Eicher and TATA vehicles.

15.3 Truss panel for body sides:Full height truss panel between waist to crib rail for entire length of body and at rear end including corners shall be provided in stainless steel sheet of 0.7 mm of 430 Grade and in scotch/mirrorbright finish. These panels shall be riveted with 5 mm Aluminum alloy solid rivets to the structural members at waist rail together with 5 bar Aluminum chequered sheet and Indal 3402 stiffener at a pitch of 100 mm in zig-zag manner. The riveting pitch on seat rail and crib rail shall be 75 mm. The riveting pitch on pillars shall be 100 mm.

15.4 Roof structure reinforcement:The roof structure above on each door opening i.e., passenger entrances &driver doorbetween roof longitude and cant rail shall be reinforced with a truss panel of 0.91 mm thick GI sheet and shall cover three bays. The GI sheet in single piece has to be formed to the required contour of roof prior to the assembly and shall be riveted to the roof longitudes and cant rail lower flange and also to the MS angle 30x30x3 provided above cant rail between 'C' brackets with MS flat head rivets at a pitch of 100mm.

15.5 The roof exterior sheet with 1.22 mm thick AL for center portion should be in full length of body and laid longitudinally in one single piece of 1220 mm wide. The riveting should be done on the roof longitudes in ZIG-ZAG manner. The exterior sides (LH & RH) of roof sheets with 1.22 mm thick AL have to be provided in single piece as required. The riveting on cant rail, front and rear end roof sticks should be with flat beading Indal 5505. The overlap of roof exterior panels should be equal to full width of roof longitude section and should be riveted by5.0-mm dia. Aluminum alloy solid rivets (HR-30) at a pitch of 75 mm in two rows ZIG-ZAG manner. While riveting roof side sheet on cant rail, an Aluminum sheet of 1.6 mm thick and 75 mm wide full length of cant rail shall be provided on the cant rail for pasting top fixed glasses. The sides of roof shall also be provided with water channel in Indal 6250 and shall be riveted along with flat beading Indal 5505.

15.6 PU sealant has to be provided at overlapping portion of roof panel jointsto avoid water leakages. Theedges along the roof joints shall also be applied with PU sealant for fillingup the gaps. Roof joints should be water leak proof. Approved make weather shield strip of 150 mm wide and 2 mm thick shall be laid longitudinally covering roof center joints from front end to rear end to avoid water leakage from roof.

15.7 Exterior of roof sticks and longitudes shall be provided with expanded polyurethane sheet (Heatlan) of 6 mm thick.

15.8 The interior roof up to cant should be in Aluminum sheet 0.91 mm thick of alloy designation 19000, condition H2 of IS: 737 – 1986.

15.9 The interior vertical finishers for pillars, horizontal finishers for windows at cant level, waist level and finishers for intermediate rail shall be in 0.5 mm stainless steel of 430 grade and scotch /mirror bite finish. The finishers are to be pasted to structural members with PU sealants. There should not be any waviness in finishers and the sealant should not drip through the joints. All the horizontal finishers shall be in single piece per two bays and the overlap joints on pillars only. To avoid the expose of sharp edges and waviness of the SS sheet used, the inner edge of the finisher is to be bent inside and to be provided with suitable PVC 'U' beading.

15.10 The overlap joint for roof interior ceiling panels should be on the roof sticks. The overlap of the roof panels should be equal to the full width of roof stick section and should be riveted by 4.76 mm dia. Aluminum alloy multi grip blind rivets at a pitch of 100 mm. Riveting should be done on roof longitudes and cant rail also.

15.11 Interior ceiling panel joints on every roof stick, cant rail and on all sides of door openings shall be provided with decorative beading Indal 2684 as per drawing with plastic filler and end covers.

15.12 Formed 'Z' section of Aluminum sheet 1.22 mm (size 25x45x25mm) shall be provided on waist rail which shall be riveted to waist rail duly overlapping the exterior body panel at a pitch of 100 mm. The ends of 'Z' section shall be bent vertically upwards to overlap the pillar web. Suitable 30x3mm thick balata packing shall be provided below the 'Z' section to match the height of rivet heads of waist rail. Ends and corners shall be applied with P.U.sealant to avoid seepage of water in to saloon.

15.13 An Aluminum sheet formed 1.6mm thick 'Z' section (30x8x30mm) shall be riveted to intermediate rail with Aluminum flat head rivets of 5 mm to facilitate bonding of top fixed glass.

15.14 Two rows of panel stiffeners in Indal 3405 should be provided at seat rail level and in between crib rail to skirt level.

