Specification for Automatic Smoke/Fire Detection with Alarm system for 3 phase EMU/MEMUs

1. **Preamble:**

In the newly manufactured 3 Phase EMU/MEMU rakes, the Smoke detection and fire alarm system (FDS) is being provided as per specification RDSO/PE/SPEC/EMU/0163 (Rev. 3)-2022. However, for provision of Smoke detection and fire alarm system in existing 3 Phase EMU/MEMU rakes which are not having the provision of Smoke/Fire detection system, it has been decided by Railway Board for retro-fitment of the same and RCF is nominated for centralized procurement of FDS as per guidelines issued by RDSO. The Smoke detection and fire alarm system thus procured shall be retro fitted in the 3 Phase EMU/MEMU rakes running over Indian Railways.

The 3 Phase EMU and MEMUs are equipped with Electrics supplied by various OEMs of propulsion suppliers and the design of Equipments and Electrical cubicles i.e. Driver Desk, Traction/Auxiliary converters, Electrical Panels etc. are different for all the makes. Also the equipment layouts are at variance with each other according to the coach manufacturers and design of propulsion equipment suppliers. Due to the above variables there is a limitation in determining a unified scope and this has led to scope of supply according to the coach variant as well as Propulsion system.

The layouts of DMC/TC/DTC/MC/HTC/NDTC coaches prevailing over Indian Railway are as follows:

A. **Non Air conditioned MEMUs:**

I. **MEMU rakes with M/s Medha and M/s BHEL Electrics**:

MEMU/DMC - MEMU/DMC_3-9-0-301, Alt 'e' (RCF)
MEMU/DMC/3PH-9-0-001 (ICF)
MEMU/TC - MEMU/TC_2-9-0-201, Alt 'b' (RCF)
MEMU/TC6-9-0-001 (ICF)

II. **MEMU rakes with M/s Bombardier Electrics:**

MEMU/DMC3 – MEMU/DMC3/3PH-9-0-001
MEMU/TC – MEMU/TC6-9-0-001

B. **Non Air conditioned EMUs:**

I. **EMU rakes with M/s Medha and M/s BHEL Electrics:**

DTC – EMU/D/MMTS-9-0-001, EMU/D/3PH/HL-9-0-001, EMU/D/3PH-9-0-001
DTC2- EMU/D2/MMTS-9-0-001, EMU/D2/3PH/HL-9-0-001
MC- EMU/M/ER-9-0-001, EMU/M/3PH/HL-9-0-001, EMU/M/3PH/HL-9-0-001

MC2 - EMU/M2/ER-9-0-001, EMU/M2/3PH/HL-9-0-001
M/MMTS -EMU/M/MMTS-9-0-001
M/SR -EMU/M/SR-9-0-001
M2/SR -EMU/M2/SR-9-0-001
TC- EMU/C/V/MMTS-9-0-001, EMU/C/3PH-9-0-001
TC2 - EMU/C2/V/MMTS-9-0-001
TC3 - EMU/C/HC/ER-9-0-001, EMU/C3/3PH/HL-9-0-001
TC4 - EMU/C/SR-9-0-001, EMU/C4/3PH/HL-9-0-001
TC5 - EMU/C5/3PH/HL-9-0-001
TC6 - EMU/C6/3PH/HL-9-0-001
HTC - EMU/C/MMTS-9-0-001, EMU/D4HC/3PH/HL-9-0-001,
EMU/D3/HC/3PH-9-0-001, EMU/D/HC/3PH-9-0-001,

II. EMU rakes with M/s Bombardier Electrics:

TC- ICF/MRVC2/C-9-0-001
MC – ICF/MRVC2/M-9-0-001
DTC – ICF/MRVC/D/BT-9-0-001
D/HC – ICF/MRVC2/D/HC-9-0-001

III. EMU rakes with M/s SIEMENS Electrics:

TC- ICF/MRVC/C-9-0-001
DTC – ICF/MRVC/D-9-0-001
D/HC – ICF/MRVC/D/HC-9-0-001

C. <u>Air conditioned EMUs:</u>

I. EMU rakes with M/s BHEL electrics:

DMC - EMU/DMC/AC-9-0-001
TC -EMU/C/AC-9-0-001
NDMC - EMU/NDMC/AC-9-0-001
NDMC2 - EMU2/NDMC2/AC-9-0-00

II. EMU rakes with M/s Medha electrics:

DMC - EMU2/DMC/AC-9-0-001
DMC2 -EMU2/DMC2/AC-9-0-001
TC2 -EMU2/TC2/AC-9-0-001
TC3 -EMU2/TC3/AC-9-0-001
TC4 -EMU2/TC4/AC-9-0-001
NDMC - EMU2/NDMC/AC-9-0-001

Railway Board vide letter no. 2022/Elect/(G)/113/3 dated 16.05.2023 and 01.06.2023 has given the breakup of Rakes against this item, however Railway wise breakup and

detailed data of 3 Phase EMU/MEMUs has also been collected from all zonal Railways by RCF and compiled information has been utilized while finalizing this specification.

