15 -ാം കേരള നിയമസഭ

10 -ാം സമ്മേളനം

നക്ഷത്ര ചിഹ്നം ഇല്ലാത്ത ചോദ്യം നം. 1932 **02-02-2024 - ൽ മറുപടിയ്ക്ക്**

ഇലക്ട്രിക് ബസുകളുടെ മെയിന്റനൻസ്

ചോദ്യം		ഉത്തരം	
ശ്രീ. എൽദോസ് പി. കുന്നപ്പിള്ളിൽ		**ശ്രീ കെ ബി ഗണേഷ് കുമാർ (ഗതാഗത വകുപ്പ് മന്ത്രി)**	
(എ)	കെ.എസ്.ആർ.റ്റി.സി. സിഫ്റ്റ് കമ്പനിക്കായി ഇലക്ട്രിക് ബസുകൾ വാങ്ങിയ പി.എം.ഐ. എന്ന കമ്പനിക്ക് കേരളത്തിൽ ഇലക്ട്രിക് ബസുകളുടെ സർവീസ് സെന്റർ നിലവിലുണ്ടോ; ഇല്ലെങ്കിൽ എങ്ങനെയാണ് കെ.എസ്.ആർ.റ്റി.സി സിഫ്റ്റിലെ ഇലക്ട്രിക് ബസുകൾ സർവീസും മെയിന്റനൻസും ചെയ്യുന്നതെന്ന് വ്യക്തമാക്കാമോ;	(എ)	പി.എം.ഐ. കമ്പനിയിൽ നിന്നും വാങ്ങിയ ഇലക്ട്രിക് ബസുകൾക്ക് രണ്ടു വർഷത്തെ വാറണ്ടിയും രണ്ടു വർഷത്തെ വാറണ്ടിക്ക് ശേഷം ഇലക്ട്രിക് ഡ്രൈവ് ലൈൻ തുടങ്ങിയവയ്ക്ക് അഞ്ചുവർഷത്തെ എ.എം.സി.യും നൽകണമെന്നതാണ് വ്യവസ്ഥ. ആയതിനായി വാഹന നിർമാതാവ്, ആവശ്യമുള്ള ജീവനക്കാരെ കെ.എസ്.ആർ.ടി.സി. അനുവദിച്ചു നൽകുന്ന ഡിപ്പോകളിൽ വിന്യസിക്കണം എന്ന് വ്യവസ്ഥ ചെയ്യുന്നുണ്ട്. ഇപ്രകാരം പി.എം.ഐ. കമ്പനി തിരുവനന്തപുരം സിറ്റി, പേരൂർക്കട എന്നീ ഡിപ്പോകളിലെ ബസ്സുകളുടെ പരിപാലനം നടത്തി വരുന്നു. ഡ്രൈവ് ലൈൻ ഇലക്ട്രിക് പാർട്സുകൾ, ബാറ്ററി തുടങ്ങിയവ ഒഴികെയുള്ള മറ്റു ഭാഗങ്ങളുടെ പരിപാലനം കെ.എസ്.ആർ.ടി.സി. നടത്തിവരുന്നു. നിലവിൽ കെ.എസ്.ആർ.ടി.സി.-സിഫ്റ്റ് ബസുകളുടെ പീരീയോഡിക്ക് മെയിന്റനൻസ് ജോലികൾ കെ.എസ്.ആർ.ടി.സി. മെക്കാനിക്കുകളെ ഉപയോഗിച്ച് യൂണിറ്റ് വർക്ക്ഷോപ്പുകളിലാണ് നിർവ്വഹിക്കുന്നത്.
(ബി)	സിഫ്റ്റിലെ പി.എം.ഐ. കമ്പനിയുടെ ഇലക്ട്രിക് ബസുകളുടെ ബാറ്ററിക്ക് എത്ര വർഷമാണ് കമ്പനി വാറണ്ടി നൽകിയിട്ടുള്ളത്; പുതിയ ബാറ്ററികളുടെ പരമാവധി കാലാവധി എത്രയാണെന്ന് വിശദമാക്കാമോ;	(ബി)	പി.എം.ഐ. കമ്പനിയുടെ ഇലക്ട്രിക് ബസുകളുടെ ബാറ്ററിക്ക് രണ്ട് വർഷത്തെ വാറന്റിയും, വാറന്റി കാലാവധിക്കു ശേഷം 3 വർഷത്തെ Annual Maintenance Contract-ഉം വ്യവസ്ഥ ചെയ്തിട്ടുണ്ട്.
(സി)	പി.എം.ഐ. ഇലക്ട്രിക് ബസുകളുടെ പർച്ചേസിന് മുൻപ് അതിന്റെ നിലവാരം പരിശോധിക്കാൻ ഏതെങ്കിലും കമ്മിറ്റിയെ നിയമിച്ചിട്ടുണ്ടായിരുന്നോ; ഉണ്ടെങ്കിൽ അവർ സമർപ്പിച്ച റിപ്പോർട്ടിന്റെ പകർപ്പ് ലഭ്യമാക്കാമോ?	(സി)	ഉണ്ട്. റിപ്പോർട്ടിന്റെ പകർപ്പുകൾ അനുബന്ധമായി ചേർക്കുന്നു. കൂടാതെ CMVR-126 പ്രകാരം Ministry of Road Transport and Highways (MORTH) നിയോഗിച്ചിട്ടുള്ള Type approval and Homologation Agency-യിൽ നിന്നും M/s. PMI Electro Mobility Solution Pvt. Ltd. വിതരണം

			ചെയ്ത മോഡലിലുള്ള ഇ-ബസിന് Type approval ലഭിച്ചിട്ടുണ്ട്.

സെക്ഷൻ ഓഫീസർ

അനുബന്ധം

12/05/2022

ICAT

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INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

[A Division of NATRiP Implementation Society (NATIS), Govt. of India]

CAQB 0784 F01

Date: 03 October 2021

Cert	Table 7+11+13	Drgs	Total
6	14	10	30

CERTIFICATE

FOR

COMPLIANCE TO THE CENTRAL MOTOR VEHICLES RULES

1. In order to establish compliance to the provisions of CMVR, 1989, applicable as on date, documental verification / necessary testing was carried out, on the following **Base model & its variants**, submitted by the vehicle manufacturer referred below:

This certificate supersedes	Vehicle Manufacturer
CAQB 0199 Dt. 08.03.2021 CAQB 0305 F01 Dt. 22.07.2021 CAQB 0784 Dt. 27.08.2021	M/s. PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED Plant : Dharuhera (Haryana)

Electric Motor		
Model / Type	Power	Manufacturer
(Model: TM5920F) Permanent Magnet Synchronous Motor (PMSM)	102 kW @ 750 – 1050 rpm	M/s. PMI Electro Mobility Solutions Private Limited

Base Model	Type & Category	Seating Capacity	Standee capacity	GVW (kg)
REGIO 15155650	Fully Built Electric Bus M3 (Type-1)	26+D+2 folding seats or 28+D+WC	20	12700
Additional Variants	Refer ANNEXURE - IV			

1a Brief technical specifications (PMI/REGIO-15155650/001 Dated: 30.09.2021) of the Base model & its variants as declared by the vehicle manufacturer are enclosed with this certificate. Detailed specifications (PMI/REGIO-15155650/001 Dated: 30.09.2021) of the Base model & its variants are also separately issued to the vehicle manufacturer.

2. It is certified that the above **Base model & its variants** comply with the provisions of the CMVR, 1989 as amended up to date, including requirements given in Annexure-I (as detailed in ANNEXURE- I, IA & IB):

3. This Certificate is issued as per CMV Rule 126, to establish compliance with the Central Motor Vehicles Rules, 1989 and shall not be construed as a certificate of compliance to any rules other than those listed in ANNEXURE- I, IA, IB & II. Compliance to these rules has been verified based on the use of specific components / parts / assemblies etc. details of which are given in the detailed specifications duly endorsed by ICAT as mentioned at Para 1a above. It is the vehicle manufacturer's responsibility to ensure fitment of same components / parts / assemblies etc. before submission of the vehicle for registration.

4. Refer Annexure [illegible] for Accreditation.

Please turn over for DISCLAIMER

AUTHORISED SIGNATORY			
ICAT PRASHANT VIJAY DEPUTY GENERAL MANAGER	(ICAT seal: INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY, MANESAR)	ICAT DINESH TYAGI DIRECTOR	Page 1 of 6.

Office Address : Centre- I : Plot No.-26, Sector-3, HSIIDC, IMT Manesar, Gurugram-122050 Haryana (India)
Centre- II : Plot No. 01, Sector-11, HSIIDC, IMT, Manesar, Gurugram-122051, Haryana (India)
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Date : 08th October 2021

ANNEXURE - I

Rule No.	Sub Rule(s)	Compliance Verified For			Standard
93	(1), (2), (4), (6) & (7)	Overall dimension of motor vehicles			-
94	(1), (2) & (3)	Condition of tyres			-
95	(1), (2), (3), (4), (5), (6) (i) & (iii) (tubeless)		Size & ply rating of tyres	Make	IS 15636-2005, AIS-061:2004
		From	255/70R 22.5 - 16 PR (Single)	M/s. JK tyre/ Ceat	
		Rear	255/70R 22.5 16 PR (Dual)	M/s. JK tyre/ Ceat	
96	(4)(ii)	AUTOMOTIVE VEHICLES - UNIFORM PROVISIONS CONCERNING THE APPROVAL OF VEHICLES OF CATEGORIES M, N AND T WITH REGARD TO BRAKING			IS 11852:2013
98	(1), (2), (3)	Steering Gear			IS 11948:2010
		Turning Circle Diameter			IS 12222:2011
99	-	Forward and backward motion			-
100	(1), (2), (3) & (4)	Safety glass			IS 2553 (Part 2) (Revision 1): 2019
101	(1) & (2)	Windscreen wiper			IS 15802:2009
102	(1) & (2)	Signalling devices, direction indicators and stop lights			-
103	(1) & (2)	Position of the indicator			-
104	(1), (2), (4) & (5)	Fitment of reflectors			AIS-057 (Rev. 1): 2010
105	(1) (a), (2), (3), (4), (5) & (7)	Lamps			-
106	(1)	Deflection of lights			-
107	-	Top Lights			-
108	(1)	Use of red or white lights			-
109	-	Parking light			-
111	-	Prohibition of [illegible] lights etc.			-
117	(1) & (2)	Speedometer			IS 11827:2008
118	(1), (2) & (3)	Speed Governor (Exemption under Proviso to Sub Rule 118 (1) of the Central Motor Vehicles Rules, vide Notification No. G.S.R 260(E) dt. 15.01.2015)			AIS-018:2001

ICAT Ref. No.	2021 1199 (IOC (N) [illegible])
Net Power Test Report No.	CT1GQ 7773 dt. 07.10.2021
Noise Report No.	CT[illegible] 0081 dt. [illegible] 2019
Horn Inst. Report No.	CT[illegible] 0008 dt. [illegible]

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ANNEXURE - I
(Contd.)

Date : 08th October 2021

Rule No	Sub Rule(s)	Compliance Verified For			Standard
119	(1) & (2)	Horns	Installation		IS 15796:2008
			Limit :	87 dB(A) to 112 dB(A)	
			Observed :	93.6 dB(A)	
			Performance		IS-1884:1993
120	(1)	Silencers			-
	(2)	Pass by Noise	Limit :	78 dB(A)	IS-3028:1998
			Observed :	73 dB(A)	
122	(1) & (2)	Embossment of chassis number & engine number & month of manufacture (Ref. Table 11 of the Technical Specifications)			AIS-065:2005
124	Refer Annexure-IA & IB	Safety standards of components as applicable			-
	1(A)	Rear Under Run Protective Device			IS:14812:2005
		Vehicle Lateral Protection Side			IS: 14682:2004
125	(6) (For M2, M3, N1, N2 & N3)	Safety Belts, Seats & their Anchorages			AIS-023:2005
		Head Restraints			
	(1) & (2)	Rear View Mirror	Specifications		AIS-001 (Part 1) (Rev.1): 2011
			Installation		AIS-002 (Part 1) (Rev.1): 2011
	(10)	Additional Safety features for Category M & N Vehicles			AIS-145:2017
	(12 & 13)	Intelligent transportation systems			AIS 140:2016
138	(4) (c)	Warning Triangles- Use & Specifications			AIS-022:2001
		Warning Triangles- Installation			

ANNEXURE-IA

Rule 124 (1) Table Sr. No.	Parts / Components / Assemblies		Standard	4 Wheelers (M3 Category)
1	Automobiles lamps (bulbs)		AIS-034 (Part 1) (Rev.1):2010	✓
2	Hydraulic brake hose (if fitted)		IS-7079:2008	NA
3	Hydraulic brake fluid (if fitted)		IS:8654-2001	NA
8	Wheel Rims		IS:9438-1980	✓
11	External Projections		IS:13942-1994	✓
12	Retention and release of windows (Passenger Vehicles)		IS:13944-1994	✓
14	Wheel Nuts, Disc & Hub Caps		IS:13941-1994	✓
15	Accelerator Control System		IS:14283-1995	✓
16	Door Locks and Door Retention Components		IS:14225-1995	✓
17	Hood Latch		IS:14226-1995	NA
18	Tell Tale symbols and control		AIS-071-2009 (Part 1 & Part 2)	✓
20	Installation of Lighting / Signalling Devices	Performance Requirements	AIS-012:2004	✓
		With Vehicle Orientation	AIS-008 (Rev.1):2018	✓
20 (i)(a)	Main beam and dipped beam headlamps		AIS-010 (Part 1) (Rev.1):2010	✓
20 (i)(b)	Front fog lamps		AIS-012 (Part 1) (Rev.1):2011	NA

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ANNEXURE
IA (Contd)

Date: 08th October 2021

Rule 124 (1) Table	Parts/Components/Assemblies	Standard	4 Wheelers (M3 Category)
20 (i)(c)	Rear fog lamps	AIS 012 (Part 2)(Rev 1):2011	NA
20 (i)(d)	Cornering lamps	AIS-012 (Part 3)(Rev.1):2011	NA
20 (i)(e)	Rear registration plates illuminating lamps	AIS 012 (Part 4)(Rev 1):2011	✓
20 (i)(e)	Direction indicators	AIS-012 (Part 5)(Rev 1):2011	✓
20 (i)(f)	Front and rear position (side) lamps, stop lamps and end outline marker lamps	AIS 012 (Part 6)(Rev 1):2011	✓
20 (i)(g)	Reversing lamps	AIS-012 (Part 7)(Rev 1):2011	✓
20 (i)(h)	Parking lamps	AIS 012 (Part 8)(Rev 1):2011	✓
20 (i)(i)	Side marker lamps	AIS 012 (Part 9)(Rev 1):2011	✓
20 (i)(j)	Daytime running lamps	AIS 012 (Part 10)(Rev 1):2011	NA
21 (ii)	Electromagnetic compatibility of motor vehicles	AIS 004 (Part 3)	✓
23	Gradeability	AIS-003-1999	✓
26 (a)	Constructional and Functional Safety of BOV (Exempted for protection against water effects tests)	AIS 038 (Rev 1)/2015	✓
27	Measurement of Electrical Energy Consumption	AIS 039 (Rev 1)/2015	✓
28	Measurement of Range	AIS 040 (Rev 1)/2015	✓
29	Measurement of Net Power and 30 min. Power Speed	AIS-041 (Rev 1)/2015	✓
30	Type Approval of Battery Operated Vehicles	AIS 049/2008 (excluding Clause 2 & 3 of Annex D)	✓
36	The strength of superstructure of passenger vehicle	AIS 031:2004	NA
37	Flammability Requirements (M3 category above 22 seater)	IS:15061:2002	✓
38	The interior fittings in automotive vehicles of M2, M3, N1, N2 and N3 categories	AIS 047:2009	✓
40	Interior Noise Level Requirements	IS 12832:2010	✓
42	Requirement of Handhold fitted on L5, M and N categories of vehicles	AIS 046:2005	✓
49	Traction batteries used in battery operated vehicles	AIS-048:2009	✓
51	Protective devices against unauthorised use for M and N category vehicles	AIS 075:2006	NA
52	Approval of Vehicle Alarm Systems (VAS) for M1 and N1 Category of Vehicles and of these Vehicles with regard to their Alarm Systems (AS)	AIS 076:2007	NA

Additional Compliance to GSR 367 as amended by GSR 246 & 287 (E) as amended by GSR 895(E)			
125 C (1)	Body Building Approval	AIS:052 (Revision 1) 2008 – Phase I	✓
		AIS:052 (Revision 1) 2008 – Phase II	✓
125-C [(7)(a),(b)]	Additional Requirements for Bus Construction	AIS 153:2016	✓

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PRASHANT VIJAY DEPUTY GENERAL MANAGER		DINESH TYAGI DIRECTOR	Page 4 of 6

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ANNEXURE IB Date: 08th October 2021

CMV Rule	Compliance Verified For		Standard	Effective Date*
2(u)	Definitions – category of vehicle	M3	AIS-053:2005	12.11.2008
104 (1)	Retro Reflective Tape (M2 and M3 Category)		AIS-090:2005	01.10.2009
124 (4)	The procedure for Type Approval and establishing Conformity of Production for components	Safety Glass/ Tyres/ Horn		01.04.2009
		Bus Safety Belt/ Wheel rims/ Lighting and light Signaling Devices / Retro-Reflectors / Warning Triangles	AIS-037:2004	01.10.2009
		Door Locks and Door Retention component & Reflective Tapes		01.04.2010

* Compliance needs to be established for Type approval /Conformity of Production for components, listed in the notification as per the specified dates.

ANNEXURE - II

Standards	Notification	Date	Effective From	Applicable CMVR
Pass by Noise Limits	GSR 111(E)	10.02.2004	01.04.2005	120 (2)
Additional Requirement for Bus Construction	G.S.R 367 (E)	13.04.2018	01.04.2019	125 C (7)(a) (b)
	G.S.R 246(E)	29.03.2019		
Body building and approval	GSR 895(E)	20.09.2016		125 C (1)
Category A Vehicles/ Safety Glass/ Brakes/ Lamps/ Tyres/ Horn/ Seats/ Retro Reflectors/ Seals Anchorages, Head Restraints, Door locks & Door retention component/ Fuel Tank etc and other safety components	SO 1365(E)	13.12.2004	Notified Dates	ANNEXURE I ANNEXURE IA ANNEXURE IB
	GSR 589(E)	16.09.2005		
	SO 1431(E)	20.08.2007		
	GSR 784(E)	12.11.2008		
	SO 2714(E)	04.11.2010		
	GSR 290(E)	15.04.2015		
	SO 436(E)	15.03.2012		
	GSR 298(E)	24.04.2001		
	GSR 225(E)	26.03.2015		
	SO 411(E)	09.02.2016		
	GSR 382(E)	09.06.2014		
	SO 151 (E)	30.03.2005		
	GSR 1463(E)	27.11.2017		
	GSR 1182(E)	10.12.2018		
	S.O.2210(E)	01.06.2018		
	S.O.6108 (E)	10.12.2018		
	GSR 1225(E)	20.12.2018		
	GSR 177(E)	01.03.2019		
	GSR 457(E)	20.07.2020		

ANNEXURE III

Sr. No.	Name & Address	Accreditation Certificate No.
1	M/s. PMI Coaches Pvt. Ltd., Plot No. 26, Industrial Area, Dharuhera, Distt. Rewari, Haryana – 123 106	CTIVO 0061 dt. 14.01.2019

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ICAT PRASHANT VIJAY DEPUTY GENERAL MANAGER		ICAT DINESH TYAGI DIRECTOR

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ANNEXURE- IV

Date: 08th October 2021

Base/ Variants	Model	Type	Seating Capacity	Standee Capacity	GVW (kg)
Base	REGIO_15155650	I	26+D+2 folding seats or 26+D+WC	20	12700
1	REGIO_15155400	I	21+D+2 folding seats or 21+D+WC	13	12700
2	REGIO_15155900BRT	I	24+D+2 folding or 24+D+WC	22	14000
3	REGIO_15155930	I	30+D	20	12700

END OF DOCUMENT

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PRASHANT YADAV DEPUTY GENERAL MANAGER		DINESH TYAGI DIRECTOR

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Works: Plot No. 113, Sector-3, IMT, Bawal 123501 Distt. Rewari, Haryana
E-mail: corporate@vaidictesthouse.com Ph +91 1284 264105, 06
Web: www.vaidictesthouse.com

12/05/22

Report No: VTH/2022/2866
Issue Date: 23.03.2022

ULR:TC723322000002702F

TEST REPORT

Job Order No. & Date: 22-0824 / 08.03.2022

Customer Name & Address:
PMI COACHES PVT. LTD.
PLOT NO. 26, INDUSTRIAL AREA, DHARUHERA, REWARI-123106
(HR)

Sample Receipt Date: 08.03.2022
Sample Test Start Date: 08.03.2022
Sample Test Completion Date: 22.03.2022
Sample Reference No.: 22-2390
Sample Receipt Qty.: 01
Sample Condition: Ok

Sample Particulars: SAMPLE TUBE- 30X40

Test Environmental Conditions: ----------

SALT SPRAY TEST:
ASTM B 117:19

Test Method: ASTM B-117:19 STANDARD PRACTICE FOR OPERATING SALT SPRAY (FOG) APPARATUS

Other Ref. Standards: ASTM D1193: SPECIFICATION OF REAGENT WATER
ASTM E 70: TEST METHOD OF Ph of AQUEOUS Soln WITH THE GLASS ELECTROD.