15.15 The exterior body panels from waist to skirt should be without joints in 1.22 mm thick Alu. Sheets of alloy designation 19000, condition H2 of IS: 737 of 1986.The vertical butt joint of panels should be on Structural members and to be pasted with two sided VHB tape of 3M make on all sides i.e., vertical joint, on waist rail and on skirt rail and approved make sealant of 'metal tometal' type. End portion of panels at wheel arches and skirt rail shall be folded inside by 20 mm and should be fixed with flat beading and Alu. alloy head solid rivets of 5.0 mm dia. at a pitch of 100 mm.

15.16 At Rear end exterior from waist to skirt and between end pillars shall be provided with Aluminum sheet 1.22 mm sheet in single piece. This panel shall be bonded to the rear end structure with PU sealant of Metal toMetal type and VHB tape of 3M make.The rear end saloon glass frame shall be covered with 0.91mm finishers from outside and 0.5 mm stainless steel sheet from inside. Body structural members and Aluminum sheet surfaces where the sealant has to be applied shall be cleaned thoroughly for oil/dirt etc., before applying sealant.

15.17 The body sides have to be provided with rub rail in Indal 2676 with EPDM rubber insert with end covers on 2mm GI sheet formed in U 30x60x30x2mm size. The rub rail ends shall be black powder coated.

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15.18 The front end exterior panels shall be provided with decorative beading Indal 2721 at waist rail. The beading shall be anodized and fixed with blind rivets. The rear end waist level shall be provided with Aluminum flat beading (Indal 5505) with blind rivets.

15.19 The exterior corner dooms both at front and rear on off side and near sidefromcant rail to waist and waist to skirt rail shall be provided in 0.91 mmGI sheet over laid with Aluminum sheet of 1.22mm thick and Indal5505 beading on full length of pillars.

15.20 The area between exterior and interior panels of waist rail to crib rail in side structure,cant rail to cant rail in roof structure shall be provided with 40 mm thick Thermocole insulation.

16.0 FOOT BOARD:

The foot board structure at front and rear as shown in the drawing shall be in three steps built in MS. Angles 40x40x3 mm and over laid with 2.0 mm Aluminum 5-bar chequered sheet on sides and3.0 mm base thickness on tread and riser portion. The footboard should be given a support under the lowest tread by providing a 'U' type bracket made of MS angles 40x40x6 mm. The arms of 'U' bracket should be 230 mm long and secured to pillars with M10x 4numbers bolts on each pillar.Step edge beading in Indal 5700 shall be provided along the edges. The bottom tread height from ground shall not be more than 400 mm. The tread depth should not be less than 300mm. Maximum step height allowed is 250 mm.

17.0 WHEEL ARCH FRAMES AND BOXES:

The front &rear wheel arch box frames should be fabricated in MS angles 40x40x6mm and M S flats 40x6 mm in rectangle shape. The height of box frame shall be 160 mm above top surface of the tyre. The boxes shouldbe designed to accommodate 10.00 x 20 size tyres. The wheel arch box frames has to be covered with 1.6mm GI sheet and followed by 2mm Alu. 5-bar Chequered sheet in single piece instead of 3mm Aluminium 5-bar chequered sheet. Step edge beading shall be provided at the riser and along the edges of wheel arch.Mudguard shall be provided in1.22 mm thick Alu.Sheetroundlyalong wheel arch area with proper clamping and a clear gap of 100 mm from the edge of tyres.

18.0 DRIVER'S PARTITION:

The driver's partition shall be fabricated with30 x30x1.6 mm stainless steel tubesas per drg.no.CB22DRG119. It should be fixed behind driver seat and shall be supported on structural members duly reinforced in the floor as well as roof. The minimum distance from the Bonnet to partition wall shall be as per seat layout drawing. A timing board of size 400 X600mm shall be provided in Aluminum sheet 1.22mm duly painted white. The board should be provided in a sliding channel frame on 3 sides made of Indal 3620 section and fixed to the partition on saloon side.

19.0 DESTINATION BOXES AND BOARDS:

19.1 LED destination boards of size 270X960 mm of approved make Micro Craft/MG Grey Engine shall be provided **at front and rear** end of bus with proper tapping & secured clamping and as per UBS-II specification with built in controller and LCD display for front LED destination board with a provision of numbers from 0 to 9 and Up & Down buttons to select service number & route. Communication cable to be provided from Front master LED board to rear LED board for display of same route course details in both the boards.

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19.2 The side destination box shall be in first 1130 mm bay on LH side at window top fixed glass area after passenger entrance.

19.3 One flap door in 0.7 mm stainless steel sheet in size 1180 mm x330 mm is to be riveted with Stainless Steel piano hinge for full length at bottom and to be blind riveted on intermediate rail in 1st1130 mm window after passenger entrance on LH side of body. Bracket in indal 3620 is to be fitted on inner face of the door for holding the destination board of size 910 mm x210 mm. LED type light to be provided for illumination. Two locking latches and chain in stainless steel are to be provided on both sidefor locking the door and to hold it at convenient angle to change board. E 1 tower bolt has to be provided at middle of top centre and E 1 at centre areas on both sides for side destination board door.

