

Andhra Pradesh State Road Transport Corporation

Mechanical Engineering Department

Technical Specifications for supply of Bus Chassis confirming to BS-VI(OBD-II) emission norms

Hire bus tender - 2024 MSTC-VII

Sno	Specification	11M Chassis		12M Chassis	
	Type of bus body	Express, Metro Express, Ultra Pallevelugu, Pallevelugu, City Ordinary,	Ultra Deluxe,	Star Liner, Super Luxury-40 seats,	Vennela AC, Indra AC
<p>* As per the Rights of Persons with Disabilities Act (RPD) 2016 guidelines, all urban transport buses shall have 400 mm floor height only. 400mm floor height buses are fully built buses with monocoque chassis. Hence decision has to be taken in this regard.</p>					
1	Dimensions of Chassis in mm				
	Wheel Base	5639 to 5850 mm (222" to 230")		5950 to 6200 mm (234" to 244")	
	Height of the chassis	944 to 1150 mm in unladen condition			
	Front Overhang	1845 to 2265 mm for 222" to 230" WB		2205 to 2305 mm for 234" to 244" WB	
	Rear Overhang	60% of wheel base (maximum)			
2	Chassis	<p>a) The all-steel ladder type Chassis frame shall conform to latest revision of APMV and CMVR Regulations, in accordance with MoRTH notifications, prevailing at the time of supply of chassis, in all respects.</p> <p>b) Chassis shall be of full forward control to facilitate provision of front door within front over hang.</p> <p>c) Chassis shall comprise of chassis frame, Engine, Air Compressor, Self-starter, Alternator, Radiator, Transmission (Including Clutch, Gear Box and Propeller Shafts), Front axle assembly, Rear axle assembly, Weveller Suspension or Air suspension, Power Steering Assembly, Six Wheels with tyre Assemblies & Spare wheel tyre assembly, Full air brake system with DDU or Air drier & Purge tank or Air processing unit.</p> <p>d) Shall produce type approval certificate issued by Govt. of India approved agencies.</p> <p>e) 8 Ton and above Hydraulic jack with self-locking provision or Mechanical screw jack with minimum total height of 480mm in open condition and 295mm max. in closed condition. Minimum/Maximum height as per OEM design shall serve the purpose i.e., shall lift the vehicle for removal of tyre with any type of approved tyre sizes in open/closed condition.</p> <p>f) Head lamp (LED/Halogen) preferably in 7" dia round/ rectangular type with suitable relay and E4 LED/Halogen tail lamps as per CMVR.</p> <p>g) Electric Horn/Dual tone horn meeting CMVR and aesthetically designed</p>			

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		<p>instrument panel.</p> <p>h) Engine Bonnet of preferably 5 mm thick in FRP and it should be hinge type with lifting provision with proper heat shield like FR Grade glass wool/Nitrile rubber, driver cabin flooring & front-end structure and without cowl & center grill or non-hinge type or any other design as per OEM & as per CMVR norms.</p> <p>i) Tool Kit as per CMVR i.e., with suitable size wheel box spanner preferably of min. 450mm (suitable for 8'6" bodies) length & tommy bar of 1Mtr length with EN8/EN19 steel.</p> <p>j) Air intake system (air filter) shall be preferably above the Engine level/under driver seat near Bulk Head to intake fresh Air into the engine. However, OEM shall ensure that if vehicle is operated in water in exigencies like floods or heavy down pour of rain, there should not be engine hydraulic lock due to suction of water from air intake manifold.</p> <p>k) The air tanks as per OEM design meeting CMVR requirement should be provided preferably in between fuel tank and rear wheels or in such a way not to cause any obstruction for maintenance of suspension system.</p> <p>l) Chassis bend if any in horizontal plane shall not be more than 8 mm and the diagonal measurements in between axles and in vertical plane shall be same.</p> <p>m) <u>DEF tank capacity 24 Ltr minimum.</u></p> <p>n) Chassis shall be supplied with minimum 20 Ltrs diesel in fuel tank.</p> <p>o) Adjustable type HDPE Knitted Driver Seat Assembly for 224"/222"/230"WB & adjustable reclining cushion seat assembly/knitted for 234"/236"/244"WB of M/s Uno Minda / M/s Pinnacle or any brand as approved by APSRTC with ELR safety belt (in loose or part of tool kit) driver seat confirming to CMVR requirements.</p>	
	p) Driver Seat Assembly confirming to CMVR requirements.	Adjustable type HDPE Knitted with ELR safety belt (in loose or part of tool kit) driver seat	adjustable reclining cushion seat assembly/knitted with ELR safety belt (in loose or part of tool kit) driver seat
	q) HSD Tank capacity	Min 230 Ltrs	Min 350 Ltrs
3	Engine & FIP with suitable mountings on the chassis frame		
	a) Engine Output	177 HP & above, Torque: min 590 Nm	186 HP & above, Torque: min 700 Nm
		<p>b) The Engine shall be</p> <p>i. 4/6 – cylinder for 222"/224"/230" WB front weveller & rear weveller suspension model chassis.</p> <p>ii. 4/6 – cylinder for 222"/224"/230" WB front weveller & rear air suspension model chassis.</p> <p>iii. 6-cylinder for 12M chassis of front & rear air suspension, with retarder & without retarder.</p> <p>Engine shall be vertical, in line, water-cooled with Turbo Charger and Inter Cooler confirming to BS-VI OBD-II emission norms with EGR/SCR or both Technologies as per MoRTH notification from time to time.</p> <p>c) The fuel injection system should be CRDI/Unitized.</p>	