Type of Salt used: NaCl (M.W. 58.44) with minimum assay 99.9%
Total impurities ≤ 0.1%

Water: Conforms to Type IV Water in Spec D1193 ASTM D 1193 AACG

Test condition:

S.No	Parameter	Actual
1	Salt Sol. Conc.	5% (NACL)
2	Chamber temperature	(35 ± 2)°C
3	pH of Sol. solution	6.5 to 7.2
4	Fog Collection	1-2 ml/hr
5	Test duration	336 hours

Authorised Signatory

VAIDIC
Your need, Our Commitment
Regd. Office 2nd Floor, 86/82 Mahipalpur, New Delhi 110037
Works Plot No. 1737, Sector-3, IMT Bawal-123501, Distt. Rewari, Haryana
E-mail: corporate@vaidictesthouse.com, Ph. 91-1284-264405, 06
Web: www.vaidictesthouse.com

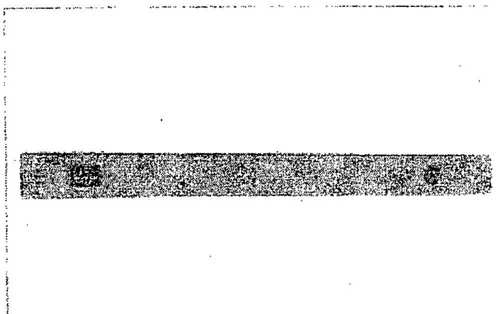
Report No : VTH/2022/2866
Issue Date : 23.03.2022

TEST REPORT

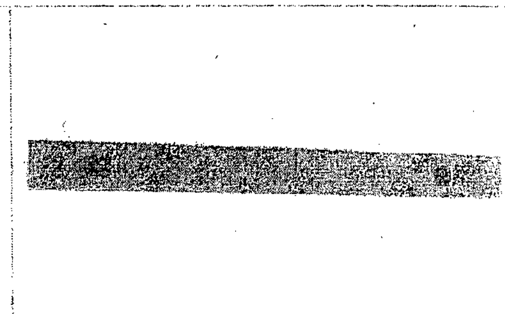
ULR-TC723322000002262F

Observation :-

Sr. No.	Test Duration	Observation
1	After 24 hrs	No visual change is observed on the specimen.
2	After 48 hrs.	No visual change is observed on the specimen.
3	After 72 hrs.	No visual change is observed on the specimen.
4	After 96 hrs.	No visual change is observed on the specimen.
5	After 120 hrs.	No visual change is observed on the specimen.
6	After 144 hrs.	No visual change is observed on the specimen.
7	After 168 hrs.	No visual change is observed on the specimen.
8	After 192 hrs.	No visual change is observed on the specimen.
9	After 216 hrs.	No visual change is observed on the specimen.
10	After 240 hrs.	No visual change is observed on the specimen.
11	After 264 hrs.	No visual change is observed on the specimen.
12	After 288 hrs.	No visual change is observed on the specimen.
13	After 312 hrs.	No visual change is observed on the specimen.
14	After 336 hrs.	No visual change is observed on the specimen.



BEFORE TEST



AFTER 336 HRS

**** End of Report ****

1. The results listed refer to the tested samples and applicable parameters. Endorsement of product is neither inferred nor implied.
2. Total liability of our works is limited to invoiced amount.
3. The report can not be used as an evidence in court of law without prior permission of laboratory.
4. This test report shall not be reproduced wholly or in part.
5. All complaints about the test report should be communicated within [illegible] days from the issue of the report.
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12/05/22

Table 7 of AIS-007 (Revision 5)

BRIEF TECHNICAL SPECIFICATIONS OF MOTOR VEHICLES

A. Manufacturer's name and address	M/s. PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED, 26, Industrial Area, Near Amar Dudh Sagar Plant, Dhanuhera – 123106 Haryana India.
Importer's name and address (in case of CBU)	NA
Vehicle data	
Basic model	REGIO_15155650
Type / Description	Battery operated electric bus
Category of the vehicle	M3, Fully Built Electric Bus
Variant(s)	Refer Variant list - (PMI/VL/001) Dt. 29.09.2021
Type / Description	Type-1
Category of variant(s)	NA
Engine	
Make	NA
Model	NA
Type	NA
Bore x stroke (mm)	NA
No. of cylinders	NA
Displacement	NA
Compression ratio	NA
Max. Engine output (kW @rpm)	NA
Max. Torque (Nm @rpm)	NA
Air cleaner type	NA
Type of Fuel	NA.
Clutch	
Type	NA
Gearbox	
Make model.	NA
Type	
No. of gears	

Manufacturer: PMI ELECTRO MOBILITY Solutions Pvt Ltd. SOLUTIONS PRIVATE LIMITED	Document No: PMI/REGIO-15155650/001	Test Agency : International Centre for Automotive Technology	Cert No:
Signature: Authorised Signatory DAN ASHISH PALAI D.A.		Signature	Prashant Vijay DGM Certification Business Unit
	Sheet No	Name / Designation	Seal
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Gear ratio 1st 2nd 3rd 4th 5th 6th Reverse	NA
Drive Axle (Front / Rear / All)	NA
Front axle ratio	
Rear axle ratio	
Steering	
Type / Description	Recirculating Ball
Steering wheel diameter mm	450 mm
Ratio	Middle 22.2-left & Right 26.2
Frame	
Long member size (mm)	NA
Number of cross members	NA
Suspension	
Type / Description	Air Suspension
Spring	Air Spring
Anti-roll bar	Front & Rear
Shock absorbers	Front – 02, collapsible, double-pipe Rear – 02, collapsible, double-pipe
Brake	
Service brake (Brief description)	Compressed Air Brake
Auto Slack Adjuster Fitted (Yes / No / Optional)	Yes
ABS Fitted (Yes / No / Optional)	Yes
Front (Disc / Drum)	Disc
Rear (Disc / Drum)	Disc or Drum
Total braking area (cm^2)	Front: 784 cm^2 Rear: 1496 cm^2
Parking brake	Yes
Secondary brake	Yes
Wheels and tyres	
Wheel rim size	22.5 x 7.50
Tyre size designation including ply rating	255/70 R 22.5 16PR
Speed index	M

Manufacturer: PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED Authorised Signatory Signature: DEVASHISH PALAI	Document No : PMI/REGCO-151556650/001	Test Agency : International Centre for Automotive Technology Prashant Vijay DGM Certification Business Unit Signature Name Designation	Cert No:
	Sheet No		
Designation: PVT. DESIGN	Date: 30/09/2021	Date of Issue	Page 2 | 2

Load index / Load rating	S1 140/2500kgs, D1 137/2300kgs			
Tyre Type (Radial / Cross / Tube/Tubeless)	Radial Type			
Laden Tyre pressure (front & rear) (kg/cm^2)	790 Kpa			
Electrical system				
System voltage (V)	Accessories 24V Traction 592VDC			
Battery rating (Ah)	256Ah			
Wiper motor	24V, 150W			
Wiping system (Brief description)	24V with 2 wiper linkages			
Fuel tank				
Material	NA			
Capacity (l)	NA			
Dimensions	Base	Variant 1	Variant 2	Variant 3
Wheel base (mm)	Refer Variant list - (PMI/VL/001) Dt. 29.09.2021			
Overall width (mm)				
Overall length (mm)				
Overall height (mm)				
Front track (mm)	2070	2070	2070	2070
Rear track (mm)	1825	1825	1825	1825
Ground clearance for vehicle category M1 in accordance with IS 9435 (mm)	NA			
Min. ground clearance (mm) (other than M1)	195 mm at middle of rear axle			
Cargo box dimensions (mm)	NA			
Body overhang (mm)	Base	Variant 1	Variant 2	Variant 3
Front end	Refer Variant list - (PMI/VL/001) Dt. 29.09.2021			
Rear end				
Frame overhang mm (in case of vehicles without complete body)				
Front end	NA			
Rear end	NA			
Load body platform area				
Weights	Base	Var 1	Var 2	Var 3
Maximum GVW kg (for rigid vehicles)	Refer Variant list - (PMI/VL/001) Dt. 29.09.2021			
Maximum GCW kg (for articulated / combination vehicles)				

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	t Sheet No	Signature / Name / Designation	
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Maximum FAW (kg)				
Maximum RAW (kg)				
Kerb weight with 90% fuel (with spare wheel , tools, etc.) (kg)				
Maximum gradeability in 1st gear	10.2 Degree			
CO_2 (g/km) (Applicable for category M1 with GVW 3.5 T)				
Declared : (rounded to 3 decimal places)				
Fuel consumption (l/100 km) for Petrol, LPG or Diesel and (kg/100km) for CNG and (kWh/100 km) for Electric Driven Vehicles (Applicable for category M1 with GVW 3.5 T) (rounded to 3 decimal places)*				
Fuel Equivalent Fuel Consumption (Actual Fuel)	NA			
Petrol Equivalent Fuel Consumption (Petrol Equivalent)	NA			
Vehicle Max Speed in unladen condition	72.3 kmph			
Vehicle Max Speed in laden condition	72.3 kmph			
Seating	Base	Variant 1	Variant 2	Variant 3
Seating capacity	Refer Variant list (PMI/VL/001) Dt. 29.09.2021			
Sketch showing seating layout with vehicle dimension (mm) (all category of vehicles)	Refer Variant list (PMI/VL/001) Dt. 29.09.2021			

Manufacturer: PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED	Document No : PMI/REGIO-15155650/001	Test Agency: : International Centre for Automotive Technology	Cert No:
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Table 11 of AIS-007 (Revision 5)

DETAILS OF LOCATION OF CHASSIS NUMBER AND CODE FOR MONTH AND YEAR OF MANUFACTURE AS PER RULE 122 OF CMVR

Name of the Vehicle Manufacturer & Address :	**M/s. PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED** 26, Industrial Area, Near Amul Dudh Sagar Plant, Dharuhera – 123106 Haryana India.
Name of the basic model :	**REGIO_15155650**
Name of Variants, if any :	Refer Variant list - (PMI/VL/001) Dt. 29.09.2021
Place of Embossing or etching the Chassis Number (Vehicle Identification Number). Supporting details by drawing or pictures may be provided if necessary.	**Refer Drawing No. - P-E-A018-BB00093**

Code for month and year of production:

Code for month of production:		**Code for year of production:**			
Month.	Code	Year	Code	Year	Code
January	A	2018	A	2033	S
February	B	2019	B	2034	T
March	C	2020	C	2035	U
April	D	2021	D	2036	V
May	E	2022	E	2037	W
June	F	2023	F	2038	X
July	G	2024	G	2039	Y
August	H	2025	H	2040	Z
September	J	2026	J	2041	1
October	K	2027	[illegible]	2042	2
November	L	2028	L	2043	3
December	M	2029	M	2044	4
...		2030	N	2045	5
...		2031	P	2040	6
...		2032	R	2047	7
Position of the code for month of production in the Chassis number :		**11TH Position**			
Position of the code for year of production in the Chassis number :		**10th Position**			
Height of the Chassis number (Vehicle Identification Number) :		**8mm**			

Example of Engine/Motor No. : - 7136A040338NS-XX(XX is Serial No. & start from 0001) Example of Chassis No. (Vehicle Identification Number) with Month & Year of Manufacture: MD9 26 E L 00 BA 25 XXX (XXX is Serial Number & start from 001)

Manufacturer: **PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED**	**Document No :** **PMI/REGIO-15155650/001** **Dated: 11.05.2021**	Test Agency :	**Cert No:**
Signature: PMI Electro Mobility Solutions Pvt. Ltd. Authorised Signatory		Signature International Centre for Automotive Technology	
		Name Prashant Vijay DGM Certification Business Unit	
	Sheet No	Designation	
Designation: PV DESIGN	**Date : 11.05.2021**	**Date of Issue**	Page | 1

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TECHNICAL SPECIFICATIONS BATTERY OPERATED VEHICLES

1.0	General description of vehicle	
1.1	Vehicle Model	REGIO_15155650
1.2	Vehicle Type	Battery operated electric bus
1.3	Drawing and /or Photographs of the vehicle	Refer Drawing No. - P-E-A018-FB-0002
2.0	Description of The Traction Battery Pack.....	
2.1	Make and Trade name (If any)	PMI Electro Mobility Solutions Private Limited
2.2	Kind of Electro – Chemical Chemistry	Lithium Manganese oxide
2.3	Nominal Voltage (V) at Pack level	592V
2.3.1	Nominal Voltage (V) at Cell level	3.7V
2.4	Number of Cells/Modules and its Configuration,	Number Of Boxes Consists of 5 Standard C Boxes (4P160S); Standard one C box: 4P32S, Consists of 2 Modules; (4 cells in parallel connection and 32 cells in series) Single Module: 4P16S, Consists of 64 cells
2.5	Battery Energy (kWh)	151.55 kWh
2.6	Battery Capacity (C5),	256Ah
2.7	End of Discharge Voltage Value (V) at Pack Level	496V
2.8	Provision of ventilation for battery Yes / No	Yes
2.8.1	Brief description of the battery pack ventilation system adopted in the vehicle. Provide drawing if necessary.	Refer Drawing No. P-E-A018-FB-0005 Liquid Cooling.
2.9	Traction Battery Approval as per AIS 048: Report Number	CTICQ23161D1.12102021
2.10	On-board Indication of battery state of charge (SOC)	
2.10.	Details of indication when state of charge (SOC) of the battery reaches a level when the	SOC 20%, Beep Sound and Tell Tale

Manufacturer: PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED	Document No : PMI/REGIO-15155650/001. Dated: 11.08.2021	Test Agency : International Centre for Automotive Technology	Cert No:
Signature: DEV ASHISH PALAI		Signature	
PMI Electro Mobility Solutions Pvt. Ltd. Authorised Signatory D.A. Palai	Sheet No	Name Prashant Vijay Designation DGM Certification Busi	Seal
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1	manufacturer recommends re-charging.	
2.10.1.1	Indication format.	Level indicator and Number Value with % sign and text "SOC".
2.10.1.2	Relationship of state of charge indicator and the indication.	Level Indicator with one major unit of 10% SOC, % Indication for SOC 1:1

2.10.1.3	Make	M/s. Aranath Enterprises Private Limited
2.10.1.4	Model	Inbuilt in Cluster
2.10.2	Indication of state of charge of battery reaches a level at which driving vehicle further may cause damage to batteries	10% SOC
2.10.2.1	Indication format.	In 10% (Vehicle Stop), 15 % all accessories like AC, light will stop)
2.10.2.2	Relationship of state of charge indicator and the indication.	1:1
2.11	Battery Mass (kg)	110 kg
2.12	Brief description of maintenance procedure of battery pack, if any	No Maintenance required.
3.0	**Battery Management System (BMS)**	
3.1	Make	M/s Citic Guoan MGL (Mengguli Power Science and Technology Co. Ltd.).
3.2	Model Number / Part Number	REGIO 15155050
3.3	Software Version	LVRTE2013std_NI-VISA4.4.1
3.4	Hardware Version	HEV_BMS_Monitor_R2.0 aliases
3.5	Architecture (attach circuit board diagram and Cell configuration structure)	Refer drawing no. P-E-A018-HB0006
3.6	Balancing Type (Active/Passive)	Passive
3.7	Communication Protocol	BMS_ICC_CP10X
4.0	***DC – DC Converter***	
4.1	Make	PMI Electro Mobility Solutions Private Limited
4.2	Model Number / Part Number	M533NAN-3KW0202

Manufacturer: **PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED**	**Document No :** PMI/REG/O-15155050/001 Dated: 11.05.2021	**Test Agency:** International Centre for Automotive Technology	**Cert No:**
Signature: DEV ASHISH PALAI	S	**Signature** / **Name** Prashant Vijay	
PMI Electro Mobility Solutions Pvt. Ltd. Authorised Signatory D.A. PALAI	**Sheet No**	**Designation** (11101) DGM Certification Busi	
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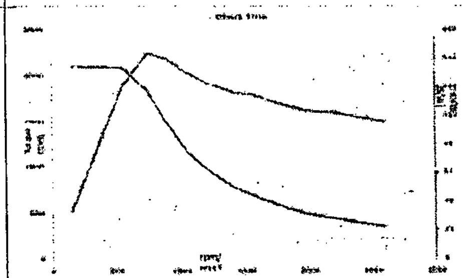
4.3	Hardware Version	M533NAN-3KW002
4.4	Input Range (Current in A and Voltage in V)	Current: Depends on load Voltage: 400-750V
4.5	Output Range (Current in A and Voltage in V)	Current: 0-1100A Voltage: 275-430V
5.0	**Description of The Drive Train**	
5.1	General	TM5023F
5.1.1	Make	PMI Electro Mobility Solutions Private Limited
5.1.2	Type	Permanent Magnet Type Synchronous Motor
5.1.3	Use: Mono motor/multi motors (number)	Mono Motor
5.1.4	Transmission Arrangement parallel / Transaxial / others to specify	Other: In Series, Motor axis is Connected to differential Through propeller shaft.
5.1.5	Test Voltage (V)	548 V
5.1.6	Motor Nominal Speed (min $^{-1}$)	1128 rpm
5.1.7	Motor Maximum Speed, Min $^{-1}$ or by default reducer outlet shaft gear box speed (specify gear engaged)	2800 rpm
5.1.8	Maximum Power Speed (min $^{-1}$) and (km/h)	1830 rpm 23.84
5.1.9	Maximum Power (kW)	143.7kW
5.1.10	Maximum Thirty Minutes Power (kW)	102kW
5.1.11	Maximum Thirty Minutes speed km/h (Reference in AIS-039 (Rev. 1) and AIS-040 (Rev2))	750 to 1050 rpm
5.1.12	Range as per AIS040 (Rev.1) (km)	273 km at 100% SOC
5.1.13	Speed at the beginning of the range (min $^{-1}$)	1800
5.1.14	Speed at the end of the range (min $^{-1}$)	1400
5.2	Traction Motor	
5.2.1	Make	PMI Electro Mobility Solutions Private

		Limited -
5.2.2	Model Number/ SR.NO.	TM5023F - -
5.2.3	Type (BLDC, DC, AC etc)	AC
5.2.4	Working Principle	Permanent Magnet Type Synchronous Motor
5.2.4.1	Direct current/ alternating current/ number of phases	AC -3 Phase
5.2.4.2	Separate excitation/ series / compound	Excitation
5.2.4.3	Synchron / asynchron **	Synchro
5.2.4.4	Coiled rotor / with permanent magnets/ with housing	Stator Coiled, with permanent magnets, with housing
5.2.4.5	Number of Poles of the Motor	16
5.2.5	Motor power curve (kW) with motor RPM (min⁻¹) / vehicle speed in (km/h), (Provide Graph)	
5.3	**Power Controller**	
5.3.1	**Make**	PMI Electro Mobility Solutions Private Limited
5.3.2	Model Number/ SR.NO. Number	SKAI4SA2CD12-2043WC1
5.3.3	Software Version	93456
5.3.4	Hardware Version	CE-0109
5.3.5	Type	CO200HW, CO2000
5.3.6	Control Principle : vectorial / open loop / closed / other (to be specified)	Vectorial
5.3.7	Maximum effective current supplied to the Motor (A)	375A
5.3.8	Voltage range use (V to V)	300-750V
5.4	Cooling System	

INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY ICAT MANESAR

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Authorised Signatory	Sheet No	Designation: DGM Certification Busi	
Designation : VP-DESIGN	Date : 11.05.2021	Date of Issue	Page 4

	motor : liquid/air	Liquid
	controller: liquid/air	Liquid
	Battery : liquid / air	Liquid
5.4.1	Liquid cooling equipment characteristics	
5.4.1.1	Nature of the liquid	Mix of Ethylene Glycol and water
	circulating pumps yes / no	Yes
5.4.1.2	Characteristics or make(s) and type(s) of the pump	DC Pump
5.4.1.3	Thermostat setting	Constant Flow of current
5.4.1.4	Radiator : drawing(s) or make(s) and type(s)	1161171301221 and Type: Cross Flow, single pass: make: Qingdao.
5.4.1.5	Relief valve pressure setting	NA
5.4.1.6	Fan : Characteristics or make(s) and type(s)	DC Fan
5.4.1.7	Fan : duct	No Duct
5.4.2	Air-cooling equipment characteristics	No Air Cooling
5.4.2.1	Blower : Characteristics or make(s) and type(s)	NA
5.4.2.2	Standard air ducting	NA
5.4.2.3	Temperature regulating system yes / no	NA
5.4.2.4	Brief description	NA
5.4.2.5	Air filter make(s) type(s)	NA
5.4.3	Maximum temperatures recommended by the manufacturer:	
5.4.3.1	Motor Outlet :	75 °C
5.4.3.2	Controller inlet :	75 °C
5.4.3.3	Battery inlet :	18 ~ 22 °C (Outlet 45 °C)
5.4.3.4	At motor reference point(s)	85 °C
5.4.3.5	At controller reference point(s)	85 °C
5.4.3.6	At Battery reference point(s)	50 °C
5.5	Insulating Category	H

Manufacturer: PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED	Document No : PMI/REGIO-15155650/001 Dated: 11.05.2021	Test Agency : International Centre for Automotive Technology	Cert No:
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		Name Prashant Vijay	
	Sheet No	Designation DGM Certification Bush	
Designation : VP-DESIGN	Date: 11.05.2021	Date of Issue	Page 15

5.5.1	Ingress Protection (IP) Code	IP67
5.6	Lubrication System Principle Bearings : friction / ball Lubricant : grease / oil Seal : yes / no Circulation : with / without	 Ball Bearings Grease Yes Without
6.0	**Charger :**	
6.1	Charger : onboard / external	External
6.1.1	Make	M/s Mass Tech Controls Private Limited. Mumbai
6.1.2	Model	RGZP/G/375KW/750V RGZP/G/150KW/750V RGZP/G/120KW/750V RGZP/G/180KW/750V RGZP/G/60KW/750V
6.1.3	Software Version	501
6.1.4	Hardware Version	Robinson (II)
6.1.5	Type (AC/DC, Slow/Fast)	Split type DC Charger, Fast
6.1.6	Standard Protocol (BEVC DC001 (or) BEVC AC001 (or) CCS (or) GBT (or) CHAdeMO (or) SAE J 1772 (or) if other specify)	GB/T & CCS
6.2	Description of the normal profile of charging system	RGZP/G/375KW/750V RGZP/G/150KW/750V RGZP/G/120KW/750V RGZP/G/180KW/750V RGZP/G/60KW/750V Split type DC Charger Fast
6.3	Specifications	
6.3.1	Mains Supply :	Three Phase
6.3.1	Input Nominal Voltage (V) & frequency	380 V ± 10%, 50Hz ± 3%