19.4 Six destination boards in 0.91 mm thick GI sheet have to be supplied along with the vehicle duly painted in white color.

19.5 The side destination board shall be illuminated by LED lights of 600-mm length of approved design and made with luminosity of 150 to 200 lux.

20.0 CONTINUOUS BEAM:

A longitudinal continuous beam in pressed top hat section with 2.0 mm thick GI sheet similar to roof stick profile should be provided. This beam in inverted position shall connect all the roof sticks from front end to the rear as shown in the seat layout drawing. The joints should not be more than three with reinforcement using 30x25x2 mm thick, 50 mm long 'U' channel welded at joints from inside. There should not be any mismatch at the joints, welded joints to be ground for even surface and ends should be tapered to a length of 150 mm. Reinforcement is to be provided in thebeam with30 x6mm in 200 mm length flats for fitment of stanchions.This beam should be provided with M6 tapping bolts at every roof stick on both sides and the remaining beam should be riveted in Zig–Zag manner with 100 mm pitch.

21.0 STANCHIONS:

Four stainless steel tube stanchions in 304 grade of 38 mm OD x 1.6mm thickness as per IS: 6913-1992 should be provided in between the saloon continuous beam and saloon floor as per seat layout plan. SS Flat 4 mm with 3 mm balata packing shall be provided at bottom ends of the stanchionsand SS 40x40x4 mmangle on roof continuous beam.The stanchions have to be fitted on floor longitudinal members and to roof continuous beam with M6 size through bolts. The stanchions shall be fitted rigidly with dome nuts.

22.0 CONTINUOUS ROOF HAND RAIL:

Two rows of continuous roof hand rails (grab rails) in stainless steel tube in 304 gradeof 25 mm OD x 1.6 mm thick and 2B finish has to be provided as shown in seat layout drawing. These hand rails are to be provided with18 nos. of plastic molded swiveling type hand holds with nylon ribbon arm slings in Green/Yellow color, one per bay. Ends of these pipes shall bejoined together duly inserting a pipe of 100mm long. The intermediatesupport brackets ofIndal 9638 powder coated in grey color shall be used.

23.0 WINDOW GUARD RAIL:

Two rows of window guard rails ofstainless steel tube in 304 grade and 2B finish of 20mm OD x 1.6 mm thick as per IS: 6913-1992 have to be provided from outside on both sides of the vehicle at a height of 75 mm and 175 mm above waist level. The pipes shall be bolted to the pillars with M6 bolts and intermediate end sockets as per

drg.no.CB22LBG115.Tapping plates in MS flat 30x6 mm x 125 mm long shall be provided inside the pillar for fitment of guard rails.

24.0 CABIN FRONT WINDSCREEN, SALOON REAR GLASSES AND WINDOWS:

24.1 The cabin front-end shall be fitted with two-curved windscreen glasses of size 1220x1020 mm. The windshield glass frame assemblies shall be made in MSL 25x25x3 mm to match the profile of the curved glasses. The windshield frames shall be provided between front cant rail and dash structure duly welded on all sides. A center post reinforcement of formed 'U' section in GI sheet 25x75x25x3 mm shall be provided duly welding on the dash structure and front cant. The complete frame including center post from inside shall be covered with 0.5 mm stainless steel in scotch brite finish and to be covered with 1.22 mm Alu. sheet from outside.

24.2 The curved laminated glasses shall be of 5.76 mm thick with minimum 0.76 mm PVB film, select float quality, safety clear WAVE FREE as per IS: 2553 – 1971 and to be fitted with 47.5 mm EPDM synthetic rubber extruded section. The approved brands for glasses are DURASAFE, DURATUF, ATULTEMP, REALSAFE, SEKURE, SEKURIT, GSC. All corners of windshield glasses shall be provided with clamps in Alu. sheet 1.6 mm in black powder coating/readymade to be use.

24.3 The saloon rear end glass shall be bonded to the MS angle 30x30x3 mm frame provided in the rear body structure with P.U. Sealant. The single piece glass shall be of 1760 x 800 mm size in 5.0 mm thick, toughened safety clear glasses as per IS: 2553 – 1990 & IS: 2835 – 1987. The lettering work to be done on the glasses and at cant level as mentioned below with in size of 50 mm:

"BREAK ANY GLASS IN EMERGENCY FOR EXIT"

In Telugu:

" అత్యవసర సమయంలో ఏ అద్దమునైనను పగులగొట్టుము"

24.4 The window frames in Hindalco 6482 extruded section as per drawing CB22WDG128 shall be provided between waist rail and intermediaterail.For a standard bay of1130 mm, the window frame size shall be 1125 x 673 mm. The window frame shall have two horizontal sliding glasses of 600x540 mm size with flock channel of EPDM rubber quality. The area between cant rail to intermediate rail shall be provided with a fixed glass of size 1127x450 mm.