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		<p>d) FIP make shall be Bosch/Denso/Delphi/TATA-Cummins (<u>Service support for FIE system other than Bosch should be extended for a minimum period of 10 years by the vehicle manufacturer.</u>)</p> <p>e) Air compressor maximum duty cycle shall be 30% and should be gear driven for all models.</p> <p>f) Air compressor minimum capacity shall be <u>230cc</u> water cooled for air suspension chassis.</p>
4	Cooling System	<p>a) The System shall include Aluminum Radiator with transparent/Translucent De-aeration Tank, Water pump and Viscous Fan of adequate capacity with thermostat of failsafe type to control the coolant temperature shall be maintained around 100°C. The water pump supplied shall be of self-lubricating system type only. The position of the fuse box/electric panel shall not be beside the radiator cap/Coolant top up point.</p> <p>b) Approved radiator makes: Halgona, TATA Toyo, Alkraft, Banco & Modine</p>
5	Pollution & Exhaust Gas (BS-VI OBD-II NORMS)	<p>The Engine shall meet Bharat Stage-VI OBD-II emission norms applicable at the time of delivery of chassis. The Tenderers shall give a certificate based on their Engine Dynamo Meter Test, the exhaust gas analysis of CO, HC, NOX and PM (Particulate matter) in gms/KWh. A Photo Copy of the test certificate issued under CMVR rules by the Competent Authority shall be submitted along with the tender. The Engine shall meet BS-VI OBD-II emission norms.</p>
6	Transmission & clutch	<p>a) Single plate dry type, Air assisted Hydraulic actuated.</p> <p>b) WABCO make of clutch booster preferably with fork & pin type and push on clutch operating lever or any make as per OEM design or any make approved by APSRTC. However, the OEMs have to give undertaking with assurance that any premature failure of the same shall be replaced at FOC with better technology to avoid enroute failures of the vehicles.</p> <p>c) PP shaft of Spicer India (self lubricated/manual greasing) make.</p>
7	Gear Box	<p>Shall have synchromesh gear box with 6 forward gears (<u>over drive optional</u>) and one reverse gear.</p>
8	Front Axle	<p>a) The Front Axle shall be of I-beam type made of alloy steel forging with a minimum load carrying capacity of 6,000 Kgs., with Reverse Eliot design.</p> <p>b) Approved makes of AAL/TVSAI/OE make.</p>
9	Rear Axle	<p>a) Fully floating type with Hypoid Gears, with a minimum carrying capacity 9700 kgs. and the Crown Wheel Pinion ratio shall be maximum 5.29 for all models of chassis.</p> <p>b) Approved makes of AIL(Dhana)/Meritor (AAL)/OE make.</p>
10	Tyres	<p>a) Tyres – 6 nos + 1 Spare tyre shall be provided in a cage type carrier/OEM design carrier.</p> <p>b) Tyres must be less than six months old as on the date of delivery of chassis.</p> <p>c) Wheel disc make - Wheels India.</p> <p>d) Tyres shall meet AIS:142 with regard to Rolling resistance, wet grip and rolling sound as per MoRTH notification issued from time to time.</p>