Manufacturer: PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED	Document No : PMI/REG10-15165560/001 Dated : 11.05.2021	Test Agency : International Centre for Automotive Technology	Cert No:
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	Sheet No	Designation DGM Certification	
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	(Hz) with tolerances.	
6.3.3	Output Voltage Range (V) and Current Range (A)	200-750VDC Max 500A
6.4	Reset period recommended between the end of the discharge and the start of the charge	20-120 Min
6.5	Recommended duration of a complete charge	1hr
6.6	In case of onboard charger	NA
6.6.1	Continuous rating of charger socket (A) :	250A
6.6.2	Time rating (h) of charger socket, if any :	NA
6.6.3	Whether soft-start facility Yes /No:	NA
6.6.4	Maximum initial in-rush current (A)	250A
7.0	Electrical details of vehicle for functional safety	
7.1	Schematic diagram showing the electrical layout giving all major electrical items along with their physical location in the vehicle. It shall include batteries, power-train components, protection fuses, circuit breakers etc.	Refer Drawing no. P-E-A018-FB-0004
7.2	Specifications of circuit breakers/ fuses used for protection of battery/ power train	Refer Drawing no. P-E-A018-FB-0004
7.2.1	IS / IEC specifications	Refer Drawing no. P-E-A018-FB-0004
7.2.2	Rating (A)	
7.2.3	Opening time (ms)	
7.3	Working voltage V	592V DC, Motor AC: 600V, 3 Phase
7.4	Schematic highlighting physical location of live parts having working voltage greater than	Refer Drawing No. - P-E-A018-FB-0006
7.5	Electric cables / connectors / wiring harness	
7.5.1	IEC protection class	IP67

Manufacturer: PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED	Document No: PMI/RECO-1515565001 Dated: 11.05.2021	Test Agency: International Centre for Automotive Technology	Cert No:
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		Name Prashant Vijay	
PMI Electro Mobility Solutions Pvt. Ltd. Authorised Signatory D. A. Palai	Sheet No	Designation DGM Certification Business	
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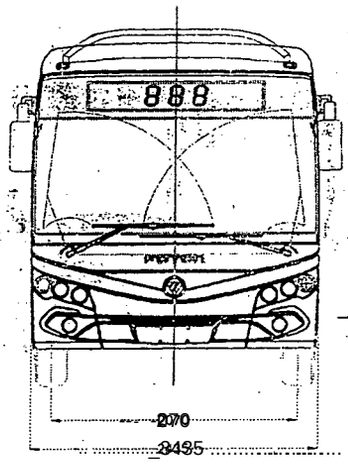
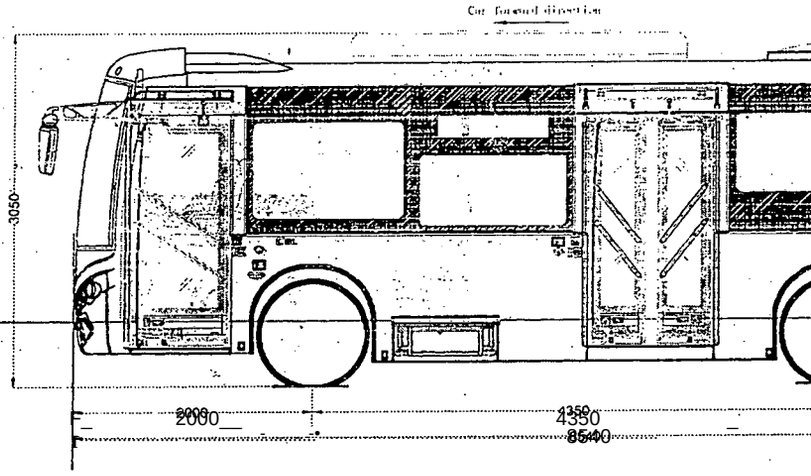
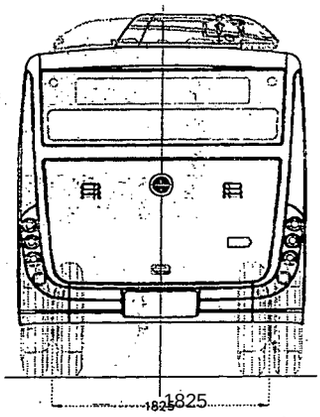
7.5.2	Insulation material used	Cross linked Polyolefin
7.5.3	Is Conduits provided? Write Yes / No	Yes
7.6	List of exposed conductive parts of on-board equipment.	NA
7.6.1	Any potential equalization resistance used to electrically connect these parts Yes/No	NA
7.6.2	If yes give details	NA
7.7	List of failures due to which the vehicle will come to standstill	• Motor system 3 and 4 level fault indication. • Battery system 3 and 4 level fault indication. • Insulation 2 level fault. • Vehicle interlock initiation; • High voltage cutting off; • Contactor adhesive.
7.8	List of conditions under which the performance of vehicle is limited and how.	Motor system 2 level fault indication Battery system 2 level fault indication
8.0	Electrical energy consumption of Vehicle in W-h/km as per AIS-039	659.96 Wh/Km

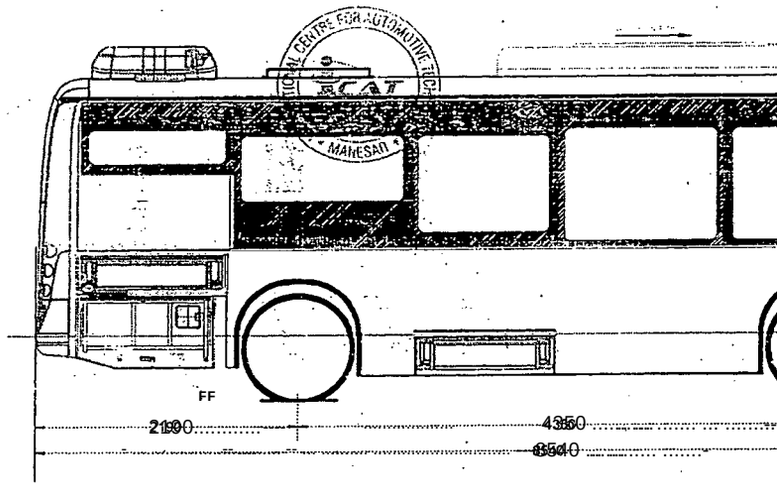
Manufacturer: **PMI ELECTRO MOBILITY SOLUTIONS PRIVATE LIMITED**	**Document No:** **PMI/REG-1515650/001** **Dated: 11.05.2021**	**Test Agency :** International Centre for Automotive Technology	**Cert No:**
Signature: DEVASHISH PAL		Signature Name Prashant Vijay	
	Sheet No	Designation DGM Certification Busi	
Designation: VP DESIGN	Date : 11.05.2021	Date of Issue	Page 8

CAGB 0784 F01 08 OCTOBER 2021 JKK









International Centre for Automotive Technology

Prashant Vijay
DGM Certification Business Unit

PMI ELECTRO MOBILITY SOLUTIONS PVT L					
Size A4	Sign	Date	Revision	Description	De
DRN.	VINIT	25/08/2021			XX-X
CHD	XXXX	XX-XX-XXXX			
APPD	XXXX	XX-XX-XXXX			
Material detail:				Scale	
Finish				Sheet	

Non - Transferable

TYPE APPROVAL TEST REPORT

Report No	G	T	N	S	0	0	0	5	3

Date: 11/12/2018

1.0	Name and Address of the Customer	M/s Ster India Private Limited, Plot No.A1,Sipcot Industrial Park, Irungattukottai, Sriperumbudur taluk, Kancheepuram District, Tamilnadu-602117,India
2.0	Customer Reference	GHTC Reference No:GHN000053
3.0	Description of Component	Bus Passenger Seats, Twin Seater-New City Cantilever Seat
4.0	Part No & Drawing No	Refer Table:1 of Annexure-1
5.0	Objective of the Test	To carry out Type approval test on the test samples mentioned in Sr.No.03 above as per AIS:023/2005 with Amendment No:04.Refer Table 2 of Annexure-1 for details of tests carried out
6.0	Vehicle Category and Group	Category M3 - Group 'A', Class-I
7.0	Name of Manufacturer and address	M/s Ster India Private Limited, Plot No.A1,Sipcot Industrial Park, Irungattukottai, Sriperumbudur taluk, Kancheepuram District, Tamilnadu-602117,India
8.0	Test Procedure & Specification	AIS:023/2005 with Amendment No.04
9.0	Test Results & Observations	Refer Annexure-II

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8.16	Battery cable, harnesses - Hanging / Not clamped / Grommet missing or not sealed	Medium			
8.17	Original battery cable is to be used, in case of changed battery cable it should be from approved supplier - polycab	Critical			
8.18	Fouting of body parts with chassis aggregate - Leaf springs & Mudguard, Exhaust pipe	Medium			
8.19	Tyre Air Pressure	Medium			
	AIS-140 DEVICES				
9.1	Check proper routing of FDAS (FIRE DETECTION ALARMING SYSTEM) clamping / not fouling with engine				
9.2	Check FDAS display on dashboard area is missing / loose / damage / malfunction				
9.3	panic switches :- missing / loose / damaged				
9.4	Emergency lightning system :- system working / device fitted properly / connections				
9.5	Escape hatch :- buzzer working / damage free / proper sealing				
9.6	RPAS sensors fitment / missing / loose / damage / connections not provided				
9.7	FDAS routing engine area - routing with engine heated parts / Clamping / Damage / Loose				
	Any Other Fitments				
10.1	Any Other Fitments as per specs	Critical			
	Signature of the BB Rep.		Signature of the TML / Team lease rep.		

Report No	G	T	N	S	0	0	0	5	3

Date: 11.12.2018

I. Conclusion: The seats mentioned in Sr. No 03 above meet all the requirements of AIS 023/2005 with Amendment No: 04 as per tests mentioned in Table:2 of Annexure I.
10.0 The report is issued as a component level type approval report as requested by seat manufacturer. Seat Static strength tests were conducted considering one reference plane as seat manufacturer has not provided the seating layout. Hence this type approval test report is not valid for layouts having different reference planes.

Remarks: Refer page 3 of 6 for disclaimer clauses

GLOBAL AUTOMOTIVE RESEARCH CENTRE GARC CHENNAI

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3.32	Emergency Door Interior/ Extrusions/ Emergency release lever / Red cover with instructions/ Magnetic catcher :- Missing/ loose / fouling/ damage / aesthetics / function	Critical			
3.33	Emergency exit plate/ Grab handle/ Tow bolt/ Instruction Plate on Door & Bottom :- Missing / loose / fouling / damage / aesthetics / function	Critical			
3.34	LH / RH Window sliding glasses/ locks / Fixed glass / Rock channel / beadings :- Missing / loose / fouling / damage / aesthetics / function / dislodged	Medium			-
3.35	Fans / Fan switch :- Missing / loose / fouling / damage / aesthetics / function as per specification sheets	Medium			
3.36	Check no tool mark or other damage is to be there on stachion pipes & big brkts/ grab rail & mtg brkts / Roof / All Extrusions / Hinge / Lock / Latch pieces and mounting brackets Window frames near mounting screws areas	Critical			
3.37	Check stanchion pipes mounting on roof brackets are done using bolts and nylock nuts.	Medium			
	ELECTRICAL				
4.1	Fuse box should use blade type fuses of Fire Retardant material with current capacity 5/10/15/20/25A as per fuse box requirement	Critical			-
4.2	End Terminals, Connectors & Elements: All the ends shall be suitably crimped	Critical			
4.3	The interconnection shall be through couplers/ junction boxes/ terminal blocks.	Medium			
4.4	The battery compartment shall be well ventilated	Critical			
4.5	Battery compartment shall be separated from the passenger and driver compartment with ventilation.	Critical			
4.6	Ensure presence of rubber grommets for battery cables at battery compartment passing holes	Critical			
4.7	Presence of rubber boot on cut-off switch terminals	Critical			
4.8	Sharp bend should not present at battery cable at cut off switch ends	Critical			
4.9	Battery terminals shall be protected against short circuit risk and should have rubber caps.	Medium			
4.10	Fuse Box Diagram on the fuse box should indicate terminal location and fuse rating	Medium			
4.11	Ensure no lapping taken from body as well as chassis harness	Medium			
4.12	Wipers - Working at all speeds / No Fouling with windshield glass beading during operation.	Critical			
4.13	Washing water from nozzle falls in the wiper blade sweep	Medium			
4.14	Apply Vaseline / petroleum jelly on terminals	Medium			
4.15	Fuse Box, relay bank, cut off switch should be mounted on Fire Retardant & Insulated Sheet.	Medium			
	SHOWER TEST & UNDER BODY				
5.1	Wiper blades to clean water in the Driver's field of vision are not loose and rested in parallel to each other and returning to parking position after switching off. No fouling of blades.	Medium			
5.2	No fouling of wiper motor with intercooler hoses and Accessibility of coolant filling neck should not be obstructed by wiper motor or by any part.	Critical			-
5.3	Wiper motor mounting bracket and triangle plate mounting bracket are slotted type for required adjustment of linkages.	Critical			-
5.4	Wiper system installation certificate (proof) from body builder and wiper supplier for first vehicle of each order is to be attached with PDI sheet.	Critical			
5.5	Water ingress into Height marker lamp, Tail lamp, Headlamp & Side Indicator lamp	Medium			
5.6	Check floor ply/ chequered sheet screws are provided with plylock / nuts for avoiding loosening of screws and sagging or drumming in floor.	Critical			
5.7	No leakage from Windows, RH Door, Emergency Door, Driver Door, Front windshield, Rear Glass, Roof	Medium			
5.8	Under Body Painting / Connector welding / Cowl mounting :- Missing / loose / welding defect / coverage	Critical			
5.9	Check thickness of gusset provided on floor cut outs for fastening trap cover bolts should be 5mm	Critical			
5.10	Clamping, Tie available at every 300mm distance	Medium			
5.11	Sagging of Wire must not be more than 20mm from Body Clamping position below floor cross member	Medium			
5.12	Wiring harness CORRECT ROUTING	Medium			
5.13	All electrical wirings, pneumatic pipes to be kept at 300 mm or more distance away from Silencer/ Exhaust Manifold area	Critical			
	Paint				
6.1	No paint defects on outer and inner panels (Scratches, Rundown, Blister, Rough finish)	Medium			
6.2	No paint overspray (eg: Dashboard, Steering wheel, Gear shifter, ABC pedals, Engine hood, Door & Window beadings).	Medium			
6.3	Fire wall to be painted in matt black matching dashboard and engine hood	Medium			
	WIRE MESH & Other fitment (Refer Specification)				
7.1	Powder Coated Ladder: matt black/ color/ Scratches/ loose fitment/ Aesthetics/ rattling sound	Critical			
7.2	RLC plate for matt black / scratches / loose fitment / Mountings with proper rod sealing/ rattling sound/	Critical			
7.3	RLC: Powder coated Frame angle/rails/ scratches/ roof mounting with proper sealing/ rust/ mounting bolts tighten/	Critical			-
7.4	RLC GI sheet: Loose/ rattling sound/ dent/ waveness/ Extra hole/ drill chips/ Rust on sheet/	Critical			
7.5	Window Wire mesh: powder coated / Rust/ damage / incomplete mesh/ poor weld/ broken/ rattling sound/clamp rust/ coating	Critical			
7.6	Windshield mesh rear: Powder coated/ rust/ incomplete mesh/ broken/ damage/ clamping	Critical			
7.7	No rust on: wiremeshes / Ladder and mounting bolts of ladder are properly tight / RLC and welding of rope hooks on RLC / RVM Brackets and brackets mtg brackets are welded with structural members (in case of overhang type guard rail and its mounting brackets. Salt spray (SS) OK report (as per released Powder coating guidelines / standard) is to be provided for each lot of powder coated items.	Critical			
7.8	Check rope hooks are properly welded on each leg of RLC	Critical			
7.9	Check for proper sealant (521 UV) application on panel joints and on RLC mounting bolts followed by paint application.	Critical			-
	MISCELLANEOUS				
8.1	Unusual sound & Vibration (e.g.: Outer RVMS, Saloon Mirror) from body, Window frame, glasses & Emergency Exit during running the vehicle during the road test	Medium			
8.2	Fouling of body parts with chassis aggregate - Leaf springs & Mudguard, Exhaust pipe	Medium			
8.3	Functioning of Hand brake & Service brake	Critical			
8.4	DENT / ROLL ON RUST PRONE PARTS	Critical			
8.5	Greasing on Sliding and movable Surfaces	Medium			
8.6	Fasteners - Zinc plated with Olive Green passivation	Medium			
8.7	No paint defects on outer and inner panels (Scratches, Rundown, Blister, Rough finish)	Medium			
8.8	No paint overspray (eg: Dashboard, Steering wheel, Gear shifter, ABC pedals, Engine hood, Door & Window beadings)	Medium			
8.9	WINDOW GLASS SLIDING HARD	Medium			
8.10	Confirm the length of weld plate/ correct welding/ proper painting of rear OVER hang	Medium			
8.11	Accessibility for front and rear leaf spring mounting pins and shackle pins OK	Critical			
8.12	Steering oil - Check for easy accessibility & filling	Critical			
8.13	Service brake / Hand brake / Hand brake Buzzer :- Missing / loose / damage / air leakage / function	Critical			
8.14	Brake pipes / Wiring harness / pneumatic pipes / grommets :- loose / hanging / fouling / damage / routing /	Critical			

Report No	G	T	N	S	00	0	0.5	5	3

Date: 11.12.2018

Disclaimer

1. GARC issues Type Approval Certificates (TAC) /Test Reports/ Extension Reports/ Developmental Test Reports for vehicles/ components/ parts/ assemblies etc. based on the documents produced and/ or prototype/ vehicle(s) or submitted by the applicant and testing thereof.

2. GARC issues Type Approval Certificates (TAC) /Test Reports/ Extension Reports/ Developmental Test Reports in compliance to motor Vehicle Act/ central Motor Vehicle Rules and their provisions as amended from time or any other statutory orders under which GARC is authorized. Other Rules / Act are outside the purview/ scope of the TAC/Test Reports/Extension Reports/Developmental Test Reports.

3. Test(s) on prototype(s)/ vehicle(s) or sample(s) is/are carried out on the basis of standard procedures as notified under specific rules/ requested by the applicants. Results of such tests are property of TAC/ Test Reports/Extension Report/Developmental Test Reports. These results cannot be disclosed unless specifically ordered so by Government/court, etc.

4. Unless otherwise supported by a separate Certificate, this Test Reports/Extension Reports/ Developmental Test Reports shall not be considered in isolation as valid Type approval for any vehicle.

5. GARC is not responsible for testing each vehicle/components/parts/assemblies etc. For which Test Reports/Extension reports/ Developmental test reports is issued. Further, GARC is not responsible for ensuring manufacturing quality of the vehicle/components/parts/assemblies etc. for which the Test Reports/Extension Reports/Developmental Test Reports is/are issued.

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9. No extract, abridgment or abstraction from this test report may be published or used to advertise the product without the written consent of the Site-Head, GARC, who reserves the absolute right to agree or reject all or any of the details of any items of publicity for which consent may be sought.

The appropriate local court at Chennai shall have the jurisdiction in respect of any dispute, claim or liability arising out of this report.