24.5 The glass shall be bonded to the 1.6 mm Aluminum sheet on cant rail and1.6 mm Aluminum sheet 'Z' flange on the intermediate rail by applying Metal to Glass type PU sealant of approved make/ brands. The window glasses shall be of 5.0 mm thick toughened float quality, safety bronze tinted glasses as per IS: 2553 - 1990 & IS: 2835 – 1987. Window frames shall be black powder coated.

24.6 The edges of all sliding glasses shall be ground, chamfered and polished to smooth surface.

24.7 All window frames to be provided with corner cleats with flat rivets besides welding to the window corners. They should be fitted with M6x30 mm CSK head screws-2 nos. on each vertical side on pillars Galvanized MS flat 30x6 mm tapping plates shall be provided on pillars. Four drain slotsof 50X3 mm size shall be punched on bottom side of window frame to drain out water collected in frame grooves.

24.8 All sliding shutters are to be provided with finger pulls in Indal 1752 section 100 mm long powder coated in black colour.

24.9 AllSeat frames MS pipe at welding portion should be cup cutting in order to facilitate full welding at joints instead of pressing.

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24.10 Vertical overlap of window frames on pillars shall be provided with asealing rubber profile as shown in the drawing. The fixed glasses are to be secured intact.

24.11 Approved makes of EPDM rubber profiles or Rubber Extrusions &Moldingsare ASP/ALP/Sri Venkateswara, Bangalore and any approved make of APSRTC.

24.12 Approved makes of P.U sealants are Total seal /Sikaflex/3M India/Bostik /Anabond and Henkel.

25.0 PASSENGER ENTRANCE, ASSIST RAILS AND DRIVER'S DOOR:

25.1 The passengerentrances cum exits areto be provided on LHS side as shown in the drawings.

25.2 At Front & Rear entrances on both sides of step well, assist rails in stainless steel tube of 304 grade in 32 OD x 1.6 mm thick shall be fitted from roof stick to floor with approved make. SS Flat 50X4 mm with 3 mm balata packing and tapped bolted to the tapping plates provided in roof sticks at top and on cross bearers at bottom. Two horizontal support pipes and one diagonal support pipe in stainless steel tube of 304 grade in 32 OD x1.6 mm thick shall be provided on both sides of step well. The pipes shall be fitted with SS Flat 50X4 mm with 3mm balata packing. If the bolts protruded outside of the sockets, they shall be provided with steel doom nuts.

25.3 **DRIVER'S DOOR:**The driver's door should be provided with full drop sliding glass type between top and bottom duly extending up to floor level as per sketch no.CB22DRG119. The window frame shall be in Hindalco 6482 section as per the window design. The door shall have Oneheavy-duty door lock of MSL make only with outer handle, one locking latch from inside, striking plates and dovetail catches. The door shall be fitted with two forged hinges on 'A' pillar. Driver door frame shall be provided with one horizontal bar in stainless steel 25x1.6 mm pipe from inside for holding.

25.4 **PARTITION FOR LADIESSEATS**:OnePartitionhas to be provided in the saloon with sliding door in the gangway after ladies marked seats as per the Drg.CB22LP001.

25.5 **PASSENGER SEATS:**The seat layout plan and seating arrangement shall be as per the respective drawings.no.C2260SG22125 for AL, C2460SG22330 for TATAand C3060SG22225 for Eicher.

25.6 **SEATFRAMES:**The seat frames for single and twin seater shall be as per the drg.no.CB22SFT140. The legs of seat frames should be located on floorlongitudes and seat rail only. Belting fabric 3 mm thick (one piece) shallbe provided in between the floor and seat leg foot piece. The seat legs shall be fastened with M8X1.0 hexagonal head H.T.bolts using plain washers and nyloc nuts. Seat backrests shall have a provision for advertisement .The seat frames should be powder coated. Ladies seat frames should be yellow powder coated separately.

25.7 **SEAT BOTTOM CUSHIONS:**Seat bottom cushions shall be provided in P.U. molded foam conforming to grade "J" of IS: 8255 – 1976. The density of PU foam shall be between45 to 50 kg/cu.m. And indentation hardness shall be between 15-17 Kgf at25% deflection.