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	e) Tyres Size	10 x 20 – 16 PR radial tyres with wheel disc size 7.5" x 20".	295/80R 22.5 – 16PR – tubeless tyres with wheel disc size 8.25" x 22.5" – 165mm offset
	f) Approved makes & brands	a) 10.00X20 Steel Radial-JK-JUH3/JUH 3+/JetwayJUH5 or MRF-Steel Muscle S1R4 R16 or Michelin XZE2/XZE3 HD, XYZ3 HD/X Multi Z or Apollo-ENDURACE MA or CEAT-WINMILE R or Bridgestone-R153.	a) 295/80R22.5 - JK JUL/JUL1/Jetway JUM or MRF-Steel Muscle S1R4 PLUS TL or Michelin-X Multi Z2 or Bridgestone R156 or CEAT or Apollo-ENDURACE.
11	Steering	<p>a) The steering position shall be on the right-hand side of the bus. The steering system shall be power assisted gear driven pump and sufficiently rugged in design to withstand peak road shocks without risk of component failure or inadvertent alteration of steering geometry.</p> <p>b) Approved makes: ZF or Rane preferably in equal numbers</p> <p>c) Steering ball joints shall be of grease type/self-lubricated.</p>	
12	Suspension System		
	a) Type of suspension	Front & rear weveller	Front weveller & rear air suspension
		<p>Front & rear air suspension</p> <p>i) Double acting Telescopic Type Shock absorbers shall be provided.</p> <p>ii) Air suspension shall be of Wheels India/OE make only</p>	
13	Brakes	<p>a) Brake system either with disc brake or drum brake or combination of both will be accepted.</p> <p>b) Dual line Full Air Brake system shall be provided on all four wheels with Auto Slack Adjusters of approved make MEI/Haldex/WABCO/Knorr Bremse</p> <p>c) Air shall be drawn by compressor from after filter and before turbo charger.</p> <p>d) The Quick release valve/relay valve at front and relay valve at rear.</p> <p>e) Graduated type hand control valve shall be provided for Hand Brake system with actuators operating on rear wheels. The control valve shall be provided on the right-hand side of the driver/on the Dash Board only and must be easily accessible to the driver.</p> <p>f) Auxiliary air tank shall be provided for utilizing air for air suspension & Auxiliaries.</p> <p>g) Polyamide brake pipes with identification colors/ sleeves at ends from SP Valve shall be provided for front, rear and hand brake connections. (Tapes and stickers not allowed).</p> <p>h) Critical parts of Brake System such as Air Compressor, APU, QRV, HCV, DB valve, Brake chambers etc shall be of either WABCO or Knorr Bremse Make but not in combination.</p> <p>i) ABS & Electronic Stability Control shall be of either WABCO or Knorr Bremse Make.</p> <p>j) All the chassis shall be with Electronic Vehicle Stability Control (EVSC) as per AIS:150.</p> <p>k) Hydro dynamic retarder of OE make/Electro Magnetic Retarder (EMR) of Brakes India Ltd./Telma make shall be fitted for 234"/236"/244"WB Chassis for AC models only.</p>	

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	l) Hydro dynamic retarder/ Electro Magnetic Retarder (EMR)	Not required	Not required	Not required	required
14	Gradeability	14% to 27%.			
15	Electrical System	<p>a) The system shall be of 24 Volt DC.</p> <p>b) 24V battery manual electrical battery Isolator switch shall be provided in Battery compartment with Electrical Isolator switch at RH side driver Dashboard/cabin area.</p> <p>c) For 234"/236"/244"WB chassis the battery shall be of.</p> <p>d) Electric wires shall be clamped in a neat form and must not be left haphazardly. The electric units and the electrical system fitted shall not be prone to short circuit problems.</p> <p>e) ECU should be placed in such a location easily accessible to the technicians and preferably away from the dash board to avoid damages in case of accidents as per OEM design & CMVR regulations.</p> <p>f) Battery cable (preferably 325 strands with 0.45 mm strand dia.) of reputed make with suitable length shall be provided and shall meet IS:2465 specifications standards.</p> <p>g) Approved Battery makes: Exide, Pace Setter, Amco, Amaron.</p> <p>h) Batteries must be less than six months old as on the date of delivery of chassis.</p>			
	Battery Capacity	Batteries shall be of 2x12 Volts, 21 plates & 150 Ah of approved make	Batteries shall be of 2x12 Volts minimum 25 plates, 180 Ah for EMR & non-EMR models of approved make		
16	Alternator & Self Starter	<p>a) Dynamically balanced* Alternator with built in regulator shall be provided with minimum of 80 Amps output for both EMR & non-EMR models.</p> <p>b) The Starter Motor shall be with 4 step relay pre-engaged type, flange mounted with minimum rating of 4.0 KW.</p> <p>c) Both these units shall be so located as to prevent ingress of oil or rainwater into them.</p> <p>d) Self Starter & alternator shall be of Lucas-TVS or SEG Automotive (Bosch) make.</p>			
17	Instrument panel	Aesthetically designed Instrument panel with backlit light should consist of Speedo meter with Km counter, Air Pressure Gauges, Flashing – Side indicator and switch, Warning lamp with buzzer for low air pressure, warning lamp for discharging of batteries, Starter Switch of good quality preferably LUCAS TVS(LISPART) /AES/Minda/Valeo, Dipper switch, Ammeter of <u>110</u> Amp Range or Volt Meter, Temperature Gauge, pressure gauge/warning lamp with buzzer for low engine oil pressure, Engine RPM Meter Etc., If the gauges are not provided other provision has to be made.			

As per CMVR

		The instrument panel should be properly covered at bottom side to avoid ingress of dust and water
18	Noise Level	Shall meet the MOEF notified limit of 82 db tested as per IS:3028 of 1998 for noise reduction system for the noise made by components of the chassis particularly engine, exhaust system etc.

Note:

1. *Dynamic balancing is a method through which, we balance the moving parts of a machine, or piece of industrial machinery. To do this, we rotate these parts at high speeds. When we do this, we are able to gain a measurement of the imbalance within each individual rotating component.
2. Tyres supplied along with the chassis shall meet AIS:142 norms notified from time to time by MoRTH.
3. The chassis shall confirm AIS:140 norms notified by MoRTH from time to time except vehicle tracking device and panic buttons.
4. The Tenderer shall submit detailed specifications of Chassis, aggregates and sub-assemblies with make and model of unit. If any new component is being used than the regular brands it must be informed in advance and get the approval.
5. No part of chassis shall cause hindrance for body fabrication.



Chief Mechanical Engineer (C&B)