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2.20	Rear bumper/ Chequered foot step / Lowered foot step RR tow hook/ Bracket / Tow pin / bottom skid / Cutouts for Access to mounting :- Missing / loose / fouling / damage / aesthetics	Critical			
2.21	Window guard rails (2 nos. of pipe, first pipe height 75 mm & gap b/w guard rails to be 75 to 100mm) & clamps LH RH: loose / damage / taper / powder coat peel	Medium			
2.22	Peep Window Provided on driver side / co driver side (300/300/5mm) :- Sealant / finish /Taper / scratches / over spray	Critical			
2.23	Air Eliminator switch :- Missing / Loose / fouling / damage / aesthetics / function / operating instruction plate should be fitted on the cut out.	Critical			
2.24	RHS Windows / frames / beadings / Weather Strips / holdouts / Window Posts :- damage / scratches / crack / gap	Medium			
2.25	RHS Stretch panels / Skirt panels / Louvres / Rain gutters / Side roof / Graphic Painting / Rivets :- Missing / Loose / fouling / damage / aesthetic / rattling / drumming / gaps / flush	Medium			
2.26	Waist Rail / Extrusions / Beading / End caps / Vertical Extrusions / RH :- Missing / Loose / fouling / damage / aesthetics / function	Medium			
2.27	Flap chains / Hook / Battery sliding tray with Chain Catcher / Terminals / Corrugated sleeve / battery cable / grommets / Drain Hole Missing / Loose / fouling / damage / aesthetics / function	Critical			
2.28	Mudguard / tyre / wheel caps / Mudflaps / Wheel arch beading / RH, Fr RRr : : Missing / Loose / fouling / damage / aesthetics / function / Mudguard gap at front & rear as per design	Medium			
2.29	Side markers 4 nos on each side RRH: - missing / loose / gap / crack / damage	Critical			
2.30	JK Door / glass / beadings should not foul in roller section and to be cut upto roller section / Key Lock / Canopy / nylon brush / Caution sticker / beadings / hinges / handles :- Missing / Loose / fouling / damage / aesthetics / function / dislodging	Critical			
2.31	Jk Door Sliding channel / Bottom bearing Grease Nipple / Aperture / Rubber stoppers / jamb post :- Missing / loose / damage / aesthetics / function	Medium			
2.32	J,K, Door inner opening handle / linkage / Striker / assist "S" pipe / Inner glass protector handle :- Missing / loose / damage / aesthetics / function	Medium			
2.33	Step well / Extrusions / Chequered plate / Assist rail (vertical) / Step lamp Sunken Type :- Missing / loose / damage / aesthetics / function	Medium			
2.34	Exterior Panel above J,K Door / Roof Exterior / UV Sealant :- Missing / loose / fouling / damage / aesthetic / rattling / drumming / gaps / flush	Medium			
2.35	Check for proper sealant (521 UV) application on panel joints and on RLC mounting bolts followed by paint application.	Critical			
	INTERIOR				
3.1	PVC coated interior panels / window posts / back panel / front header / side wall / Above dr.door, J,K, Door :- Missing / loose / fouling / damage / aesthetics / rattling / bulging / drumming	Medium			
3.2	Extrusions /PVC linings /curtain rail LH/ RH / rear / hooks :- Missing / loose / fouling / damage / aesthetics / rattling / bulging / drumming	Medium			
3.3	Check for underlength and gaps with roof panelling in roof Al extrusion and end caps are tightly fixed with extrusions.	Critical			
3.4	Roof Grab Rail / Sockets / End caps :- Missing / loose / fouling / damage / aesthetics / function	Medium			
3.5	Roof lamp / Bell switches / Driver ventilator / AC Exhaust grill / Perforated flap / Knobs (refer specs) :- Missing / loose / fouling / damage / aesthetics / function / accessibility	Medium			
3.6	Check tubular hatrack pipes fixed on end brackets using lock pins and end covers provided on end brackets.	Critical			
3.7	Hat rack / End covers / Extrusions / Rexene / padding / Brackets / AC Ducting / AC Nozzles / side wall duct cover / LH / RH :- Missing / Loose / Scratches / damages / aesthetics / function	Medium			
3.8	Dashboard design keeping instrument cluster at its original chassis position for better driving and instrument cluster visibility.	Critical			
3.9	Clutch oil filling access flap provided with screws on dashboard :- Missing / loose / fouling / damage / defective / gap / taper / function	Critical			
3.10	Driver side Sunvisor (roller blind type) / Saloon mirror / AC Duct above driver / AC Duct above RH 1st Seat / AC Nozzles :- Missing / loose / fouling / damage / defective / gap / taper / function	Critical			
3.11	STG wheel / cloumn / Combination Switch :- Missing / loose / fouling / damage / aesthetics / function	Critical			
3.12	ABC pedals / rubber covers / Chequered plate / Washing unit container / Driver ventilator :- Missing / loose / fouling / damage / aesthetics / function.	Critical			
3.13	Dashboard / Fuse box / Spare fuses / Inst cluster / switches / piconake with screen printed identification sticker / Joy stick / Engine stop knob :- Loose / missing / fouling / damage / aesthetics / function / over spray / fuse box cover with correct screen printed sticker	Medium			
3.14	No floor gap adjecent to: - fire wall area in front of co driver seat / Wheel humps / Tuch hump / chequered sheet joints	Critical			
3.15	Slots for spare switches are not to be left open on instrument cluster.	Critical			
3.16	Check for clamping of wiring harness under dash board area. wiring should not hang loose so that it does not get entangled with driver feet while operating ABC pedals.	Critical			
3.17	Driver seat / Degree adjuster / Riser Bellow / headrest / Battery cut off switch / cover / Cable / Grommets :- Missing / loose / fouling / damage / aesthetics / function	Critical			
3.18	Hylem sheet mounted battery cut-off switch should be easily accessible to driver and function or access to switch should not be obstructed by any other part.	Critical			
3.19	Fire extinguisher 5 kg Dry Powder - ABC type (pressure indicator should be in " green" zone) :- Access not OK / missing / loose / fouling / damage / aesthetics	Critical			
3.20	Seat belts / buckles (For driver + 1st row of the RH Seats) / buzzer / seat arm rests :- Missing / Loose / fouling / damage / aesthetics / function / Torque 7.5 mkg	Critical			
3.21	Body, Chassis, Cowl number plates :- Loose / taper / missing / damage / overspray	Medium			
3.22	JK Door / Solenoid switch / Pneumatic pipes / forks / pins / linkages / dobs :- Missing / loose / fouling / damage / aesthetics / function in case of pneumatic door	Medium			
3.23	Air cleaner inspection cover / Lock / Cut out Grip Beading / cover insulation / hoses / Power Stg oil container :- Missing / loose / fouling / damage / aesthetics / function	Medium			
3.24	Driver partition (Green tint glass with frame) :- Missing / loose / damage / aesthetics / Leg room Min 400 mm for seat behind D.Partition	Medium			
3.25	Step partition (anodised) / sockets / grey powder coating / First aid box :- Missing / loose / damage / aesthetics / anodised	Medium			
3.26	Engine hood (mat black) / Lifting handles / Beading / Seal / Toggle clamps / Gear lever knob in right orientation / boot :- Missing / loose / fouling / damage / aesthetics / hot air leakage / Rust / overspray.	Medium			
3.27	Flooring / driver and passenger cabin / Front wheel Hump / Floor extrusions and beadings :- Bulging / loose pasting / damage / gaps / crude cutting of edges	Medium			
3.28	Floor cut out covers - gear box / float / strainer / Lifting handles / sealing :- Missing / loose / fouling / damage / aesthetic / function / locking / unlocking / accessibility problem	Medium			
3.29	Floor Extrusions / step well / step lamp :- Missing / loose / damage / fouling / aesthetics / function / hard anodised /	Medium			
3.30	Passenger Seats / rexene :- Missing / loose / fouling / damage / cut / aesthetics / rattling sound.	Medium			
3.31	Tool box / Jack / rod / clamp :- Missing / loose / fouling / damage / aesthetics	Medium			

Report No	G	T	N	S	0	0	0	5	3

Date: 11.12.2018

Annexure-I

TABLE 1:-

Sr.No	Description of the Seat	Drawing No.	Part No.	With Head Restraint	With Armrest
1.0	Twin Seater New City Cantilever Seat	04861-0001-000-00-01	04861-0001-000-00-01	No	Yes

TABLE 2:-

Sr.No	Test Name	Tests Conducted
A	Dimensional Measurement	Yes (As per Clause 4.3.1.1, 4.3.1.3, 4.3.1.4, 4.3.1.5, 4.3.1.6, 4.3.1.8 & 4.3.1.9 of AIS:023/2005 for Group A)
B	Static Strength of Seats	Yes (As per Clause 4.3.2.1 & Clause 5 of AIS:023/2005)
C	Energy Dissipation	Yes (As per Clause 4.3.2.1 & Clause 6 of AIS:023/2005)

Note:

1. Approval of Dimensional Measurements as per clause no. 4.3.1.2, 4.3.1.7, 4.3.1.10 & 4.3.1.11 to be taken by vehicle/bus body building manufacturers when seat is fitted in the vehicle.
2. Approval of Seat Anchorage of a vehicle type as per Clause no 4.3.3 to be taken by vehicle/bus body building manufacturer when seat is fitted in the vehicle.

GLOBAL AUTOMOTIVE RESEARCH CENTRE * CHENNAI * GARC

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TATA Document: TBV QAF 009	FLM Check Sheet	FLM Sheet FLM-112/12 Release Date : 14/02/2013		
Model Description :	Master MCV Buses			
VC No :				
Chassis No :				
BB Name :				
Inspection by :				
Inspection Date :				

Sr. No.	Parameter	Criticality	Observation Body Builder Representative	Observation – TML Representative	Remarks
	FRONT				
1.1	Front face should be of 55 sheet metal/OE/cowl face with single piece windshield / LH/RH & Center flap to be painted Black/white.	Critical			
1.2	Front Header / Joint with roof / A Pillars / LH / RH - Damage / Waviness / Poor finish / Aesthetics	Medium			
1.3	Peep window provided on driver & co driver both side A Pillar and on driver door below window incase of extra width of A pillar causing blind zone.	Critical			
1.4	Outer RVM / LH / RH / Underview Mirror / Brackets / Front Height Markers / Front Rain Gutters:- Missing / Loose / Fouling / Damage / Aesthetics / Function / CMVR on mirrors / Rust on RVM brackets.	Critical			
1.5	Front Windshield / Single piece Rubber Mould / Sealant Application:- Missing / Loose / Damage / Corner gaps / Beading edges trimmed / Aesthetics	Medium			
1.6	Front windshield cleaning grab handles:- Missing / Loose / Fouling / Damage / Aesthetics	Medium			
1.7	Front white reflecting tape below windshield and on front bumper (as received in chassis) is to be replaced with new if fadded or damaged.	Critical			
1.8	Wiper blades / Wiper Motor / Bracket / Linkages / Locks / Wheel Box / Spray nozzles / Washing unit / Tube / Grommet:- Missing / Loose / Fouling / Damage / Aesthetics / Function	Critical			
1.9	Headlights / Headlight removable Panel / Mesh / Mascot:- Missing / Loose / Fouling / Damage / Aesthetics / Function	Critical			
1.10	Center flap / Tata Plate / Tata Logo / Centre Grill / Locking Knob:- Missing / Loose / Fouling / Damage / Aesthetics / Function	Medium			
1.11	Center Flap Hinges / Stay rod / Clamp / Budget lock / Catcher / Service indicator / Radiator / Horn / Cowl Wiring / Grommets :- Missing / Loose / Fouling / Damage / Aesthetics / Function	Critical			
1.12	Registration number plate / Front Bumper / Fog lamps / Front Indicators / Front Parking Indicator / Access to Tow pin:- Missing / Loose / Fouling / Damage / Aesthetics / Function	Critical			
1.13	Tow hook accessibility is to be ensured without any damage to body while towing.	Critical			
1.14	Check for symmetrical gaps at both ends of front bumper. Uniform gap with side paneling	Critical			
1.15	Front Face Bottom Cut out / Front Bumper bottom Cut out / Bumper Gaps:- Missing / Loose / Fouling / Damage / Aesthetics / Function	Medium			
1.16	Front bumper (Bumper thickness 1.5 mm painted in body colour & lower bumper panel 1mm thick with rubber end covers) & number plate - loose / damage / front gaps / taper / flush & gap with side panels. In case of FRP bumper, thickness of FRP should be minimum 3mm.	Medium			
1.17	Coolant level / Engine Oil level / Dip Stick Clamping:- More / Less / Missing / Loose / Fouling / Damage	Medium			
1.18	Front show mountings:- Missing / Loose / Fouling / Damage	Medium			
1.19	Front show FRP surface:- Aesthetics	Medium			
	SIDE, REAR & ROOF (EXTERIOR)				
2.1	Outer panels above & below Driver door / Driver door / outer panel / outer handle / key lock / Foot step without fouling with tyre while turning / Door sealing / Window :- loose / damage / lock defective / not adjusted / function	Medium			
2.2	Dr. door interior / hinges / full engagement of dove tails / handles of vinyl plastic make, identification marks, mounted using pan head screws / trim / sealing / edge cover / "B" post handle / Aperture / Buzzer / Striker / Latch / Extrusions:- Missing / loose / fouling / damage / aesthetics / function	Medium			
2.3	Powder coated aluminium window guard rails / Guard rail brackets at centre gap of frames / Clamps:- Missing / Loose / fouling / damage / aesthetics / rattling sound	Critical			
2.4	LHS Stretch panels / Skirt panels / Louveres / Rain gutters / Side roof / Graphic Painting / Rivets:- Missing / Loose / fouling / damage / aesthetic / rattling / drumming / gaps / flush	Medium			
2.5	LHS Windows / frames / Glasses / beadings / Weather Strips / Capping / Window Posts:- damage / scratches / crack / gap	Medium			
2.6	Waist Rail / Extrusions / Beading / End caps / Vertical Extrusions LH / RH :- Missing / Loose / fouling / damage / aesthetics / function	Medium			
2.7	Access Flaps / AC Engine & Compressor / Gas Springs / Heat shielding for AC Engine compartment / refrigerent pipes:- Missing / loose / damage / aesthetics / function	Medium			
2.8	Mudguard / tyre / wheel caps / Mudflaps / Wheel arch beading LH / Frt / Rr :- Missing / Loose / fouling / damage / aesthetics / function / Mudguard gap at front & rear without any fouling	Medium			
2.9	Side reflectors / markers 4 nos on each side LH - missing / loose / gap / crack / damage	Critical			
2.10	Emergency door / Exterior / Break Glass / Beading / Red Arrow / Handle / Extrusions / Window:- Missing / Loose / fouling / damage / aesthetics / function	Critical			
2.11	Emergency door apperture uniform cutting and proper fixing of rubber beading on apperture.	Critical			
2.12	Rear Show / Rear header / Rear 3 pc wind shield / Rubber beadings / Rear show joint with roof / Sealant:- Missing / loose / fouling / damage / aesthetics / Cracks	Medium			
2.13	Rear three piece wind shield apperture is to structure type (solid apperture for rear three piece wind shield in place of rubber profile partition between rear glasses.	Critical			
2.14	Rear Height marker lamps on rear header (Red) / lamps 2 Nos at rear below rear wind shield :- Missing / loose / damage / water ingress / gap at bottom	Critical			
2.15	TATA Monogram / Rear Grab Handles 2 nos:- Missing / loose / damage / aesthetics	Medium			
2.16	Turkey Tail lamps LH & RH / Access to mounting:- Missing / Loose / damage / crack / water ingress / not working / gap	Critical			
2.17	Reg. No. plate / lamp missing / loose / rust / damage / gap	Critical			
2.18	Access Flaps for spare wheel, Battery, Fuel flap, Lock / Knob / Catcher / clamp / hinges :- Missing / Loose / fouling / damage / aesthetics / function	Medium			
2.19	Battery - All battery cells should be accessible for top up purpose / Loose Connections / Terminal damaged or melted / crack in battery.	Critical			

Report No GNST0NS000513 Date: 11.12.2018

Annexure II

Test Results & Observations:-

1.1 Dimensional Measurement: Clause 4.3 of AIS 023/2005 (Group A, Category M3, Class I Vehicle)

Sr.No	Seat Variant	Test Description	Cl.no	Min. Specified value	Observed value
1.1.1	Twin Seater New City Cantilever Seat (04881e0001e000-00-01)	Width of seat cushion (HH) (mm)	4.3.1.1	800mm	880mm
1.1.2		Back Rest Height (H) mm	4.3.1.3	800mm	996mm
1.1.3		Depth of seat cushion (K) mm	4.3.1.4	350mm	400mm
1.1.4		Torso angle (α°) 4.1	4.3.1.5	12°	21°
1.1.5		Seat Base Height mm	4.3.1.6	350-500mm	460mm
1.1.6		Armrest height (A) mm	4.3.1.8	Min. 175mm	240mm
1.1.7		Armrest section width mm	4.3.1.9	40mm	40mm

Note:
Approval of Dimensional Measurements as per clause no's 4.3.1.2, 4.3.1.7, 4.3.1.10 & 4.3.1.11 to be taken by vehicle/bus body building manufacturer when seat is fitted in the vehicle.

1.2 Static Strength of Seat Test: Clause no. 4.3.2.2 & Clause no. 5.0 of AIS 023/2005

Sr.No	Seat Variant	Test conditions	Specified Load to be Applied, N	Specified Displacement, mm	Achieved Load, N	Observed Displacement, mm
1.2.1	Twin Seater New City Cantilever Seat (04881e0001e000-00-01)	At H1 Position	2500±100	100 ≤ 400	2500	102
		At H2 Position	7272±200	≥ 50	7200	52

Note: H1 and H2 Positions are selected as 800mm and 550mm respectively from seat anchorage mounting plane

Cr1

GARC

B.Sabarinath	S.Nagarajan	M.V.Ramachandran
Supervisor-Certification Lab	Manager-Certification Lab	Site Head-GARC
(Prepared by)	(Reviewed by)	(Approved by)

Plot E1, SIPCOT Industrial Growth Centre, Oragadam, Mail to: Post, Sriperumbudur Taluk, Kancheepuram Dist. 602105. Tamil Nadu, India.
Ph: +91-44-27143500 E-mail: enquiry@garcc.in Web: www.garcc.in

Sr. No.	Shop	QA Inspector Name	QA Inspector Sign.	Remark
1	Structure			
2	Paneling			
3	Paint			
4	Trim			
5	PDI			

Report No	G	T	N	S	0J0	0	0 1 5	3 1

Date: 11.12.2018

Annexure II (contd.,)

1.3 Energy Dissipation test Clause no.4.3.2 Cl.No.6 of AIS 023/2005

Sr.No	Seat Variant	Specified Type & Direction of Impact	Specified Impact Speed & Time Duration (t) above 80g	Observation: Achieved Impact Speed & Time Duration (t) above 80g.,	Observation: Average 'g' Level	Remarks
1.3.1	Twin Seater, New City. Cantilever Seat (04861-00001-00-00-01)	Rear Impact (Area III) Towards front -LH	24.1 ± 0.5 km/hr & t ≤ 3ms	23.7 km/hr & 0ms	20.7	No dangerous. edge protruded out during and after the test
1.3.2	-	Rear Impact (Area III) Towards front - RH	24.1 ± 0.5km/hr & t ≤ 3ms	23.8 km/hr & 0ms	26.2	No dangerous edge protruded out during and after the test

B.Saharnath
Supervisor-Certification
(Prepared by)

S.Nagarajan
Manager-Certification Lab
(Reviewed by)

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Technical Information for the Type Approval Test Report of Automotive Vehicles—Seats, their Anchorages and Head Restraints for Passenger Vehicles of Categories M1, M2, M3 and Goods Vehicles of Category N as per AIS 023-2005 Amendment No 4

1.0	General Information	Information to be filled by the Customer
1.1	Name & address of the Customer	Ster India Private Limited Plot No. A1, Sipcot Industrial Park Irungattukottai, Sriperumbudur Taluk, Kancheepuram District, Tamil Nadu, 602117, India.
1.2	Telephone No	044-27156404/7829946604
1.3	E-mail address	Prashanna@stc.com
1.4	Contact person Name/Designation	Prashanna D/Manager-Quality
1.5	Trade name or mark of the motor vehicle	NA
1.6	Vehicle Category	M3
1.7	Group and Class	"Class I Group 'A'"
1.8	Application on Vehicle Model(s) & Variants	Passenger Bus
1.9	Seat Manufacturer's name and address	Ster India Private Limited Plot No. A1, Sipcot Industrial Park, Irungattukottai, Sriperumbudur Taluk, Kancheepuram District, Tamil Nadu. 602117, India.
2.0	Details of the Seat	
2.1	Part Number & Drawing No.	04861-0001-00-00-01
2.2	Seat Type (Driver's Seat/ Front Passenger seat/Passenger Seat/Individual Seat/Bench Seat/Group of seat and seating Positions)	Bus Passenger Seat, Twin Seater New city (cantilever Seat) (Double Seat NC.) Report no: GTNSE0053
2.3	SFIs with head restraint	NA
2.4	Seat attachment fittings and its adjustment	NA
2.5	Displacement and locking system including the minimum distance between fitting points	NA
2.5	Position and arrangement of seats	NA
2.6	Seats, if any, which incorporate a safety belt anchorage	No
2.7	Description of seat anchorages	NA
2.8	Energy absorption test of the rear part of the seat back	Yes
2.9	Size and grade of bolts fitted with the seats on the floor in the vehicle	NA

Information document Page 01 of 03

S.NO	Part	SERIAL NO	MAKE	VERIFIED BY
1.	The frame			
2.	Heavy rubbing			
3.	Brake hose			
4.	Steering gear assembly			
5.	Front axle assembly			
6.	Rear axle assembly			
7.	Engine			
8.	Starter			
9.	Transmission			
10.	Drive shaft assembly			
11.	Retarder assembly	Transmission built-in Starter series number / Controller Series No.		
12	24V Battery			
13.	Generator assembly			
14.	Radiator			
15.	Cold machine			
16.	TYRE FRONT RHS			
17.	TYRE FRONT LHS			
18.	TYRE REAR RHS(OUT)			
19.	TYRE REAR RHS(IN)			
20.	TYRE REAR LHS(OUT)			
21.	TYRE REAR LHS(IN)			

2.10	Number of occupants and description of foam / trim for each seat.	2 Seater, Polyurethane Foam, Upholstery as per Drawing
2.11	Details of Mounting / Orientation of the Component (Sketches/Photograph)	Attached Drawing
2.12	Dimensions of armrest	As per attached Drawing
3.0	**Documents / Drawings to be submitted**	
3.1	Detailed Dimensional Engineering Drawings preferably on A3/A4 size.	Attached A4 Drawing
3.2	Drawings showing Seating Layout and Seat anchorages	NA
3.3	Drawings showing the area of the rear part of the seat back verified for energy dissipation	NA
3.4	All seat drawings with seat manufacturer's drawing number and Vehicle manufacturer's drawing number/part number	As per Drawing
3.5	In the case of seats fitted with head restraints, the head restraint shall be shown on all drawings, diagrams and photographs.	NA
Additional information if any		-

Report No: GTNS 00053

GARC CHENNAI

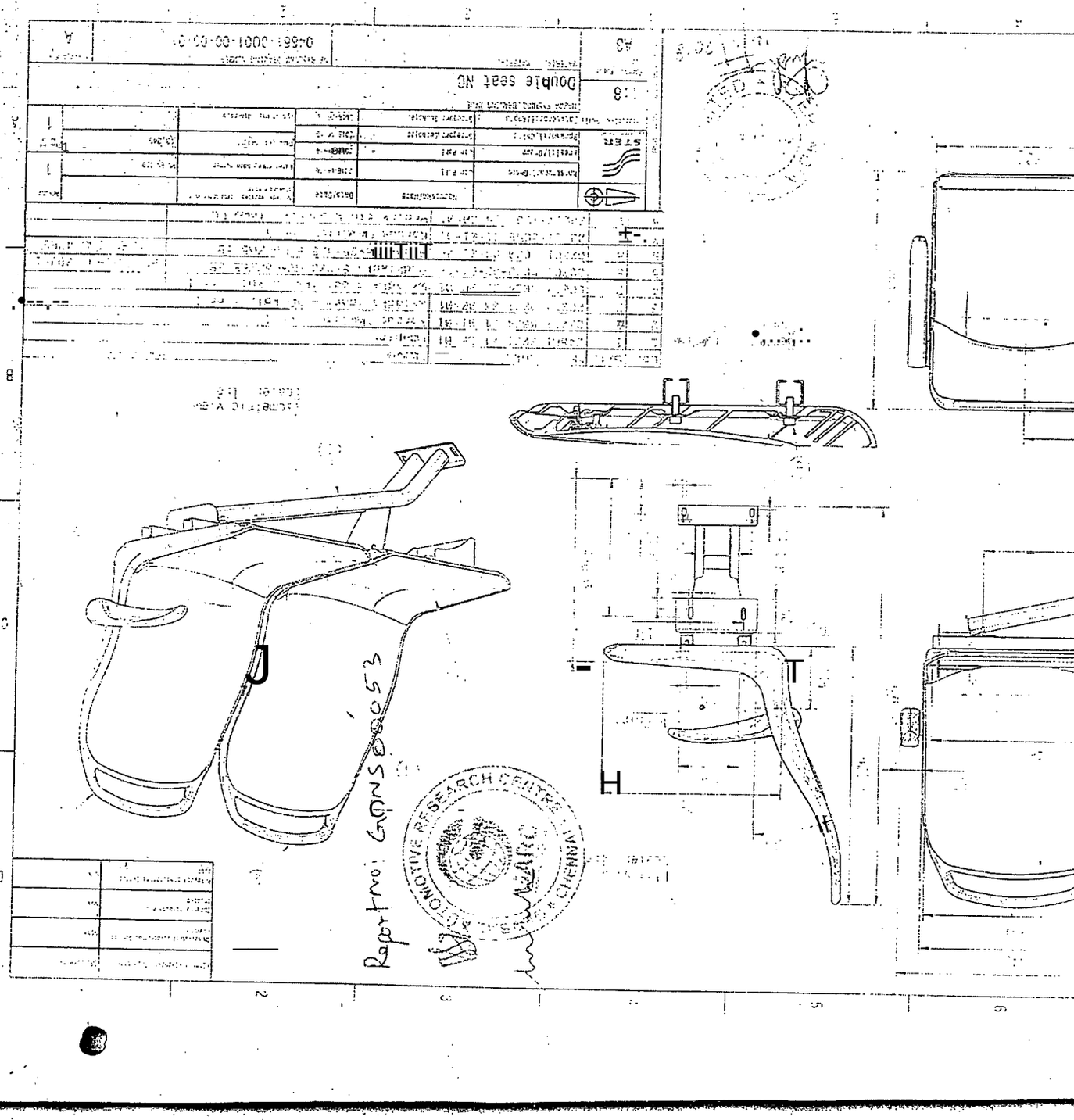
Note: - In case of EXTENSION, please provide details of Base Test Report (attach copy also)

Please Provide Details here	-

Details of Concern Person	Contact Person	Contact Person (Alternate)
Name	Prashanth D	Janardhanan MA
Designation	Manager-Quality	Plant Head
Contact No	7823946604	7823946601
E-Mail	Prashanth@stcm.pl	jana@stcm.pl
Date	14.11.2018	14.11.2018
Signature with Seal	STC INDIA PRIVATE LIMITED A-1, SIPCOT Industrial Park, Sriperumbudur Taluk, Irungattukottai, ... 602 117.	