Sizes:	Twinseater	: 813 x 380 x 90/65 mm
	Single seat	:420x 380 x 90/65 mm
	Five Seater	: 1990x 380 x 90/65 mm
	Six Seater	: 2440 x 380 x 90/65 mm
	Conductor seat	: 500 x400 x 90/65 mm

The cushions to be mounted on 8.0 mm thick ply wood conforming to Grade-MR, type-AA, as per IS: 303 – 1989. The upholstery shall be with expanded vinyl coated fabrics as per specifications at ANNEXURE:-II.

25.8 The color of Rexene shall be in charcoal grey with prior approval of CME(C&B) only. The bottom plywood shall have 4vent holes of 10 mm dia. per passenger seat. The

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bottom of plywood should be pasted with 1.0 mm thick ABS panel. The bottom cushion should be fitted 25 mm ahead of seat frame front end.

25.9 SEAT BACK SQUABS: The PU molded foam back cushion of 30mm base thickness as shown in the drawing and conforming to grade "E"of IS: 8255-1976 shall be mounted on 8.0 mm thick plywood of grade – MR, type-AA, of IS: 303-1989 and upholstered with same expanded vinyl coated fabric mentioned above.

Sizes:		
	Twin seater	: 813x455 x 30 mm
	Single seat	:420x455 x 30 mm
	Conductor seat	:500 x455 x 30 mm
	Five Seater	: 1990 x 455 x 30 mm
	Six Seater	: 2440 x 455 x 30 mm

The back of plywood shall be pasted with 1.0 mm ABS sheet of matching shade.Seat back rests shall have a provision for advertisement.

25.10 All upholstery work shall be carried out with 3mm piping at all joints. A margin of 12 mm shall be provided for Rexene along the stitching lines and double stitching to be provided duly folding the Rexene edge by 6mm. The tacking of Rexene to plywood to be by folding the Rexene by 12 mm with a pitch of 50mm in between nails.

25.11 A sample seat shall be produced for approval of Chief MechanicalEngineer (C&B) before manufacturing in bulk and fitting in the vehicles.

25.12 The sewing thread makes to be of "MODI/COATS", variety no.38 as per IS: 1720-1978.

26.0 DRIVER'S SEAT:

26.1 The OE knitted type driver seat supplied with chassis shall be retained. The driver seat frame mounting on cabin floor shall match the OE mounting position.

26.2 In case of non-supply of OE knitted driver seat with the chassis, HDPE knitted driver seat of approved make shall be fitted. The seat shall have fore and aft, up and down adjustment of 100mm with reclining back and to be fitted 350 mm away from steering wheel edge when the seat is fully forwarded.

26.3 The height of driver seat bottom shall be 450 mm when measured in fully lowered position.

26.4 There shall be a thigh clearance of 200 to 260mm between steering wheel edge and driver seating position.

26.5 The driver seat shall be so located that the center line of driver seat shall be 705 mm away from the center line of body.

26.6 The driver seat shall be provided with "ELR" type safety belt of makeAutoliv/Rane/any other make approved by APSRTC (conforming to AIS- 052).

27.0 BATTERY BOX:

27.1 The battery box shall be provided on LHS side below floor level to accommodate two no's 12V batteries of size521Lx292Wx248H mm with slider arrangement. The battery box is to befabricated with MSL 40X40X6mm and MS Flat 40x6 mm and is to be paneled with 0.91 mm GI sheet on floor and three vertical sidesfollowed by Hammertone coating and the bottom of the box shall be provided with 12 mm compressed chequered plywood.

27.2 Complete Interior surface of the battery box is to be overlaid with 0.5 mm stainless steel sheet of 430 grade. The bottom of the batteries shall be provided with 12 mm-compressed plywood and acid resistant rubber mat. Batteries shall be provided with suitable clamping, wood packing to prevent vibrations when the vehicle is in operation. One cutout is to be done on longitudinal wall for passage of battery cables and is to be provided with 6 mm balata with an 'X' type cutting. Four rows of full-length battery cables

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without joints shall be connected to the battery cut-off switch terminalsto self-starter and batteries. The terminals and cables should be firmly clipped in position with cable tie and soldered. One LED light shall be provided in Battery Box for illumination. One guard rail of SS 25 X 1.6mm pipe with brackets to be provided at front side to safeguard them.

28.0 ELECTRICAL WIRING AND OTHER FITMENTS:

The earth return system of wiring should be used. All automotive cables used shall be of IS: 2465 – 1984 quality covered with PVC sleeve as per IS: 1951-1961. Wherever the cables have to pass through roof and side structures, PVC conduits of ½" dia shall be provided. There shall not be any loose or hanging cables, and if they pass through holes in panels or structural members other than roof and side structures, rubber grommets shall be provided in the holes of such panels and structural members and shall be securely clipped as near as practicable to such rubber grommets to avoid chaffing.