2. **Scope:** This specification covers the Supply, Installation, Testing and Commissioning of point based Automatic Smoke/Fire Detection with Alarm system for MEMU/EMU rakes in accordance with the rake formations as follows:

    1) Type 1A - for 12 car EMU
    2) Type 1 B - for 15 car EMU
    3) Type 2 A - for 8 car MEMU
    4) Type 2 B - for 12 car MEMU
    5) Type 3 – for Air conditioned EMU rakes

    RDSO has issued the guidelines for automatic smoke/fire detection with alarm system in non Air Conditioned EMU/MEMU rakes vide letter no. **MC/ACF/Fire detection/AC dated 10.06.2022** and vide letter no **MC/ACF/Fire detection/AC dated 09.03.2022** for air conditioned EMU rakes which forms the basis of scope of supply. Other references in this regard are as under:

    i) MC/ACF/Fire detection/AC dated 12.10.2022 and 17.07.2023

    To familiarize with the detailed scope, the supplier may visit and physically assess the existing rakes with M/s Medha, M/s BHEL, M/s BT (now Alstom) and M/s Siemens electrics over various zones of Indian Railway.

    Also during retro fitment, it is advisable that all the rakes of same propulsion system supplier are fitted with same automatic Fire/Smoke detection system to ensure that smoke/detection system remains functional without putting any limitation on attaching/detaching of basic units from one rake to another of same propulsion system supplier for in-service rakes.

    The Rake formations of EMU/MEMU rakes are as follows:

Rake formation	Type	Configuration
12 car EMU	1A	DTC-MC-TC-NDTC-MC-TC-NDTC-MC-TC-TC-MC-DTC
15 car EMU	1B	DTC-MC-TC-NDTC-MC-TC-NDTC-MC-TC-NDTC-MC-TC-TC-MC-DTC
8 car MEMU	2A	DMC-TC-TC-TC-TC-TC-TC-DMC
12 car MEMU	2B	DMC-TC-TC-TC-TC-TC-TC-DMC-TC-TC-TC-DMC
16 car MEMU	2 X 2A	DMC-TC-TC-TC-TC-TC-TC-DMC-DMC-TC-TC-TC-TC-TC-TC-DMC
		DMC-TC-TC-TC-DMC-TC-TC-TC-TC-TC-TC-DMC-TC-TC-TC-DMC
12 car Air Conditioned EMU	3	DMC-TC-TC-TC-TC-NDMC-NDMC-TC-TC-TC-TC-DMC

3. The Railway wise break up of 3 phase EMU/MEMU rakes is as under:

Railway	EMU		MEMU		
	12 Car	15 Car	8 Car	12 Car	16 Car
CR	156	2	16	1	0
ER	16	0	0	5	0
ECR	0	0	5	4	0
ECoR	0	0	8	2	0
NR	0	0	1	0	1
NCR	0	0	15	0	0
SR	0	0	11	6	0
SER	18	0	4	0	0
SCR	0	0	5	6	0
SWR	0	0	1	2	3
SECR	0	0	14	0	0
WR	92	13	0	0	0
WCR	0	0	12	1	0
Total Rakes	282	15	92	27	4
Basic Units	1203		281		
Total Basic Units	1484 (*)				

(ref.- Railway Board letter no. 2022/Elect/(G)/113/3 dated 16.05.2023; RCF letter no. RCF/HSQ/ED/3PH/2050 dated 03.08.2023 & Railway Board letter no. 2022/Elect/(G)/ 113/ 3 dated 08.08.2023)

* The above distribution may vary according to the actual rakes available at site and firm shall carry out the installation, testing and commissioning accordingly.

** The shed-wise holding and consignee details are as per Annexure-1 attached.

*** The allotment of rakes to supplier is interchangeable and may vary as per the requirement of IR and firm shall be required to carry out the work as required by Railways.

4. The Fire detection system shall be retro-fitted in the existing MEMU/EMU rakes and the installation and commissioning work of Automatic Smoke/Fire detection with alarm system shall be carried out at User Railway as per the details in clause 3 above in accordance with the availability of rakes spared by Zonal Railways. All wiring accessories, connectors, MCB, Mounting brackets, Hardware etc. required for installation and commissioning at site shall be in the scope of supplier.

5. TCMS interface is not in the scope of supply and separate FDCU shall be provided with HMI display of 7 inches (min.) with metallic enclosure and mounting arrangement to suit at site in each DMC of MEMU rakes and each DTC of EMU rakes. All major components i.e. Fire Control unit, Heat cum Smoke detector, HMI etc. shall be SIL2 compliant (EN54-7, EN54-5, EN54-2 etc.) as mentioned in the RDSO guidelines.