Information document page 02 of 03

S.NO	Inspection Items	Project Requirement	Defect description	Defect category	Responsible unit	Repair confirmation	Inspection Confirmation
43	Airbag height adjustment	The installation height error of the airbag is ±5mm, and the height valve swing rod is perpendicular to the connecting rod.					
44	Cotter pin	The two ends of the split pin at the nuts of both ends of the steering rod are separated, and the separation Angle is greater than 120°. The split pin has no shaking and channeling phenomenon.					
45		The two ends of the split pin at the fixing nut of the steering arm are separated, and the separation Angle is greater than 120°. The split pin has no shaking and channeling phenomenon.					
46		The two ends of the split pin at the throttle pedal are separated, and the separation Angle is greater than 120°. The split pin has no shaking and channeling phenomenon.					
47		The two ends of the split pin at the brake pedal are separated with the separation Angle greater than 120°, and there is no shaking or channeling of the split pin.					
48	Leakage test and pressure retention of brake line	Connect the barometer for a pressure holding test and check the barometer pointer for 30 minutes without dropping.					
49	Engine oil and item inspection	Engine surface debris cleaning					
50		Engine cylinder number and nameplate					
51		Check engine oil filling type and quantity					
52		Check the type and quantity of gearbox oil filling					
53	Reserved pipeline, wiring harness	Reserved pipeline, joint sealing					
54		Reserve the seal of the connector					


Double seat NC
STEER
J
H
T

CHASSIS QUALITY INSPECTION RECORD							PAGE-21
S.NO	Inspection Items	Project Requirement	Defect description	Defect category	Responsible unit	Repair confirmation	Inspection Confirmed
1	Wire harness	The chassis wiring harness is fixed on the frame with clamps, and the spacing between clamps is no more than 400mm.					
2		The wire harness passes through the frame holes with rubber grommet or lead strip protection.					
3		In the distance from the high temperature (supercharger, exhaust pipe, retarder air pump steel pipe) within the scope of 200mm as far as possible not to arrange, can not avoid when the installation of heat insulation board, insulation measures wrapped cotton insulation.					
4		The wiring harness shall not exceed the plane under the underframe.					
5		The wiring harness connector at the underframe of the vehicle shall be wrapped with insulating tape for protection.					
6		The wiring harness is arranged separately from the oil pipe and water pipe.					
7	Suspension	The gap between shock absorber and adjacent parts is greater than 20mm.					
8	Transmission	The valve mouths of the inner and outer tires should be staggered 180°, and the phenomenon of creases and fractures is not allowed after the elongated tracheas is bent					
9	Tire dynamic balance	For the hub and brake drum joint or hub and brake disc joint, when installing the tire, the tire light point should correspond to the blue point point on the outer end face of the tire bolt corresponding to the remaining unbalance position point of the hub and brake drum joint or hub and brake disc joint.					
10		The position of the dynamic balance block of the inner and outer tires of the rear axle is symmetrical, and the error is not more than 1 tire bolt distance. The valve nozzle of the inner and outer tires should be staggered 180° (in case of conflict, the position of the dynamic balance block should be ensured first)					
11		Minimum clearance between balance block and brake: fix the axle and rotate the wheel to ensure that the actual minimum clearance between balance block and brake chamber bracket is not less than 3mm.					
12	Engine hoisting	Engine Angle: engine mount cushion clearance is uniform, strictly According to the Angle Control Parameters Control Table.					
13		Engine cushion: cushion clearance from cushion metal shell without obvious distortion.					
14	Steering system	Steering rod installation: complete split pin, split pin end part of the opening greater than 60°.					
15		Moving parts of the steering system shall not interfere with other parts during the whole steering process, and the minimum spacing shall be 10 mm.					

TEST REPORT

1.	Test Report No.	:	ERL/2018-19/3000003974/ 916 Date: 30.11.2018
2.	SO No.	:	3000003974
3.	Customer's Name	:	STBR INDIA PVT LTD.
4.	Customer's Address	:	Plot No: A-1, Sipcot Industrial Park Irungattukottai Sriperumbudur, Kanchipuram-602 117 Tamilnadu
5.	Letter reference and date	:	E mail dt. 10.10.2018
6.	Kind Attention	:	Mr. Prashanna. D Manager Quality Assurance
7.	Service requirements	:	Testing of material for Flammability as per IS 15061-2002 Clause Annex. C.
8.	No. of Samples	:	01.
9.	No. of pages	:	03.
10.	Test Report Compiled By		Ms. N D GHAVATE CHEMIST
11.	Test Report Verified & Approved By		Mr. A HAWASE DEPUTY GENERAL MANAGER

Place of Issue: PUNE

Date of Issue: 30.11.2018

DISCLAIMER:

This test report pertains only to the components / assemblies / vehicles etc. actually tested at ARAI in the presented condition [illegible] / manufactured / submitted by the customer. The issuance of this test report alone does not indicate any [illegible] of the product. No extract, abridgement or abstraction from this test report shall be published or used to advertise the product without the written consent of the Director, ARAI, who reserves absolute right to agree or reject [illegible] publicity for which consent may be sought. ARAI is in no way responsible for any misuse of [illegible] design / type / system in connection with entire vehicle / components / parts and assemblies. Breach of any statutory provision of official laws or laws [illegible] will be the sole responsibility of the customer and ARAI shall not be liable for any claims or damages [illegible] whatsoever, the customer shall be liable for the same and undertakes to indemnify ARAI in this regard. Further, the ARAI has the right to [illegible] withdrawal of the certificate issued, in case of any [illegible] to the knowledge of ARAI. The appropriate local courts in Pune shall have the jurisdiction in respect of any dispute or liability arising out of this report.

ARAI will preserve the tested samples for a period of ONE month from the date of issue of the test report. Queries, if any, regarding the sample or the test report will be attended to in this stipulated period of ONE month only. Further, the test standards, drawings supplied by customer, letters, e-mails etc. exchanged with respect to this test work will be preserved in our custody for a span of THREE years from the date of the report.

FRL/2018-2019/R000000974
SO No.3100003974

TEST REPORT

Name of the customer	=	STEER INDIA PVT. LTD.
Service requirement	:	Testing of material for Flammability as per IS: 15061-2002 Clause Annex. C.

1.0 Sample Details as submitted by customer:

Material Manufacturer name	:	STEER INDIA PVT. LTD.
Material Grade	:	Plastic
Material Type	:	Polypropylene
Component Part No.& Batch No.	:	Seat Shell/Insert/ARM Rest/ Hip Support/ Back side cover
Identification Code	:	NA
Drawing No	:	Refer Table
Date Of testing	:	25.11.2018

Table:

S.NO	MODEL	PART NAME	DRAWING NO
1	SAPPHIRE	SEAT INSERT	00022-7001-12-01-01
2		SEAT LOCK	00022-0200-0-06-01-01
3		ARMREST	00022-0012-02-02-01
4		ARMREST DISTANCE LH	00022-1002-2-01-0-01
5		ARMREST DISTANCE RH	00022-1000-2-2-UD.1o01
6		ARMREST CAP	00022-1001-2-03-0-01
7		FOOT COVER LH	00022-7005-100-01
8		FOOT COVER RH	00022-7006-0-0-01
9		BACKREST COVER	00022-7004-0-01-01
10		GRAB HANDLE	0002-0023-00-00-0101
11		0001 SMER PROFILE	00022-7002-002-02-01
12	MB	SHELL	04188-0020-00-01-01
13		BACKREST INSERT	00000-5050-01-01-01
14		SEAT INSERT	00000-5085-02-01-01
15		ARMREST DISTANCE LH	04188-0022-50-04-01
16		ARMREST DISTANCE RH	04188-0021-50-0-01
17		ARMREST	00022-01015-51-03-01
18		ARMREST CAP	00017-1030-01-01-01
19		STANCHION COVER	[illegible]
20	NC 400 MM	SHELL	00017-1235-00-00-01
21		BACKREST INSERT	00017-1235-03-01-01
22		SEAT INSERT	00017-23542-01-01
23		ARMREST DISTANCE LH	00017-1255-04-01-01
24		ARMREST DISTANCE RH	00017-1254-04-01-01
25		ARMREST CAP	00000-5410611-0-01
26		ARMREST	00017-1030-11-01-01
27	NC 140 MM	SHELL	00017-1164-00-00-01
28		BACKREST INSERT	00017-0002-00-01-01
29		SEAT INSERT	00017-0005-02-01-01
30		SEAT LOCK LH	00017-0016-02-03-01
31		SEAT LOCK RH	00017-0016-02-02-01
32		ARMREST DISTANCE LH	00017-1106-15-01-01
33		ARMREST DISTANCE RH	00017-1105-15-01-01
34		SEAT INSERT RAL 2004	00017-0004-02-01-01
35		BACKREST INSERT RAL 2004	00017-0000-00-01-01
36		SEAT INSERT RAL 5017	00017-0001-02-01-01
37		FOOT SUPPORT	00017-0007-03-00-01
38		STANCHION COVER NC	00017-0017-05-00-02
39		BACKREST INSERT RAL 5017	00017-0010-00-01-01

1.0 Melting Behaviour Test as per IS: 15061: 2002; Clause 3.4 and Annex C

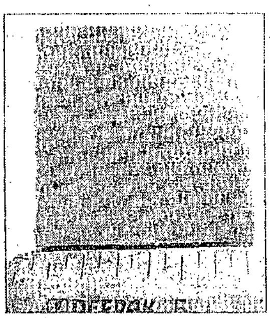
1.1 Observation Table:

Sr. No.	Test Description	Specified Requirement	Observation			
			Test Piece 1	Test Piece 2	Test Piece 3	Test Piece 4
*1.	* Melting Behaviour test as per IS: 15061: 2002 Clause 3.4 Annex C	The result of the test shall be considered satisfactory if, taking the worst test result, no drop is formed which ignites the cotton wool.	No drop was formed which ignites the cotton wool. (Refer Photograph)			
2.	Remark	Sample under test meets the Melting Behaviour test requirement when tested as per IS 15061: 2002; Clause 3.4 and Annex C				

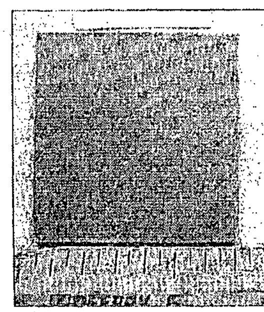
The tests mentioned with an * is not accredited by NABL.

Photograph

Sample Before test



Sample After test



Test Report Compiled By

Ms. N.D. GHAWATE
CHEMIST

Test Report Verified & Approved By

Md. A. RAWASI
DEPUTY GENERAL MANAGER

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AkzoNobel India Limited
Powder Coatings
Bangalore 562114

Test Report

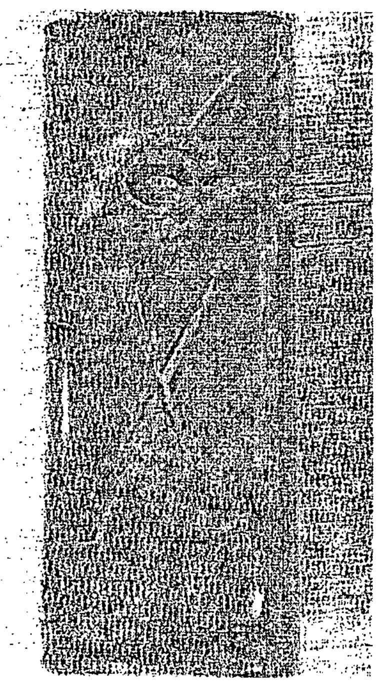
AkzoNobel

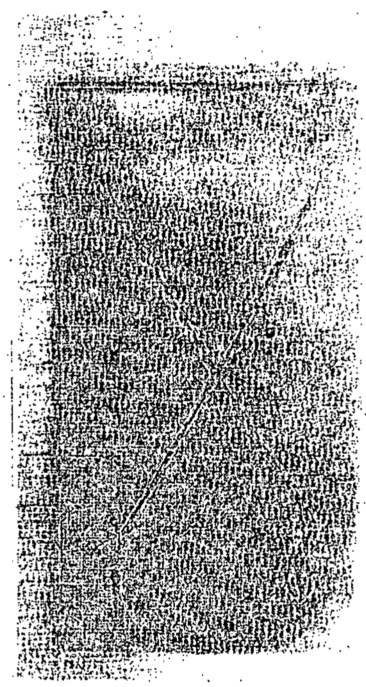
Department	Powder Coatings
Author	Krishnendu
Subject	Salt Spray Test report of 2-Coat Powder coating on customer line-coated panel & component
Customer	M/S STER India
Date	10/01/2020

2-Coat System: AL166N + MPC69N

1. **Salt Spray Resistance Test:**

Test	Specification	Observation	Remarks
Salt Spray Resistance	ASTM B117 – 1500 hrs.	Observed no blister, rust creep age is <3mm after 1500 hrs.	Passes 1500 hrs. 1.





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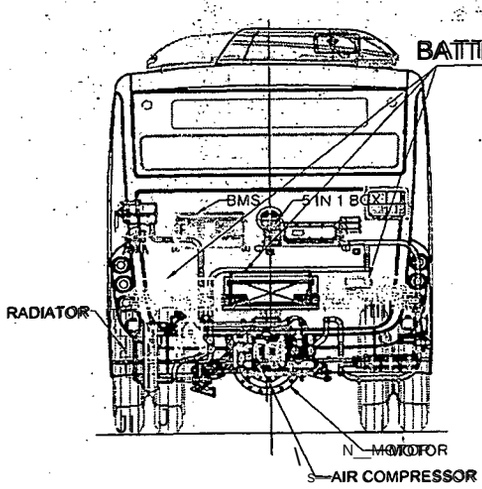
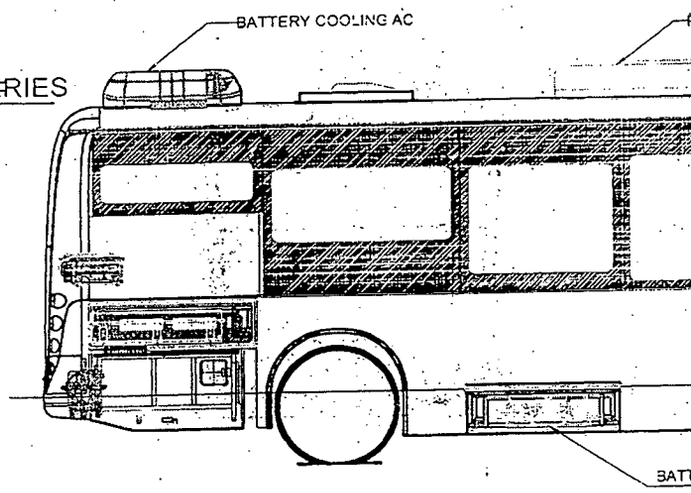
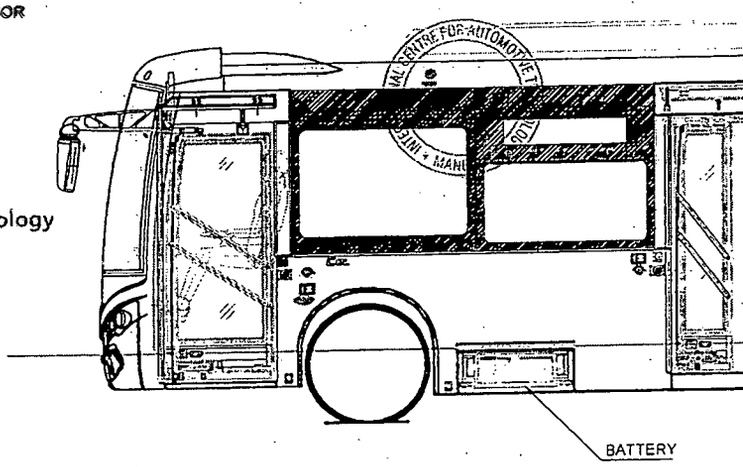
08 OCTOBER 2021







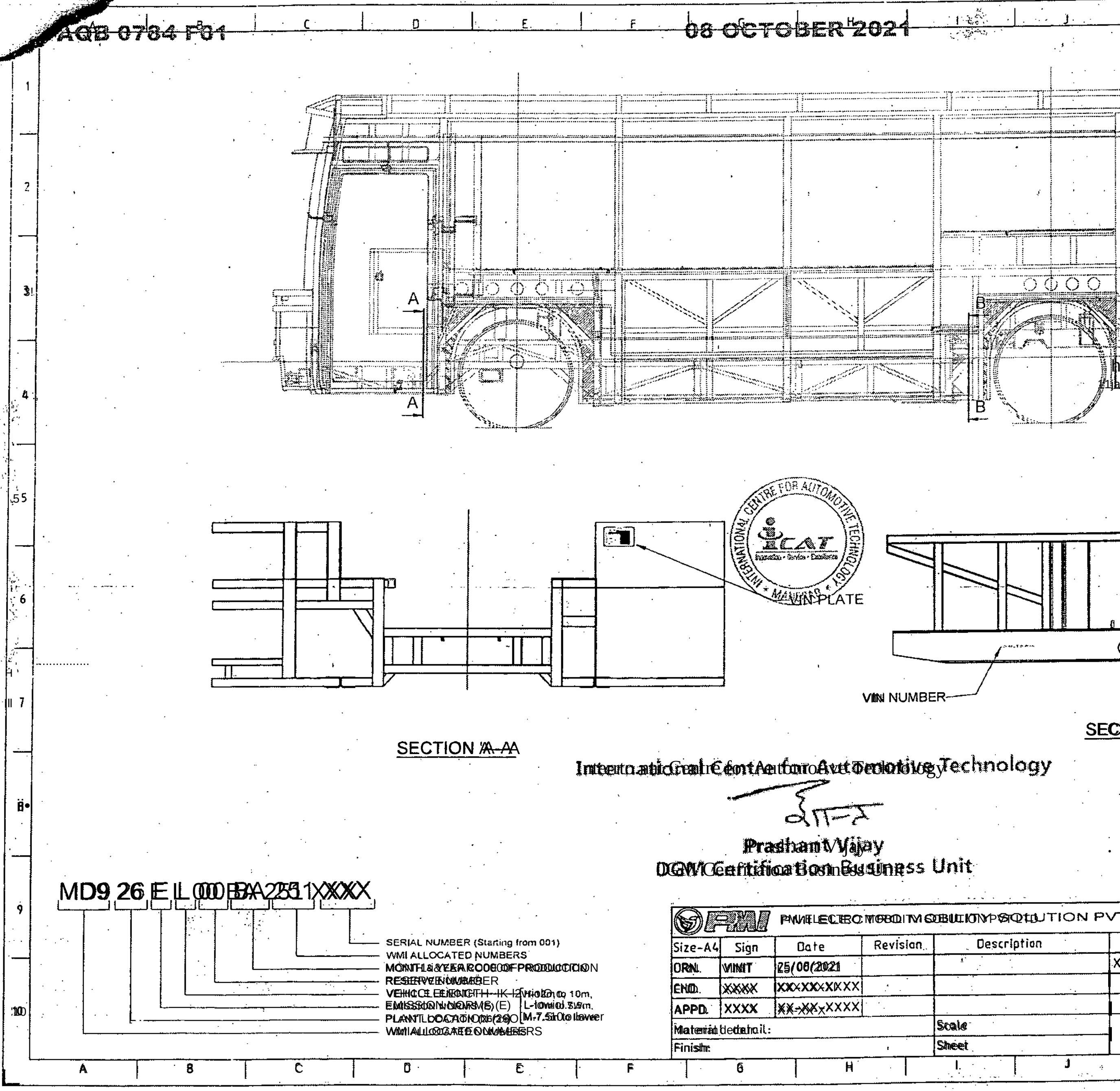
International Centre for Automotive Technology