28.1 All wiring in saloon shall be carried through Aluminum extruded section Indal 2735 wire casing in two rows along the cant rail offside and near side in such a way that it shall be easily accessible at all points without the need to strip major paneling of body. The extruded section shall be so located and fitted as not to affect the appearance of body. Any wiring which has to run along the chassis frame shall be securely, clipped to ensure that there shall be no chaffing with any of the moving parts.Further care shall be taken to route such wiring in such a way that it is not subjected to splashing of oil, water, mud etc..

28.2 The battery main cable of size 398/0.40 mm shall be provided as required duly using good quality lugs with proper soldering, bolting and insulation etc.,there shall be no joint in battery cables.

28.3 The saloon and cabin are to be provided with 8 nos. of 390 X130 mm longLED light assemblies of approved makeandas per layout drawing.

28.4 All OE electrical fitments shall be retained and kept in working condition. Any extension of wiring harness should be done by providing male-female connectors only. Tapping of power for saloon lighting etc., shall be taken from the OE female sockets provided by the chassis manufacturers. There should not be any tapping of power by slashing the main harness.

28.5 The OE wiper machine, arm and blade supplied with the chassis shall be provided at cant level. Washer tank, if included in the system and supplied with chassis, is to be fitted on left side of front end structure at a convenient location. In case wiper assemblies are not supplied with the chassis, 17 W Lucas TVS electrical wiper machine with E 2 blades of 610 mm length (min) shall be provided by the fabricator.

28.6 One single tone Air horn of CEETEE model of Roots/ELGI make shall beprovided.In addition to the OE electrical horn, one more electrical horn conforming to type -3 of IS 1884- 1993 shall be provided for AL vehicles. The noise levels of these horns should be between 93 dB to112dB.

28.7 Modular switches as per IS: 9433 –1980, 230Vx5 amps shall be used. A 6-pole disc type fuse box with independent fuse designated for every electrical circuit shall be fitted on switch board provided at cant level. Maximum current capacity of any circuit shall not exceed 15 Amps.

28.8 The current carrying capacity shall be 1.5 times the load current of the electrical circuit. The fuses used shall confirm to IS-4063 /1982. Switches and fuse box are to be fitted on hylam/decolam sheet of 3 mm thick and to be fitted on sunken tray located above the driver door with non-metallic shielding to avoid short circuits.

28.9 Cable ends shall be suitably crimped/soldered with lugs so as to with stand vehicle vibrations. The inter connections shall be made through couplers/junction boxes /terminal

blocks only. Weather proof connectorsshall be used for connecting cables which are exposed to atmosphere to avoid water/moisture ingress during use.

28.10 Two additional head light assemblies of 8" dia with suitable reinforcement for fitment on front end structure, are to be provided along with OE head lamp assemblies on A/L buses. Four round type headlights ofapproved make shallbe provided on Eicher and Tata vehicles with proper reinforcement structure for fitment. They shall be fitted at a distance not more than 400 mm from the extreme outer edge of the body and not more than 1200 mm height from the ground.

28.11 In Ashok Leyland buses, OE front direction indicator lamps shall be retained and to be provided below 1500 mm height on the outer edge of body in amber colour. For TATA and Eicher buses, approved type frontindicators shall be provided.

28.12 In addition to this, four LED type direction indicator lamps (flat type) in amber color shall be provided on the lateral side of the body at wheels and below 1500 mm height from the ground.

28.13 And E 1 AMW type indicator light to be provided on both sides abovefront wheel arch area.

28.14 LED type height marker lamps in white color at front and in red color at rear shall be provided. The marker lamps shall be above windshield glasses at front and above cant level at rear on maximum possible outer edges.

28.15 LED type tail lamps in 5" dia, 4no's on each side (Two -red, one-white and one –amber) shall be provided. The mounting shall be below 1500 mm from ground and 400 mm from the outer edge. The red lights shall have individual circuits for parking and brake lights.

28.16 Rear number plates shall be provided with LED type light assembly of 300 mm lengthin Rear bumper.

28.17 Electricalside flashers of LED type flat type in ambercolourshall be provided at cant level on all four corners.

28.18 OE battery cut-off switch supplied with chassis shall be provided withseparate fuse control. In case of non-supply of battery cut-off switch along with the chassis, IGSA-552 or part no. LP-134/3 of Lucas India Services Ltd., make shall be fitted in driver cabin with a label "Battery Cut-off switch". The battery cut-off switch to be located 300mm above the cabin floor on 3.00 mm GI plate provided in side structure.

28.19 One 12VConverter has to be provided at conductor seat area on intermediate rail for connecting TIMS. One LED type light with separate switch of approved design shall be provided at conductor seat.

28.20 Six 6" dia speakers of Boston (Si-600) or Pioneer (TS 1641 GS) make shall be provided. The speakers shall befitted to roof.

28.21 One reverse gear horn/alarm (4 tones) shall be provided with noise level not more than 100 dB if not supplied with the chassis.

28.22 All LED type lights shall comply with the specifications.

28.23 In the driver cabin, Instrument panel with all gauges, OE switches &Indicators with labels shall be provided at 45-degree angle and shall be in the reach of driver from his seat. The frame shall be fabricated in MS angle 25x25x3 mm covered with 0.91 mm thick GI. Sheet.

28.24 Power for connecting Wiper, Indicatorsand Fog lamps shall be drawn from the OE Fuse box supplied by Chassis manufacturer only duly providing male/female sockets.

28.25 Never connect the circuits with twists & knots. Never tap power by slashing the main harness.

29.0 BODY PAINTING AND COLOR SCHEME:

29.1 Body to be painted on the exterior and interior with synthetic air-drying coach type enamel paints. The body under frame and chassis shall be painted with anti-corrosive rubberized paint of specified make only. The exterior painting process shall consist of carefully

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cleaning and etching followed by self-etch primer coat, an under coat, finish coat and glaze coat.

29.2 Approved paint (SE) brands are: 'Autostar' of 'Akzo-Nobel Ltd'/'Aspa' ofAsian Paints/'Nova plus' of Kansai Nerolac.

29.3 Color Scheme - Color scheme should be as per sketch given:

a) Exterior portion

Shade	Shade reference
Crystal white	ICI -169037
Satin black	ICI-169003
St. Germaine Red	ICI-169222

b) Interior portion

i. Interior roof including front and rear destination boxes fromcant to crib level	Francoise white	ICI-169012
ii.Destination boards, inside portion of boxes	White	ICI-169001
iii. Number plates	Golden Yellow back ground and black color letters/numbers	Size 65Hx10TH and 10 mm spacing
iv. Seat frames	Powder coating	

The color scheme may be modified or changed at the time of execution of bus body fabrication as per the orders of Chief Mechanical Engineer (C&B).

29.4 APSRTC monogram shall be provided on both sides of body as perSKETCH1916 in image transfer stickers.

30.0 MISCELLANEOUS FITTINGS TO BE PROVIDED:

30.1 Two Fiber handles of 100 mm size are to be provided at waist level of cabin front end. Two footsteps on the bumper shall be provided for giving feasibility to clean the front windshield glasses. Footsteps should not protrude outside the bumper.

30.2 Two OE fully adjustable rear view mirrors of convex type shall be fitted with brackets as per drawing No:CB22RVM140, One convex mirror has to be fitted inside driver cabin at center pillar between front glasses and one convex type mirror to be fitted at outside (at top side between two wind screen glasses of front end for near vision of road in front of bus. The location of rear view mirrors shall be so located to have at least 2500 mm wide vision from the body line of vehicle when viewed from driver seat.

30.3 The front registration number plate in 1.6 mm Alu. sheet has to be provided on the front bumper at right side with Indal 5505 beading around registration number plate.It shall be exhibited in black alphabets/numerals with golden yellow back ground. The size of the number plate shall be 450x250 mm.The rear registration number plate shall be on rear bumper at right side area.

30.4 Two fire extinguishers of approved make and dry chemical type of5.0 kg capacity each conforming to IS: 2171of 1985 suitable for A,B&Cclass of fires shall be provided with suitable MS clamping arrangement.

30.5 Rubber mud splashguards of size 650x456 mm are to be provided for front and rear wheels.

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30.6 First aid box in Stainless steel and size 310X220X128 mm with leather straps andlocking arrangement shall be provided in driver's cabin. First aid medicine kit containing the items mentioned under Rule 138(4)(d) of the latest M.V.Rules shall be provided in the box.

a. Antiseptic cream of 0.5 % Centrimide I.P.in non-greasy base 5 mg – 2pcs
b. Sterile Surgical Gauge dressing - 1 pack of 4 pcs.
c. Wash proof plaster - 5 pcs.
d. Sterile elastic plaster - Size: 6 cm x 30 cm - 1 pc.
e. Gauge rolled - Size:7.5 cm x 2.5 mtrs. - 3 pcs.
f. Elastic bandage for wounds and BurnsSize: 8 cm x 1.5 mtrs. - 1 pc.

30.7 One pair of towing hooks with 36 mm eye dia. punched in MS flat 75x12mm shall be provided at the rear end, to be attached to chassis long member with 4 Nos. of M12 bolts.

30.8 All lettering works in vinyl stickers shall be done as per the guidelines with 25H X 6T.

30.9 The rear bumper shall be in GI sheet of 2.0 mm thick-formed channel section of size 50x175x50 mm in single piece with brackets in MSL40x40x6mm and to be fitted to the chassis long members. The ends of the bumper are to be curved. The center portion of bumper shall be made sunken to accommodate a registration number plate and number plate light.