Prashant Vijay
DGM Certification Business Unit

NOTE:-
NO. OF BATTERY PACKS - 5
NO. OF BATTERY -55
CAPACITY - 151.55 KWh
BATTERY OUTPUT -592 V
BATTERY AMP - 256 Ah

Size-A4	Sign	Date	Revision	Descript
DRN.	VINIT	25/08/2021		
CHD.	XXXX	XX-XX-XXXX		
APPD.	XXXX	XX-XX-XXXX		
Material detail:				Scale
Finish:				Sheet

AQB 0784 F01 08 OCTOBER 2021



International Centre for Automotive Technology

Prashant Vijay

DGM Certification Business Unit

PMI ELECTRO MOBILITY SOLUTIONS PVT LTD

AQB 0784 F01 **08 OCTOBER 2021**

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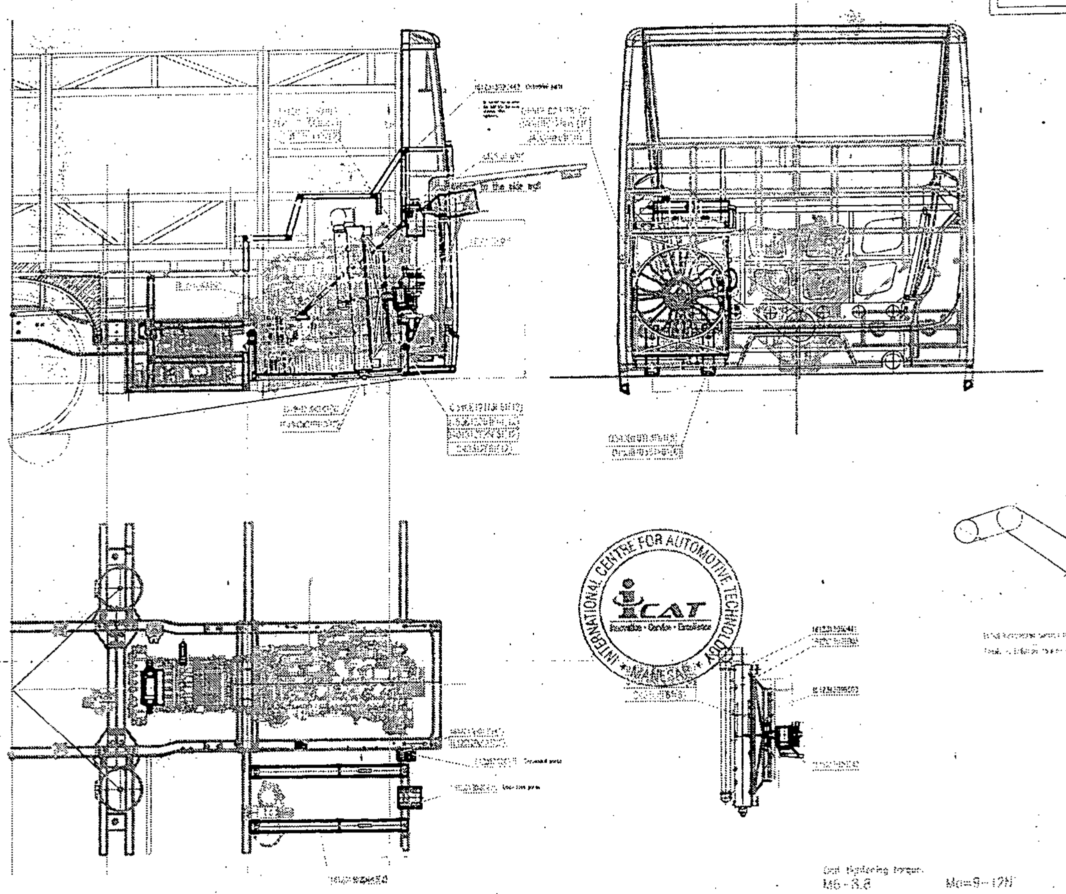


Bolt tightening torque:
M6-8.8 Mo=9-12N·m
M8-8.8
Mo=23-30N·m
M10-8.8
Mo=45-60N·m
M12-8.8
Mo=80-110N·m
M16-8.8
Mo=215-240N·m

International Centre for Automotive Technology

Prashant Vijay
DGM Certification Business Unit

PMI ELECTRO MOBILITY SOLUTIONS PVT LTD

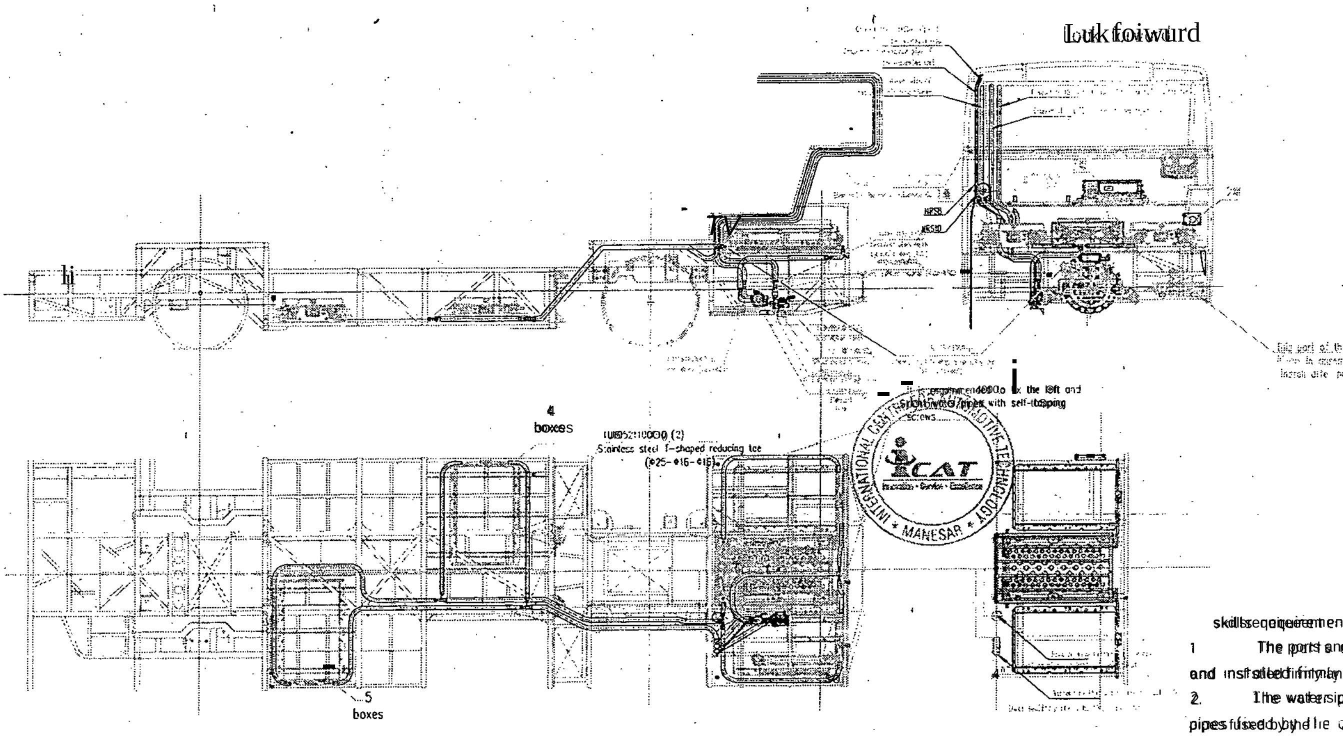
Material Detail:			Modification	Modification
Design By:	2021 SIGN	DATE		
	DRN. ROHIT	10-03-2021		
	CHD.			
(CAD)	APPD.			
		Scale		

FITMENT & FUNCTIONAL CHARACTERISTICS	SAFETY CHARACTERISTICS	12.5 – 3.2 µm Ra ▽	3.2 – 1.7 µm Ra ▽▽	1.6 – 0.8 µm Ra ▽▽▽	▽ FOR SPECIFIC VALUE/BETTER	SURFACE FINISH UNLESS OTHERWISE SPECIFIED

Unspecified Tolerance for	Angular Dims.– Length of Shorter arm.						Radii & Chamfers				Linear Dimensions (Machined)							
	Over	0	10	50	120	400	Over	0.5	3	6&	Over	0.5	6	30	120	400	1000	2000
For castings, forgings, Pipes,Profiles etc. refer WCS-055	Upto	10	50	120	400	above	Upto	3.0	6	above	Upto	6	30	120	400	1000	2000	4000
	Tol.	±1°	±30'	±20'	±10'	±5'	Tol.	±0.2	±0.5	±1.0	Tol.	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2.0

PMI ELECTRO MOBILITY SOLUTIONS PVT LTD

CAGE/13464 F01 08 OCTOBER 2021



skills requirement

1 The parts and ... and installed firmly ...

2. The water pipes ... pipes fixed by ... should be formed ...

3. The water pip...

4. The electrical ... the tab connection ...

5. After the ... leakage in the piping sy...

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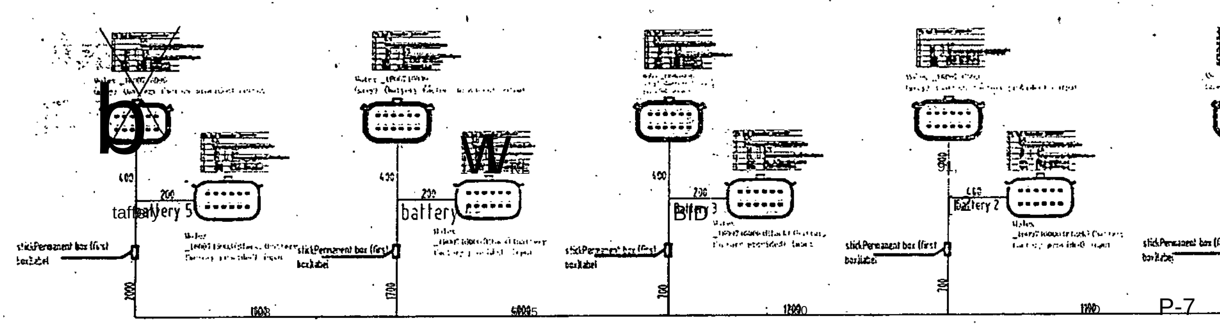
DGM Certification Business Unit

PMI ELECTRO MOBILITY SOLUTION PVT LTD

Size-A4	Sign	Date	Revision	Description
DRN.	VINIT	25/08/2021		
CHD.	XXXX	XX-XX-XXXX		
APPD.	XXXX	XX-XX-XXXX		
Material detail:				Scale
Finish:				Sheet

CAR02-0784 F01 | C | D | E | F | 08 OCTOBER 2021



Why All plugs on the drawings supplied by the battery manufacturer. To prevent the harness from being forced or pulled, the connector must be ... with glue

the length of the connector is 1 to 1.5 times the width

Daisy chain communication(A25 DEDICATED LINE), 0.75mm2, shielded twisted pair.

100-ohm characteristic resistor

note:

Harness should be manufactured as per ISO/TS 16949 ...

Shielded cable ... the shield ... should be ... ground ... and connected ...

*line Flame retardant waves for external useline guarantee protect *

If not indicated, the bundle ... 50mm ... degrees ... and ... tolerance ... degrees.

All plug-ins are visible for the pin ... (the pin numbers with the position number)

:: MAKE IT PERMANENT BY 03/10/2021

Use ... for high temperature resistant ... not less than 125 degrees C.

Use ... (Shield the net.) Copper ... (... corrosion).

This ... plug ... should ... waterproof plug installed in the empty position

International Centre for Automotive Technology, Manesar

PMI ELECTRO MOBILITY SOLUTIONS PVT				
Size-A4	Sign	Date	Revision	Description
DRN.	VINIT	25/08/2021		
CHD.	XXXX	XX-XX-XXXX		
APPD.	XXXX	XX-XX-XXXX		
Material detail:			Scale	
Finish:			Sheet	

A | B | C | D | E | F | G | H

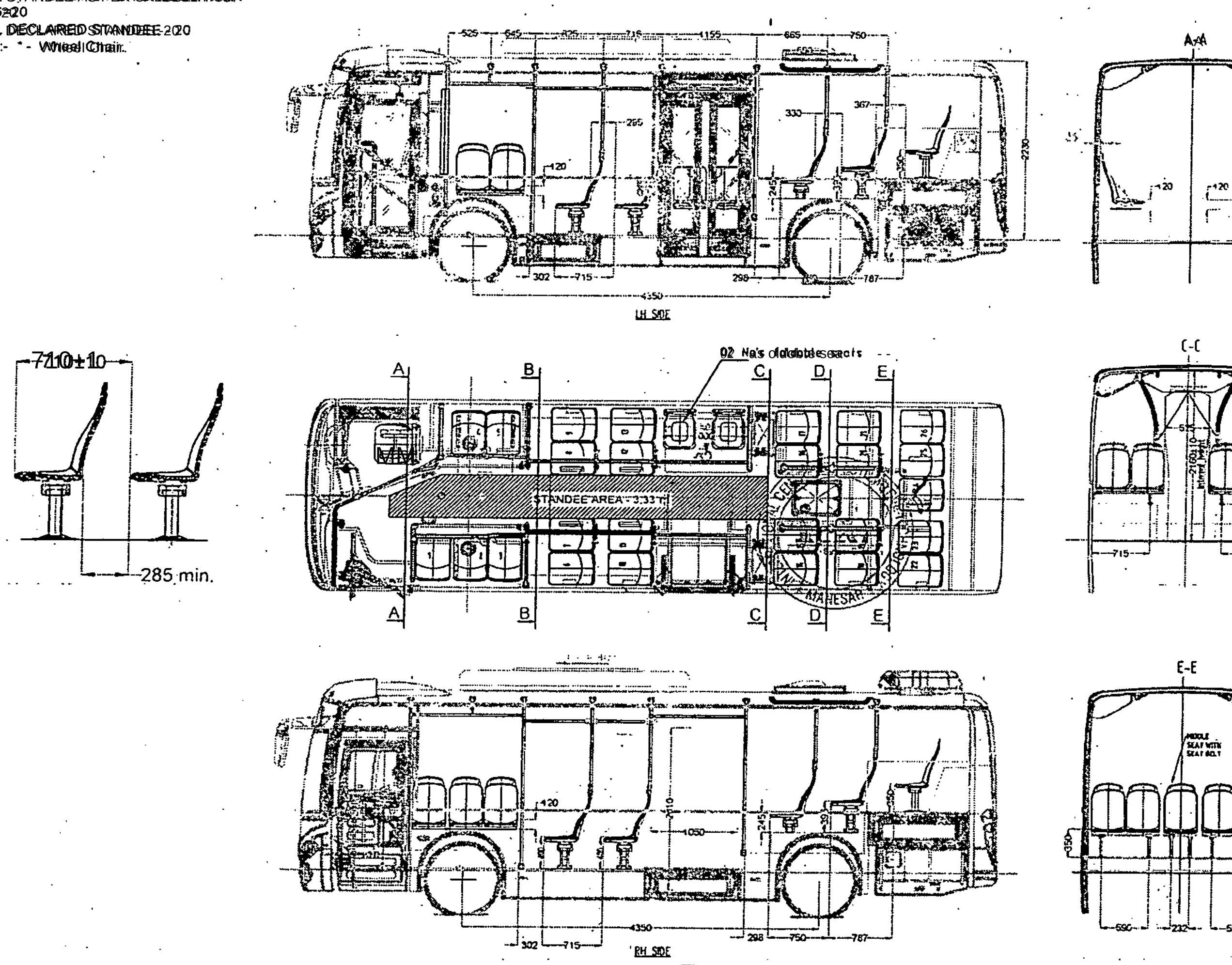
CAQB 0784 F01 **08 OCTOBER 2021**

S.NO	Model/Variant Name	Vehicle Type (I/II/III/IV)	Length (mm)	Width (mm)	Height (mm)	Engine / Motor power (kW)	Engine / motor rpm	Wheel Base (mm)	Complete Bus Kerb Weight (kg) FAW	RAW	Kerb Weight (Without AC)	Kerb Weight (With AC)	FOH (mm)	ROH (mm)	Seating Layout Drawing No.	Seating layout type (2*2 or 3*2 etc.)	Seating Capacity
[illegible]	REGIO_1S155653	Type I	8540	2450	3050	[illegible]	750-1050 rpm	4350	[illegible]	5735		8745	2060	[illegible]	[illegible]	2*2	[illegible] or 26+D+WC
1	[illegible]	Type I	8540	2450	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] folding seats or [illegible]
[illegible]	REGIO_1S150000RT	Type I	[illegible]	2450	3480	[illegible]	750-1050 rpm	4350	3500	[illegible]					P-E-A010-FB-0001	[illegible]	[illegible] folding or [illegible]+D+WC
1	REGIO_1S155[illegible]	Type I	8540	2450	3120	[illegible]	750-1050 rpm	4350	3010	5735		8745	2060	[illegible]	P-E-A024-FB-0001	2*2	30+D

Manufacturer:	PMI Electro Mobility Solutions Pvt. Ltd.	Test Agency:	ICAT
Signature:		Signature	International Centre for Automotive Technology
Name	Mr. Dev Ashish Rai	Name:	Prashant Vijay
Designation:	V.P	Designation:	DGM Certification Business Unit
Document No.:	[illegible]		
Dated:	[illegible]		

CAQB 0764 F01 — **08 OCTOBER 2021**

TOTAL SEATED PASSENGER -
26+2 FOLDABLE SEAT+WC
TOTAL STANDEE AREA - 3.33 m²
TOTAL STANDEE AS PER CALCULATION -
3.33X6=20
TOTAL DECLARED STANDEE-20
NOTE :- * - Wheel Chair.



International Centre for Automotive Technology

Prashant Vijay
DGM Certification Business Unit

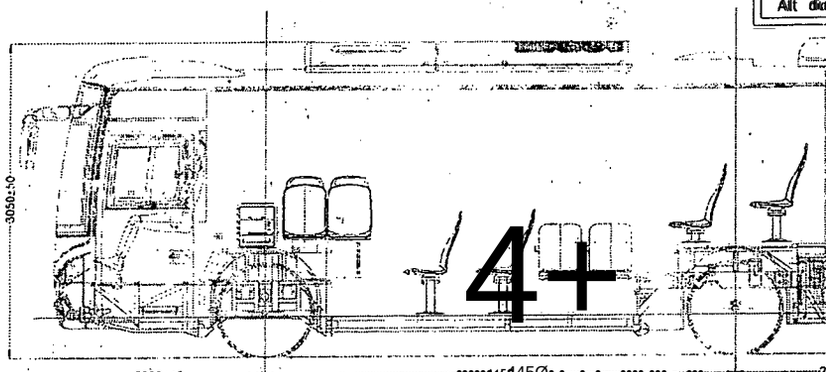
PMI ELECTRO MOBILITY SOLUTION PVT L

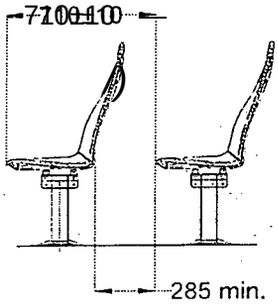
Size-A4	Sign	Date	Revision	Description
DRN.	VINIT	25/08/2021		
CHD.	XXXX	XX-XX-XXXX		
APPD.	XXXX	XX-XX-XXXX		

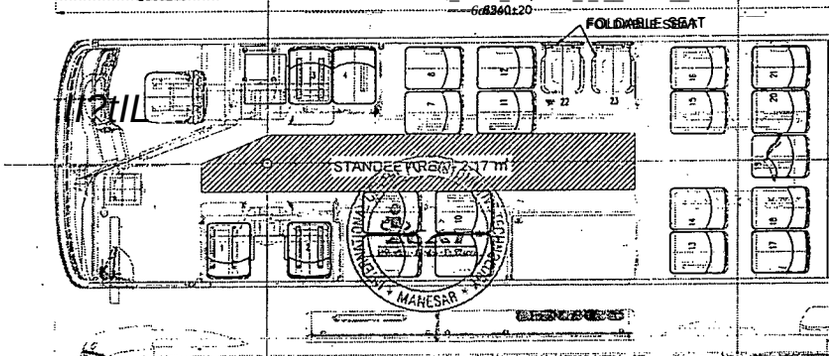
Material detail:
Finish:
Scale
Sheet

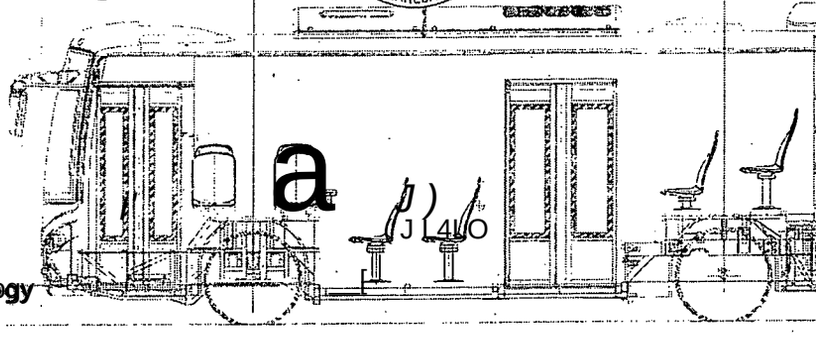
PMI ELECTRO MOBILITY SOLUTIONS PVT LTD

TOTAL SEATED PASSENGER -
21+D+2 FOLDABLE SEAT / 21+D+WC*
TOTAL STANDEE AREA - 2.17 m²
TOTAL STANDEE AS PER CALCULATION -
2.17 X 6 = 13.02
TOTAL DECLARED STANDEE - 13
NOTE :- * - Wheel Chair.









International Centre for Automotive Technology

Prashant Vijay
DGM Certification Business Unit

Material Debit:				Modification	Modification
Design By:	2021	SIGN	DATE		
(CAD)	DRN.	VNIT	3/3/2021		
	CHD.				
	APP.				