30.10 The OE front bumper supplied with the chassis shall be retained. Front bumper length shall be increased to suite the body width i.e., 2590 mm. If the chassis is not supplied with front bumper, the bumper shall be fabricated in GI sheet 2 mm thick of size 40x300x40 mm to suite the body width by the fabricator. The mounting shall be attached to chassis long members with MS angle 50x50x6 mm 400 mm long.

30.11 Two sunken off setfootsteps of size 150x150mm shall be provided below the driver door, one at 700 mm height from the ground and another at 950 mm in offset manner.

30.12 The entrances at front &rearandatdriver's door shall be provided with water drain canopies at cant level with 1.22 mm Aluminum sheet.

30.13 Pure rubber matting of 3.0mm thick shall be provided atfoot control pedals area in driver's cabin.

30.14 A footstool for driver to be provided in 3 mm Aluminum5-bar cheq. Sheet and Indal 2651 used for legs preparation.

30.15 Tapping of compressed air for Air horn and Windscreen wiper should be obtain from port no.24 of system protection valve with proper unions, 'T' joints. Polyamide pipe of 6 mm shall be used for tapping of air. The pipeline shall be firmly clamped in position.

30.16 One roller type Sun visor of 24" size to be provided in driver cabin.

30.17 Driver& engine bonnet area to be separated from passengers by providing one row of stainless-steelpipe of 304grade in 32OD x 1.6 mm thick vertical supports and SS flat 50X4 mm with balata packing.

30.18 The seats earmarked for ladies, PHC persons, senior citizens are to be very clearly exhibited on seat back rests and at intermediate rail.

30.19 Retro-Reflective Conspicuity Marking tapes of Diamond grade 50 mm wide conforming to AIS: 90 of approved make shall be bonded to the body sides as per the sketch provided. The cumulative length of tapes provided shall not be less than 80% of length of that side. These tapes shall be white in color at front, yellow on sides and in red at rear of the body.

30.20 One stainless steel assist rail of 25 mm dia x1.6 OD (304 Grade)up to a height of 600 mm from floor shall be provided on rear side pillar of driver door from inside.

30.21 "Break any glass in Emergency"stickering to be displayed on rear saloon glass both in English and Telugu.

30.22 G.I. sheet 0.50 mm thickness to be provided inside the bonnet to avoid heat dissipation.

30.23 Support pipe of SS 25x1.6 mmhas to be provided at top of the 6seater area.

30.24 Stainless steel sheets, tubes, pipes etc. should be of Jindal make/any other source approved by APSRTC.

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30.25 A separate Ladies partition has to be provided as per approved specification &as per drawing no.CB22LP001.

30.26 One 200 mmSS handle to be provided on outer side of driver door.

30.27 One Amplifier of approved make i.e. AHUJA/SONY shall be provided.

30.28 On Dash board front area left side,where it is clearly visible to passengers, stickering can be provided as "Book Your Tickets Online@www.apsrtconline.in" in3" of letter size inlettering font "Times New Roman ".

30.29 Slogans in Telugu to be exhibited as follows

1. టిక్కెట్టులేనిప్రయాణంనేరం, అందుకురూ. 500/- వరకుజరిమానా.
2. ఈబస్సుమనందరిది!దీనినిపరిశుభ్రంగాఉంచుదాం!!

30.30 Tim machine Box, Water bottle holder are to be provided at conductor seat area to tress panel and a 3 pin socket with switch for Tim machine charging also to be provided.

30.31 Provision of Single seat to conductor instead of twin seaterat specified area.

30.32 All Slogans & Stickering to be done as per the instructions from time to time given by APSRTC with size of 25 H X 6T.

30.33 If there are any modifications in specifications are proposed during fabrication, it will be communicated by APSRTC from time to time and to be implemented immediately.

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S.No	Drawing No	Description
1	C2260SG22125	
2	C2260SL22127	
3	C2260SR22128	
4	C2260UF22129	
5	C2460SG22330	
6	C2460SL22327	
7	C2460SR22328	
8	C2460UF22329	
9	C3060SG22225	
10	C3060SL22227	
11	C3060SR22228	
12	C3060UF22229	
13	CB22AEG112	Extruded AL sections
14	CB22CTG132	Chart for Sheet Specs
15	CB22DRG119	Driver door
16	CB22LBG115	Window guard rail bracket
17	CB22LP001	Ladies Partition
18	CB22LB115	Body lifting brackets
19	CB22UBG114	Body U bolt
20	CB22WDG128	Window assy.
21	CB22SFT140	Pass. Seat Frames
22	CB22RVM140	Rear view mirror
23	SKETCH1916	Monogram

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