FITMENT & FUNCTIONAL CHARACTERISTICS | SAFETY CHARACTERISTICS

Unspecified Tolerance for castings, Forgings, Pipes, Profiles etc. to IVCO-055

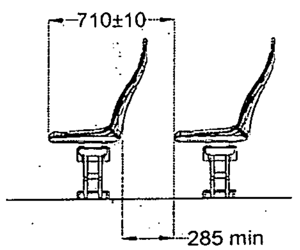
Angular Dens. - Length of Shorter arm.							Rads & Chamfers				Linear Dimensions (Machined)							
Over	0	10	50	120	400	above	Over	0.05	2	3	6	Upto	0.5	6	30	120	400	1000	2000
Upto	10	50	120	400	1000	2000	Upto	3.0	6	above		Tol.	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2.0
Tol.	±1°	±30'	±20'	±10'	±5'	±3'	Tol.	±0.2	±0.5	±1.0									

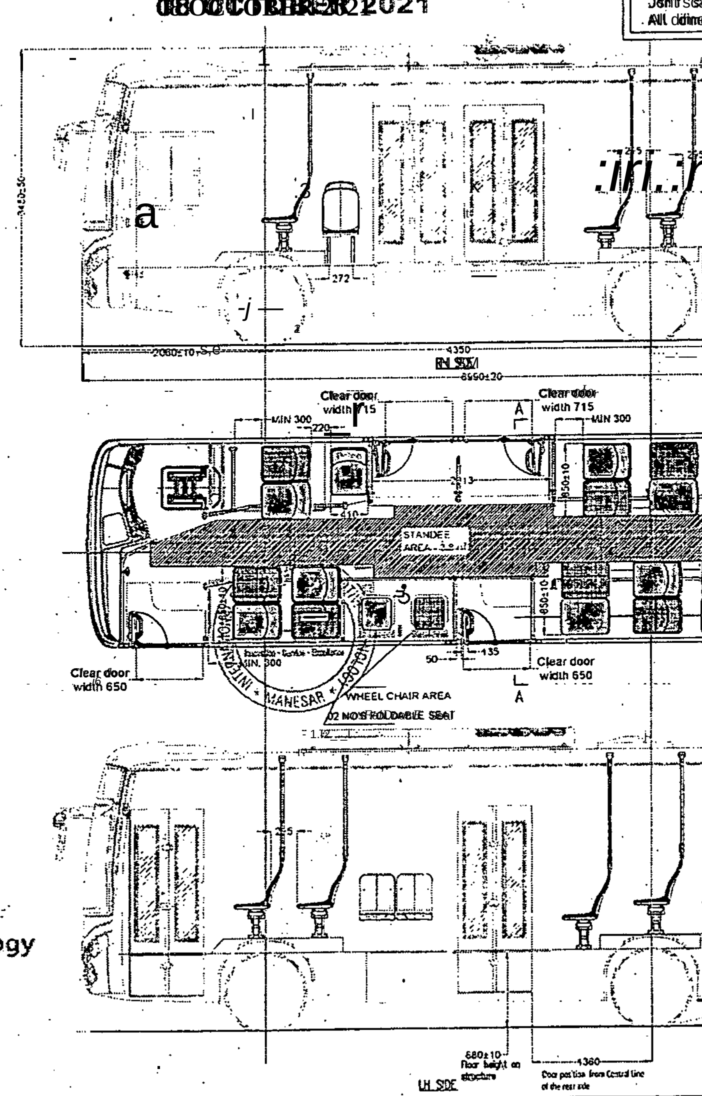
Scale

PMI ELECTRO MOBILITY SOLUTIONS PVT LTD

CAQB 0784 F01

TOTAL SEATED PASSENGER - 24+D+2 FOLDABLE SEAT / 24+D+WC
TOTAL STANDEE AREA - 3.8 m²
TOTAL STANDEE AS PER CALCULATION - 3.8X6 = 22.8
TOTAL DECLARED STANDEE - 22
NOTE :- Wheel Chair.





PMI ELECTRO MOBILITY SOLUTIONS PVT LTD

International Centre for Automotive Technology

Prashant Vijay
DGM Certification Business Unit

FITMENT & FUNCTIONAL CHARACTERISTICS — SAFETY CHARACTERISTICS

Design By: (CAD) — DRG. VINIT 13/3/2021 — CHD — APPD — Scale

Modification

PMI ELECTRO MOBILITY SOLUTIONS PVT LTD

CAQR 0784 F01

08 OCTOBER 2021

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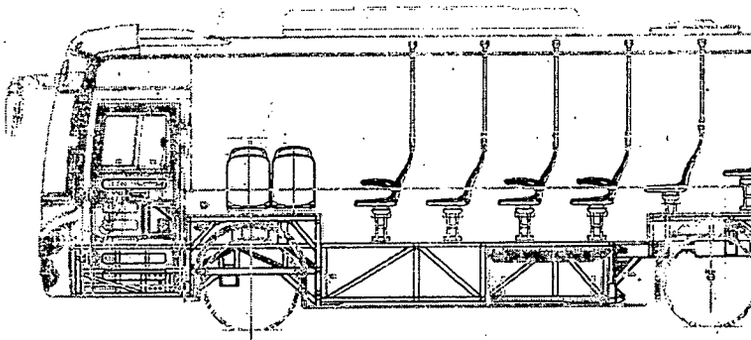
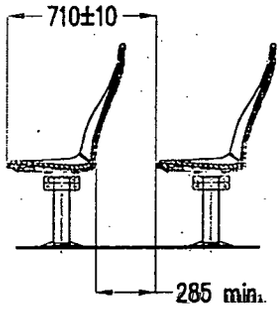
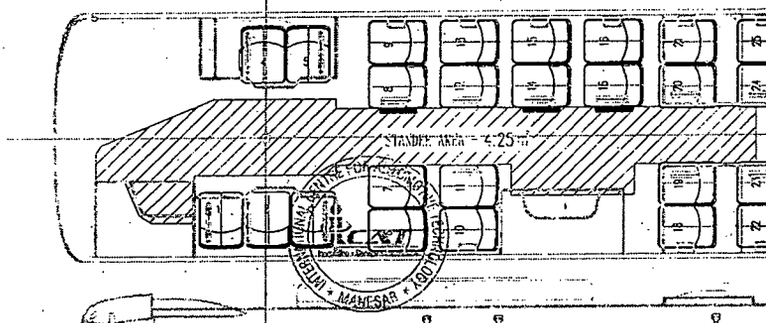
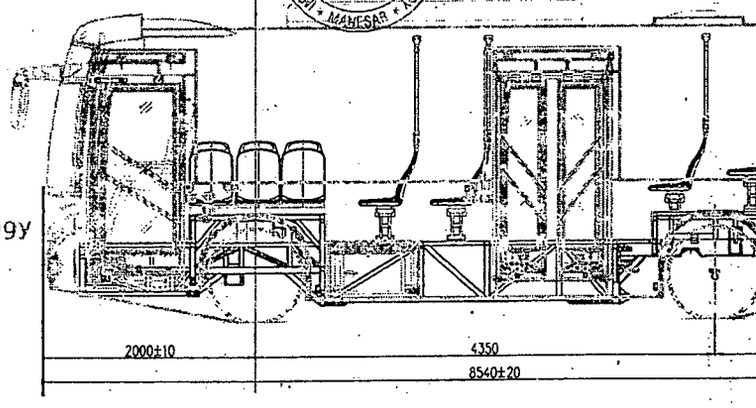
TOTAL SEATED PASSENGER –
30+D
TOTAL STANDEE AREA – 4.25 m²
TOTAL STANDEE AS PER CALCULATION – 4.25X6=25.5
TOTAL DECLARED STANDEE – 20.









International Centre for Automotive Technology

Prashant Vijay
DGM Certification Business Unit

Material Detail:			Modification	Modification
Designed By:	2021	SIGN	DATE		
(CAD)	DRN. VINIVINIT		19/4/2021		
	CHKD.				
	APPD.				
	Scale				

PMI ELECTRO MOBILITY SOLUTIONS PVT LTD

PROTO INSPECTION OF FULLY BUILT NON AC ELECTRIC BUS ON 12.05.2022 AT PMI ELECTROMOBILITY PVT LTD.

The Purchase order for 50 numbers of 9 mtrs fully built non ac electric bus was placed with M/s PMI Electromobility Pvt Ltd, vide purchase order no; SRA/01/000003/2021, dtd 24/12/2021. As per clause number 2.14 of the NIT the successful tenderer shall start delivery of the offered model of bus complaint all statutory requirements and specifications as per NIT within 60 days from the issuance of purchase order and according to the P.O, the entire quantity shall be supplied within 6 months including prototype inspection from the date of purchase order.

The technical committee constituted vide order No. RA/01/000003/2021 dt. 09.05.2022 inspected the prototype vehicle bearing chassis no. MD9ME06EL0E670120 on 12/05/2022 at the factory of M/s PMI Electromobility Pvt Ltd, Dharuhera, Rewari, Haryana.

The bus was inspected as per Appendix-I, specification of NIT and the observations were recorded against each clause wherever applicable.

SL. NO	CHARACTERISTICS	SPECIFICATION DETAILS	COMPLIANCE STATUS
1)	Type of buses	ELECTRIC BUS TYPE I	YES
2)	Type of application	CITY	YES
3)	Range in Single Charge for 80% soc as per AIS 040, CMVR 124)	120 km(minimum)	Trial run made for 124 Kms and consumed 54% battery charge.

	Throughout the entire 6 year period.		
4)	Energy Consumption	<1.0 Kwh/ Km	Not evaluated
5)	Charging Device	It should be supplied by bidder Fast charger 7, 50%	Not applicable at present
6)	No. of charging Device	One charging device for every two bus	Not applicable at present
7)	Length of buses	8500mm to 9500mm	8540 mm
8)	Floor height	400MM preferred upto 650 mm	900 mm
9)	Overall width	2600 (maximum)	2490mm
10)	Overall height	3800 ((maximum))	2900 mm
11)	No. of seats	30+1D((minimum))	30+1D
12)	Type of seat	City bus	yes
13)	No. doors	2 nos.	yes
14)	Front Door-1	At front ahead/behind axle – (Power operated – Driver controlled)	yes
15)	Center door	Between axles-, 1000 mm wide for rapid movement of passengers (Power operated – Driver controlled)	1041 mm wide (:720 mm width in open condition). Power operated-driver controlled.
16)	Positions of door controls	Should be on dashboard for driver control and emergency switch inside & outside of doors as per AIS052	Yes
17)	Power operated service door- construction &	As per AIS 052	Yes.

ROM

	control system of a power operated service door to be such that a passenger is unlikely to be injured/ trapped between the doors		
18)	Front Suspension	Weveller /Air suspension	Air Suspension
19)	Rear suspension	Air suspnsion	Air Suspension
20)	Steering system	Power assisted	Yes
21)	Charging mode	AC Charging (Suitable for fast charging also)	Yes.
22)	Electric Horn	24 V as per IS.1884.1993 Matched Pair (Low & High tone)	Yes
23)	Braking system	Power assisted disc/drum brakes	Front Disc Brake Rear Drum Brake
24)	Anti-skid anti-locking brake system (ABS)	As per CMVR required	yes
25)	Public Information System	Required as per AIS052	Yes
26)	Speed limiting device	There shall be provisions for limiting the vehicle speed at any value as per relevant KMVR and as required by KSRTC.	Speed limiting is programmed in ECU.
27)	Tyres	Radial/Tubless Tyre – 6 +1. (As per type approval)	255/70R 22.5
28)	Front overhang	As per CMVR	yes
29)	Rear overhang	As per CMVR	yes
30)	Emergency doors/exits or apertures (numbers) and	As per AIS 052	Complied as per AIS052

12/5/22 12/5/22 12/5/2022 12/5/22

	Dimension in mm		
31)	Design type approval	As per AIS 052	Copy Enclosed
32)	Bus structure - material & specs etc.	GI/Anti corrosion treated ERWCR Steel Materials as per Type approval	As per Type Approval
33)	Maximum floor height	400mm	380 mm
34)	Grab rails, Centre post and passenger slings	Stainless steel pipe of 32mm & 2mm thick for Grab rail, Centre post and should provide passenger slings at necessary points.	Provided Powder Coated Aluminium with Slings. Not be modified with Stainless Pipes as per NIT.
35)	Foot step	Lower foot step should have retractable facility for differentially disabled	Fitted on rear door.
36)	Panelling	As per AIS 052	As per Type Approval
37)	Roof material	As per AIS 052	As per Type Approval
38)	Floor material	As per AIS 052	As per Type Approval
39)	Front window glass (laminated) glass	Single piece laminated safety glass, with PVB film interlayer as per IS 2553 (part-2)-1992/latest	Yes
	Glass fitment	Front wind shield glass shall be fixed by EPDM Rubber beading. Beading less fitment is not acceptable in case of front glass.	Complied
	Size & design of glass	Standard designs and also as per table 22 of AIS 007	As per Type Approval

12/5/22

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	Rear windscreen glass	Single piece flat toughened glass- IS:2553 (part-2)-1992/latest	Yes
	Glass Fitment	Shall be fixed by EPDM rubber beading.	Pasted type provided as per Type Approval.
	Size of glass	Standard designs as per the Proto-type approved by KSRTC should be supplied in the entire supply of buses for each variant of buses.	Yes
41)	Side windows:	Flat two piece design- top fixed and bottom sliding toughened tinted glass. As per AIS 068	Yes
42)	Glass specifications	Toughened tinted glass IS 2553 (part-2)-1992/latest	Yes
	Glass thickness:	As per AIS 052	As per Type Approval
	Colour of glass	As per CMVR 100	As per Type Approval
43)	Rear view mirrors	As per AIS 052	Yes
44)	Fitment of Rear view mirror	Stainless steel C-brackets, Left side rear view mirror should visible to driver through Front Wind Screen glass(Compulsory)	MS Brackets provided, shall be modified as per NIT from the 2nd bus.
45)	Mirrors right/left side exterior/interior:	Convex as per AIS 001 & 002. Interior mirror with double curvature	Yes
46)	Seat layout	2 x 2	Two set of transverse seats provided (3 seater-1 and 2 seater-1)

47)	Seat area /seat space per passenger ((width* depth))	As per AIS 052	As per Type Approval
48)	Seat pitch-minimum	As per AIS 052	As per Type Approval
49)	Seat back rest height	As per AIS 023	As per Type Approval
50)	Passenger seating	As per AIS 052&AIS 023.	As per Type Approval
51)	Seat materials	Cushioned seat with PU foam covered with artificial Leather upholstery [Compliance of Flammability requirements as per IS 15061:2002]	Yes
52)	Seat frame structure material	Powder Coated ERW CR steel tube.	Moulded-seat provided.
53)	Back rest Materials	As per AIS052 with back rest, head support and seat cushion [compliance of flammability requirement IS 15061:2002]	City Type Moulded seats are provided without Head Support.
54)	Orientation of seats	All seats should be fitted forward looking	2x2 Layout -10 sets facing front 5 seater on rear-most end- 1. Two set of transverse seats provided (3 seater-1 and 2 seater 1)
55)	Number of seats	Minimum 30 +1D	Yes
56)	Seat back rest	Required, Fixed type	Yes
57)	Sun visor	Required (Good quality durable and easily operatable)	Yes
58)	Seat belts & their anchorage	As per AIS 052 should be provided to all seats where there is no provision for grab support in front.	Yes

12/5/22

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	Driver seat	AIS 023 and AIS 052	Yes
60)	Driver's working space	As per AIS 052, also proper air ventilation facility to be provided for driver with bottle holding clamp facility.	Yes, (Bottle Holder to be prov
61)	Corrosion prevention treatment	As per clause 3.17 of AIS 052	Certificate provided b Manufacturer (copy enc
	Internal surfaces of structural members		
	External surfaces of structural members		
	After drilling holes/welding		
62)	Primer coating	As per clause 3.17 of AIS 052	Certificate provided by t Manufacturer (copy enclosed).
63)	Body Painting:	PU Paint to be used	Certificate pfovided by th Manufacturer (copy enclosed).
64)	Body Colour and Design	Will be given by KSRTC	Yes (Logo & Graphics to be finalized by KSRTC)
65)	Electrical system, electrical cables and conductor cross section	BIS marked, copper conductors with fire retardant insulation as per IS/ISO: 6722:2006. Conductor cross-section varying as per circuit requirements, minimum cross-section 0.5 sq.mm.	As per Type Approval
66)	Fuse	As per AIS 052	As per Type Approval

Approved 12/5/22

12/5/22

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Smitha 12/5/22

Amended 12/5/22

	Isolation switches for electrical circuits where RMS value of voltage exceeds 1000 volts	As per AIS 052	As per Type Approval
		As per AIS 052	
68)	Location of cables away from heat source	As per AIS 052	Yes
69)	Type approval of circuit diagram as per standards related to electric equipment/wiring	As per AIS 052	As per Type Approval
70)	Battery (starting battery) cut – off switch (isolator switch):	Shall be positioned near driver seat for easy and quick operation by driver.	Yes
71)	Wind screen wiper:	As per table 22 of AIS 007	Yes
72)	Wiper motor:	Variable speed with time delay relay as per AIS 11	Yes
73)	Wiper arm/blade:	As per AIS 019 AIS 011	Yes
74)	Power ports for EVM charging	Requires one EVM charging point with EVM holder in driver cabin. DC to AC converter should be provided.	Location to be modified and to be placed behind the Driver Seat.
75)	Lighting- internal & external and illumination	As per AIS 052 and all interior lights should be LED Type, OE fitting preferred in case of head lamp and tail lamp.	Yes
76)	Dash board lighting/control lighting	As per AIS 052	Yes
77)	Driver seat belt & anchorage duly type approved.	As per CMVR & AIS 052 conforming to AIS 005 & 015	Yes

12/5/22

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12/5/22 Smith 12/5/22

12/5/22

78)	Fire extinguisher:	As per AIS 052/CMVR/CMVR	2 Nos. 4 Kg each provided
79)	First aid box:	Required - 1 Nos (Fixed metallic box as per provision of CMVR	Yes
80)	Handholds:	As per AIS 052, fixed type preferred.	Yes
81)	Stanchions:	As per AIS 052/CMVR.	Yes
82)	Window guard rails:	As per AIS 052/CMVR.	Yes
83)	Entrance/exit guard/step well guard:	As per AIS 052, step well guards as per Type Approval.	Yes, Additional Grab handles to be provided on rear doors.
84)	Emergency exit doors, warning devices etc.	As per AIS 052/CMVR No seats shall be fitted obstructing the free access to emergency door. One grab rail to be provided above the emergency door. Footrest cum guard to be provided in front of seats behind emergency door.	Provided as per Type Approval.
85)	Front/rear door, step well lights, door open sign	LED bulb as per AIS 008	Yes
86)	Towing device front/rear	AS per CMVR & IS 9760-ring type	Provided in Front only.
87)	Warning triangle	As per AIS 052/CMVR	Will be supplied along with the bus
88)	Bumpers-front and rear	As per AIS 052, Detachable type, easily removable in order to have access to repair the	Yes

12/5/22

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		aggregates.	
89)	Luggage Box // Courier Box	As per AIS 052 and mutually agreed by the KSRTC and bidder with scope for maximum space for the provision of courier transportation.	Provided behind rear seat but the Size to be increased.
90)	Electronic Ticketing Machine (ETM) Box	Electronic ticket machine (ETM)/Ticket rack box: one box with lock and key should be provided to keep it safely under the conductor seat.	The charging socket to be included in the ETM Box behind the driver seat.
91)	Roof hatch	2 nos. to be provided (Front-1No– openable to front and Rear-1No– openable to rear)	Yes
92	Mobile Charging unit	5 Nos. (minimum) of mobile charging unit should be provided. if the charging unit is away from the seat then sufficient lock and key facility to be provided.	Yes
93	Stay box for crew	To be provided with locking facility and accessible from driver cabin. It should be enough spacious to keep the essentially belongings of crew.	To be provided in front of the Rear Door by the shifting the position of Fire Extinguisher to the side wall.
94	Warranty	The Fully Built ELECTRIC Bus offered should have a warranty for a period of 2	To be executed by the Manufacturer.

12/5/22 12/5/22 12/5/22 12/5/22

		Years/ 2 Lakh Km which ever comes earlier, in respect of Chassis parts, Traction motor, battery pack for vehicle propulsion, and any other related systems and Body Building Materials and all kinds of consumables required to run the bus. ie ie, aggregate and bus body items provided in the bus due to defective design, material of workmanship from the date of registration of the vehicle.(Only normal wear of tyres, accident repairs of body, bus washing are excluded from warranty)	
95	Destination Board	Alpha Numeric Display Technology- Amber coloured LED based electronic display system in English Hindi and Malayalam. (Comply as per AIS 052 and CMVR). Vertically scrolling/falling type preferred, Front 1800 x 330mm size, Rear 1200 x 330 Single control for both destination boards and control unit in Driver Cabin and one board of dimensions 1800 x	900 x 290 mm 3 nos provided (Front, Left and Rear provided)).

		330mm size at the top behind the driver cabin. All boards should easily programmable and should compatible with the PIS system.	
96	Driver Cabin Separation	Should be separated from passenger saloon as per AIS 052 Stainless steel tube structure, fencing type. This separation should not restrict the driver seat position adjustments.	Provided with Powder Coated Ribbed Aluminum Fencing.
97	Driver Cabin Fan	A suitable good quality durable fan to be provided in the driver cabin to fan the driver.	yes
98	Accessories	Fully equipped tool kit containing Tommy bar, Wheel spanner, Screw driver (heavy duty), cutting pliers, pipe wrench and Hydraulic Bottle Jack 10 Ton (Minimum Capacity).	Demonstrated the Tool Kit, Jack and accessories as per NIT and to be provided along with the bus.
99	Bus Chargers	One charging unit should be supplied for every 2 buses, and installed at the location suggested by KSRTC.	To be provided as per the direction from KSRTC.
100	Proper access to repair and maintenance points of various vehicle	There shall be easy and quick access to all under chassis components which require	Yes

12/5/22 12/5/22 12/5/22 12/5/22

	components	repair and maintenance such as suspension, steering, brake ,electric motors ,battery etc.	
101	Paneling Materials	As per AIS 052(Table 22 of AIS007)	As per Type Approval
102	Conductor bell	String type required	To be Provided
104	Positioning of switches	All light control switches shall be positioned on the right side top of the driver seat.	Yes
105	Conductor seat	Shall be provided separately as independent seat near the rear foot board.	To be earmarked by KSRTC.
106	Vehicle location tracking device and emeggency button	Complying AIS 140 and as approved by KMVD with IRNSS, models with minimum 5 panic buttons necessary software shall also be supplied for Vehicle Tracking, Energy consumption monitoring, PIS and other performance reports and must be integrated with KSRTC applications.	Yes, Star Telematics.
107	Certifications	Comply with a) CMVR and KMVR requirements b) Type approval certificate by any authorized agency in CMVR 126 c) Compliance to strength of super structure- AIS0031 d) Compliance to Bus Body	Type Approval Certificate from iCAT Enclosed.

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		Code AIS 052 & ITSAIS 140 e) Compliance of flammability requirements as per IS 15061:2002 f) Certificate issued by ARAI	

Subject to the above suggested modifications, the Prototype Bus Model is in order as per the NIT.

Representatives of M/s PMI Electro mobility Solutions:

1. Sh.Sunil Mittal - Vice President, Operations
2. Sh.Ajay Joshi - General Manager
3. Sh.Kishan Singh - Manager, Design & Development

Representatives of Kerala SRTC Inspection Team:

1. Sh.R.Prithviraj - Asst.Works Manager, KSRTC
2. Sb.Ullas Babu - DGM(Technical), KSRTC SWIFT Ltd
3. Sh.S.Shibu - Manager (M&W), KSRTC

PROTO INSPECTION OF FULLY BUILT NON AC ELECTRIC BUS

The Purchase order for 50 numbers of 9 mtrs fully built non ac electric bus was placed with M/s PMI electro mobility Pvt. Ltd, vide purchase order no, S/01/00100/001003/2021, dtd 24/12/2021. As per clause number 2.14 of the NIT the successful tenderer shall start delivery of the offered model of bus complaint all statutory requirements and specifications as per NIT within 60 days from the issuance of purchase order and according to the P.O, the entire quantity shall be supplied within 6 months including prototype inspection from the date of purchase order.

During the inspection of the technical committee on 12/04/2022 at the factory of M/s PMI Electro mobility solutions Pvt. Ltd, the manufacturer has not provided a bus complying clause No. 2.14, for inspection, though the inspection was carried out with prior confirmation.

The committee expressed displeasure on not providing bus as per specification for inspection.

The representatives of the company demonstrated one fully built A/c Electric bus manufactured for some other client, and informed that the features of the bus shall be similar to the buses to be delivered to Kerala SRTC except A/c.

The bus was inspected as per Appendix-I, specification of NIT and the observations were recorded against each clause where ever applicable.

Mechanical Engineer
I/c of Executive Director (M&VM)
ME i/c of ED (T)

D.A. Palai.
12/04/2022

12/04/2022

12/04/2022

SL: NO	CHARACTERISTICS	SPECIFICATION DETAILS	COMPLIANCE STATUS
1)	Type of buses	ELECTRIC BUS TYPE I	yes
2)	Type of application	CITY	yes
3)	Range in Single Charge for 80% SOC as per AIS 040, CMVR 124) Throughout the entire 5 year period.	120 km (minimum)	Range not evaluated.
4)	Energy Consumption	≤1.0 Kwh/Km	Not evaluated
5)	Charging Device	It should be supplied by bidder Fast charger – 50%	Not applicable at present
6)	No. of charging Device	One charging device for every two bus	Not applicable at present
7)	Length of buses	8500mm to 9500mm	8350mm
8)	Floor height	400MM preferred upto 650 mm	900 mm (as per appendix I
9)	Overall width	2600 (maximum)	2460 mm
10)	Overall height	3800 (maximum)	2920 mm
11)	No of seats	30 +1D (minimum)	30+1D
12)	Type of seat	City bus	yes
13)	No. doors	2 nos.	yes
14)	Front Door-1	At front ahead of front axle (Power operated – Driver controlled)	yes
15)	Center door	Between axles 10000 mm wide for rapid movement of passengers (Power operated – Driver	1030 mm wide (720 mm width in open condition) Power operated-driver controlled.

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		controlled)	
16)	Positions of door controls I:s1tbo10001:oIh1d be on	Should be on dashboard for driver control and emergency switch inside & outside of doors as per AIS 052	Yes
17)	Power operated service door- construction & control system of a power operated service door to be such that a passenger is unlikely to be injured/ trapped between the doors	As per AIS 052	Yes
18)	Front Suspension	Weveller /Air suspension	Air Suspension
19)	Rear suspension	Air suspnsion	Air Suspension
20)	Steering system	Power assisted	Yes
21)	Charging mode	AC Charging (Suitable for fast charging also)	Yes
22)	Electric Horn	24 V as per IS.1884:1993 Matched Pair (Low & High tone)	Yes
23)	Braking system	Power assisted disc/drum brakes	4 wheel disc brake
24)	Anti-skid anti-locking brake system (ABS)	As per CMVR required	Yes
25)	Public Information System	Required as per AIS052	Yes
26)	Speed limiting device	There shall be provisions for limiting the vehicle speed at any value as per relevant KMVR and as required by	Speed limiting is programmed ECU.

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		KSRTC.	
27)	Tyres	Radial/Tubless Tyre – 6 +1. (As per type approval)	255/70R 22.5
28)	Front overhang	As per CMVR	yes
29)	Rear overhang	As per CMVR	yes
30)	Emergency doors/exits or apertures (numbers) and dimension in mm	As per AIS 052	Not inspected bus being a/c shall have to provide as per AIS 052.
31)	Design type approval	As per AIS 052	Not applicable
32)	Bus structure materials specs etc.	GI/Anti corrosion treated ERWCR Steel Materials as per Type approval	Structural inspection not made, shall have to provide as NIT.
33)	Maximum first step height	400mm	390 mm
34)	Grab rails, Centre posts and passenger slings	Stainless steel pipe of 32mm & 2mm thick for Grab rail, Centre post and should provide passenger slings at necessary points.	Ensure as per AIS052
35)	Footstep	Lower footstep should have retractable facility for differentially disabled	No accessibility to differentially abled.
36)	Panel beading	As per AIS 052	To be confirmed
37)	Roof grab rail brackets	As per AIS 052	To be confirmed
38)	Floor material	As per AIS 052	To be confirmed
39)	Front windscreen (laminated) glass:	Single piece laminated safety glass, with PVB film interlayer as per IS 2553 (part-2):1992/ latest	To be confirmed
	Glass Fitment	Front wind shield glass shall	Pasted type provided instead of

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		be fixed by EPDM Rubber beading. Beading less fitment is not acceptable in case of front glass.	EPDM beading type to be rectified as per NIT.
	Size & design of glass	Standard designs and also as per table 22 of AIS 007	———
40)	1 Rear windscreen glass	Single piece flat toughened glass- IS 2553 (part-2)-1992/latest	To be ensured
	Glass Fitment	Shall be fixed by EPDM rubber beading.	Pasted type provided instead of EPDM beading type to be rectified as per NIT.
	Size of glass	Standard designs as per the Proto-type approved by KSRTC should be supplied in the entire supply of buses for each variant of buses.	———
41)	1 Side windows:	Flat two piece design top fixed and bottom sliding toughened tinted glass As per AIS 068	Being A/c fixed type provided. shall be modified as per NIT
42)	1 Glass specifications	Toughened tinted glass IS 2553 (part-2)-1992/latest	———
	Glass thickness:	As per AIS 052	———
	Colour of glass	As per CMVR 100	———
43)	Rear view mirrors	As per AIS 052	———
44)	Fitment of Rear view mirror	Stainless steel C-brackets, Left side rear view mirror should visible to driver through Front Wind Screen	MS Brackets provided, shall modified as per NIT.

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		glass(Compulsory)	
145) 45)	Mirrors right/left side exterior /interior:	Convex as per AIS 001 & 002. Interior mirror with double curvature	———
46) 1	Seat layout	2 x 2	Two set of transverse seats provided (3 seater-1 and 2 seater 1)
47)	Seat area /seat space per passenger (width* depth)	As per AIS 052	———
48) 4 3	Seat pitch-minimum	As per AIS 052	———
49)	Seat back rest height	As per AIS 023	———
50)	Passenger seating	As per AIS 052 & AIS 023.	———
51)	Seat materials	Cushioned seat with PU foam covered with artificial Leather upholstery [Compliance of Flammability requirements as per IS 15061:2002]	———
52)	Seat frame structure material	Powder Coated ERW CR steel tube.	Moulded seat provided as per NIT
53)	Back rest Materials	As per AIS052 with back rest, head support and seat cushion [compliance of flammability requirement IS 15061:2002]	———
54)	Orientation of seats	All seats should be fitted forward looking	Two set of transverse seats provided (3 seater-1 and 2 seater 1) - shall be as per NIT
55)	Number of seats	Minimum 30+1D	Yes
56)	Seat back rest	Required, Fixed type	———
57)	Sun visor	Required (Good quality	Yes

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		durable and easily operatable)	
58)	Seat belts & their anchorage	As per AIS 052 shall be provided to all seats where there is no provision for grab support in front.	To be confirmed
59)	Driver seat	AIS 023 and AIS 052	
60)	Driver's working space	As per AIS 052, also proper air ventilation facility to be provided for driver with bottle holding clamp facility.	
61)	Corrosion prevention treatment	As per clause 3.17 of AIS 052	
	Internal surfaces of structural members		
	External surfaces of structural members		
	After drilling holes/welding		
62)	Primer coating	As per clause 3.17 of AIS 052	
63)	Body Painting:	PU Paint to be used	
64)	Body Colour and Design	Will be given by KSRTC	
65)	Electrical system, electrical cables and conductor cross section	BIS marked, copper conductors with fire retardant insulation as per IS/ISO: 6722:2006. Conductor cross-section varying as per circuit requirements, minimum cross-section 0.5 sq mm.	
66)	Fuse	As per AIS 052	

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67)	Isolation switches for electrical circuits where RMS value of voltage exceeds 1000 volts	As per AIS 052	
		As per AIS 052	
68)	Location of cables away from heat sources	As per AIS 052	
69)	Type approval of circuit diagram as per standards related to electric equipment/wiring	As per AIS 052	
70)	Battery (starting battery) cut – off switch (isolator switch):	Shall be positioned near driver seat for easy and quick operation by driver.	
71)	Wind screen wiper:	As per table 22 of AIS 007	
72)	Wiper motor:	Variable speed with time delay relay as per AIS 11	
73)	Wiper arm/blade:	As per AIS 019/AIS 011	
74)	Power ports for ETM charging	Requires one ETM charging point with ETM holder in driver cabin. DC to AC converter should be provided.	
75)	Lighting- internal & external and illumination	As per AIS 052 and all interior lights should be LED Type, OE fitting preferred in case of head lamp and tail lamp.	
76)	Dash board lighting/control lighting	As per AIS 052	
77)	Driver seat belt & anchorage duly type	As per CMVR & AIS 052 conforming to AIS 003 & 015	

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	approved.		
78)	Fire extinguisher:	As per AIS 052/CMVR/MVR	----------
79)	First aid box:	Required - Nos (Fixed metallic box as per provision of CMVR	----------
80)	Handholds:	As per AIS 052, fixed type preferred.	----------
81)	Stanchions:	As per AIS 052/CMVR.	----------
82)	Window guard rails:	As per AIS 052/CMVR.	----------
83)	Entrance/exit guard/step well guard:	As per AIS 052, step well guards as per Type Approval.	To be provided ----------
84)	Emergency exit doors, warning devices etc.	As per AIS 052/CMVR No seats shall be fitted obstructing the free access to emergency door. One grab rail to be provided above the emergency door. Foot rest cum guard to be provided in front of seats behind emergency door.	Emergency exit to be provided as per NIT
85)	Front/rear door, step well lights, door open sign	LED bulb as per AIS 008	----------
86)	Towing device front/rear	As per CMVR & IS 9760- ring type	Provided in Front only
87)	Warning triangle	As per AIS 052/CMVR	----------
88)	Bumpers front and rear	As per AIS 052, Detachable type, easily removable in order to have access to repair the	----------

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		aggregates.	
89)	Luggage Box / Courier Box	As per AIS 052 and mutually agreed by the KSRTC and bidder with scope for maximum space for the provision of courier transportation.	Required as per NIT
90)	Electronic Ticketing Machine (ETM) Box	Electronic ticket machine (ETM)/Ticket rack box one box with lock and key should be provided to keep it safely under the conductor seat.	Required as per NIT
91)	Roof hatch	2 nos. to be provided (Front-1No- openable to front and Rear-1No- openable to rear)	To be provided
92	Mobile Charging unit	5 Nos. (minimum) of mobile charging units should be provided. if the charging unit is away from the seat then sufficient lock and key facility to be provided.	To be provided.
93	Stay box for crew	To be provided with locking facility and accessible from driver cabin. It should be enough spacious to keep the essentially belongings of crew.	To be provided.
94	Warranty	The Fully Built ELECTRIC Bus offered should have a warranty for a period of 12	

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		Years/ 2 Lakh Km which ever comes earlier, in respect of Chassis parts, Traction motor, battery pack for vehicle propulsion, and any other related systems and Body Building Materials and all kinds of consumables required to run the bus.. ie, aggregate and bus body items provided in these busses due to defective design, material or workmanship from the date of registration of the vehicle (Only normal wear of tyres, accident repairs of body, bus washing are excluded from warranty)	
95	Destination Board	Alpha Numeric Display Technology Amber coloured LED based electronic display system in English Hindi and Malayalam. (Comply as per AIS 052 and CMVR). Vertically scrolling/rolling type preferred, From 1800 x 330mm size, Rear 1200 x 330 Single control for both destination boards and control unit in Driver Cabin and one board of dimensions 1800 x	900 mm 3 nos provided (Front, Left and Rear provided). Prefer Full length Front and Right side destination board. Shall be provide as per annexure-E .

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		330mm size at the top behind the driver cabin. All boards should easily programmable and should compatible with the PIS system.	
96	Driver Cabin Separation	Should be separated from passenger saloon as per AIS 052 Stainless steel tube structure, fencing type. This separation should not restrict the driver seat position adjustments.	Partial cabin separation provided in the inspected AC bus. To be provided as per NTT (Full separation required)
97	Driver Cabin Fan	A suitable good quality durable fan to be provided in the driver cabin to fan the driver.	yes
98	Accessories	Fully equipped tool kit containing Tommy bar, Wheel spanner, Screw driver (heavy duty), cutting pliers, pipe wrench and Hydraulic Bottle Jack 10 Ton (Minimum Capacity).	To be provided
99	Bus Chargers	One charging unit should be supplied for every 2 buses, and installed at the location suggested by KSRTC.	
100	Proper access to repair and maintenance points of various vehicle	There shall be easy and quick access to all under chassis components which require	

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	components	repair and maintenance such as suspension,steering,brake ;electric motors, battery etc.	
101	Paneling Materials	As per AIS 052 (Table 22 of AIS007)	———
102	Conductor bell	String type required	———
104	Positioning of Switches	All light control switches shall be positioned on the right side top of the driver seat.	———
105	Conductor seat	Shall be provided separately as independent seat near the rear foot board.	———
106	Vehicle location tracking device and emergency button	Complying AIS 140 and as approved by KMVD with IRNSS, models with minimum 5 panic buttons necessary software shall also be supplied for Vehicle Tracking, Energy consumption monitoring, PIS and other performance reports and must be integrated with KSRTC applications.	———
107	Certifications	Comply with a) CMVR and KMVR requirements b) Type approval certificate by any authorized agency in CMVR 126 c) Compliance to strength of super structure- AIS 031 d) Compliance to Bus Body	To be provided

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		Code AIS 052 & ITS AIS:140 e) Compliance of flammability requirements as per IS 15061:2002 f) Certificate issued by ARAI	

The above are only the observations of the committee on the A/c electric bus produced before the committee, however this shall not meet the specifications and requirements as per the Purchase order issued by Kerala SRTC.

Representatives of M/s PMI Electro mobility Solutions:

1. Mr: Dev Ashish Palai - Vice President, Design & Development

2. Mr: Sanjay Nagpal - Vice President, Business & Development

3. Mr: Kishan Singh - Manager Design & Development

12/04/2022

Representatives of Kerala SRTC Inspection Team:

1. Chandra Babu. R- Executive director (Technical)

12/4/22.

2. Predhueeraj. S - AWM WK Kannur

3. Shibu..S - Manager (M&W)

12/4/2022

PRE DELIVERY INSPECTION OF 99 M NON-AC ELECTRIC BUSES AT DH
PMI ELECTROMOBILITY SOLUTIONS PRIVATE LIMITED

In continuation to the prototype inspection of 9m non ac electric buses on 12.5.22, de
pointed out through email on 20.5.22. Out of the 14 points raised 9 points are accepted by M/s PMI for rectificatio
has been accepted/ agreed by KSRTC. The joint inspection details observed are.

Inspected bus	Chassis Number
KSRTC 1	MD926EL00HE251670 (Prototy
KSRTC 2	MD926EL00HE251699.1

After inspection of buses, production line process was verified & observed buses in Production process,

During the joint discussion, it was committed by M/s PMI to dispatch all 25 buses by 24th June 2022, & Rest 25 bu

Sl No.	CHARACTERISTICS	SPECIFICATION AS PER NIT	DEVIATION OBSERVED DURING PROTOTYPE EVALUATION	PMI REMARKS
1.	Grab rails; Centre posts and passengers	Stainless steel pipe of 32 mm & 2mm thick for Grab rail, Centre post and should	Provided Powder Coated Ribbed Aluminum with Slings, needs to be	OK, Stainless steel pipes s required in NIT will be provided

	slugg .	provide passenger slinggs at necessary points.	Odified with Stainless Steel Pipes as per NIT.	
2	Glass Fitment	Shall be fixed by EPDM rubber beading	Pasted type provided as per type approval.	Front windshield glass fitted in EPDM rubb profile, whereas windshield has b pasted with sealant enhance the aesthetic the rear side of the As per Clause No Appendix -I of the Glass can either pasted / can be fitte Rubber.
3	Fitment of Rear-view mirror	Stainless steel C-brackets, left side rear view mirror should be visible to driver through Front Wind Screen glass (Compulsory)	MS Brackets provided, shall be modified as per NIT from the 2nd bus.	Will be modified from Second Bus

4	Seat layout	2X 2	Two set of transverse seats provided (3 seater-1 and 2 seater-1)	Seat Layout has b designed for convenie of standee passenger this arrangeme provides more sp for passengers who getting debarded fro the bus & same Lay also has been approv in TYPE APPROVAL of PROTO by ICAT.
5	Seat frame structure material	Powder Coated ERWCR steel tube	Molded seat provided	Especially designed in Europe, approved by AA PUNE, cantilever powe coated ERWCR base fr with molded cushioned seats are provided whic will make maintenance inside of the bus very ea & provides lot of space placing luggage. (Test

Wheeler

				reports submitted to Inspection TEAM)
6	Back rest Materials	As per AIS 052 with back rest, head support and seat cushion (Compliance of flammability requirement IS 15061:2002)	City Type Molded seats are provided without Head Support	Especially designed in Europe, approved by ARA PUNE, cantilever powder coated ERW CR base fram with molded cushioned seats are provided for comfortable journey. As p AIS.052 Type I city buses head rest is not mandatory
7	Orientation of seats	All seats should be fitted forward looking	2 X 2 Layout - 100 sets facing front 5- seater on rear most end -1. Two set of transverse seats provided (3-seater-1 and 2 seater-1)	Seat Layout has bee designed for convenienc of standee passengers this arrangement provides more space fo passengers who ar getting deboarded from the Bus & same Layou also has been approve in TYPE APPROVAL of th

				PROTO by ICAT
8	Driver's Working space	As per AIS 052, also proper air ventilation facility to be provided for driver with bottle holding clamp facility	Yes, (Bottle holder to be provided)	Bottle holder will be provided in Driver cabin in all the buses including proto
9	Power ports for ETM charging	Requires one ETM charging point with ETM holder in driver cabin. DC to AC converter should be provided.	Location to be modified and to be placed behind the Driver Seat.	As per suggestion of the Inspection team, location modified, will replicated in all buses.
10	Luggage Box/ Courier Box	As per AIS 052 and mutually agreed by the KSRTC and bidder with scope for maximum space for the provision of courier transportation	Provided behind rear seat but the size to be increased.	As per suggestion of the Inspection team, size of the rear box will be increased & will be replicated in all the buses

11	Electronic Ticketing Machine(EETM) Box	Electronic Ticket Machine(EETM) /Ticket rack box one box with locked key should be provided to keep it safely under the conductor seat	The charging socket to be included in the ETM Box behind the driver seat.	As per suggestion of Inspection team, locat modified, will replicated in all buses.
12	Stay box for crew	To be provided with locking facility and accessible from driver cabin. It should be enough spacious to keep the essentiality belongings of crew	To be provided in front of the Rear Door by the shifting the position of Fire Extinguisher to the side wall.	As per suggestion of Inspection team, locat of Fire Cylinder shifted the side wall & a additional box with lock key arrangeme provided, will replicated in all t buses.
13	Driver Cabin Separation	Should be separated from passenger saloon as per AIS 052 Stainless steel tube structure, fencing type. This	Provided with Powder Coated Ribbed Aluminum Fencing.	Tube fencing will provided to separate the t driver area in all t buses.

1		separation should not restrict the driver seat position adjustments			
-	Conductor bell	String type required	To be provided.	As per suggestion of the Inspection team, will be mounted on roof in all the buses.	Provi

PRITHVIRAJ
PS. KSRTC

VINEETHRAJ R. W
ADE KSRTC

RAJEEV NAIR
AGM (Mfg. Sales) M/s PMI

A
G.M (A