6. The scope of supply shall be in compliance with the RDSO guidelines mentioned in clause no. 2 of this specification and the detailed scope of supply along with make/ models/part nos. offered shall be submitted by the bidder during tendering and design approval stages. The tentative identified areas for provision of point detectors along with their indicative quantities are as follows:

A. MEMU Rake:

Make	Configuration	CRW/ E Cab (no.)	Driver Desk (no.)	Traction Conv. (no.)	Aux Conv. (no.)	ECC (no.)	EDC (no.)	HT Room (no.)	LT Room (no.)	EWP (no.)	Total/Rake
	Indicative numbers of Smoke/Heat point detectors (#)										
Medha	8 car	2	2	2	2	0	0	4	0	16	28
	12 car	3	3	3	3	0	0	6	0	24	42
	16 car	4	4	4	4	0	0	8	0	32	56
BT	8 car	2	2	2	0	2	2	4	2	16	36
	12 car	3	3	3	0	3	3	6	3	24	54
	16 car	4	4	4	0	4	4	8	4	32	72
BHEL	8 car	2	2	2	2	0	0	4	0	16	28
	12 car	3	3	3	3	0	0	6	0	24	42
	16 car	4	4	4	4	0	0	8	0	32	56

B. Non-Air conditioned EMU Rake:

Make	Configuration	Driver Desk (no.)	D-Cab (no.)	CRW (no.)	ECC (no.)	E Cab (no.)	Shunting desk (no.)	Traction Conv. (no.)	Aux Conv. (no.)	EDC (no.)	HT Room (no.)	EWP (no.)	Total/Rake (no.)
	Indicative numbers of Smoke/Heat point detectors (#)												
Medha	12 car	2	2	2	0	0	4	4	4	0	8	18	44
	15 car	2	2	2	0	0	5	5	5	0	10	23	54
BT	12 car	2	2	2	4	0	4	4	0	4	8	24	54
	15 car	2	2	2	5	0	5	5	0	5	10	31	67
Siemens	12 car	2	2	2	0	4	4	4	4	0	8	24	54
	15 car	2	2	2	0	5	5	5	5	0	10	31	67

C. Air conditioned EMU Rake:

Make	Configuration	Driver Desk (no.)	D-Cab (no.)	E Cab /CRW (no.)	Shunting desk (no.)	Traction Conv (no.)	Aux conv (no.)	Airco conv (no)	RMPU control panel (no)	MCB Panel (no.)	HT Room (no.)	LT Room (no.)	EWP (no.)	AC area		Total/ Rake (no.)
														DM/ NDMC (no.)	TC (no.)	
	Indicative numbers of Smoke/Heat point detectors (#)															
BHEL	12 car	2	2	4	2	4	4	4	4	2	8	4	40	24	64	168
Medha (Underslung)	12 car	2	2	2	0	12	3	0	4	0	0	0	44	24	64	157

(#) The no. of sensors indicated is tentative and subjected to compliance of ARGE guidelines and RDSO guidelines MC/ACF/Fire detection/AC dated 10.06.2022 and 09.03.2022.

Note: The above scope is not exhaustive and only indicative however the actual requirement shall be based on RDSO guidelines to fulfill the functional requirements of individual rake and the same shall be within the scope of supply at no additional cost of Railways.

7. Technical requirements:

i) The work may involve opening of ceiling/paneling/moldings in passenger areas during cable laying which shall be re-done to its original shape after completion of work.

ii) Team of qualified engineers shall be deputed to carry out the retro-fitment work in User Railways and the work shall be carried out strictly under the supervision of nominated Railway supervisor for this work.

iii) Firm shall submit the detailed design documents along with OGAs of system equipment with its mounting arrangement and shall be got approved from RCF/RDSO.

iv) Six nos. control cables have been dedicated for Fire Detection System (FDS) in the inter coach couplers/jumper cables and shall be in scope of Railways. For all other communication and transmission of data between FDCU and Detectors, the cables and accessories shall be in the scope of supplier.

v) Details of spare pins available for train line communication during retro fitment is as follows:

(A) Non air conditioned MEMU (On-Board):

(i) Non AC MEMU (On-Board) - with BHEL electrics (RCF)

S.NO	COUPLER TYPE	SPARE PINS/CABLES
DMC		
1	C	61, 62, 63, 64 and 65
2	D	66, 67, 68, 69 and 70
TC		
1	C	17, 18, 19, 26, 27, 28, 29, 30 and 31
2	D	17, 18, 19, 26, 27, 28, 29, 30 and 31

(ii) Non AC MEMU (On-Board) - with Medha electrics (RCF)

S.NO	COUPLER TYPE	SPARE PINS/CABLES
1	A	9, 10, 11 & 12
2	G	9, 10, 11 & 12
3	F2	4,5,6 in AB segment
		6,14 in CD segment
		1 – 20 in EF segment

(iii) Non AC MEMU (On-Board) - with BHEL electrics (ICF)

S.NO	COUPLER TYPE	SPARE PINS	SPARE CABLES	CABLE COLOUR
1	C	F1, F2, F3	2X1 SCR	BLK, WHT, SCR Respectively
		F4, F5, F6	2X1 SCR	BLK,WHT,SCR Respectively
		F7	2X1 SCR	BLK
2	D	F1, F2, F3	2X1 SCR	BLK,WHT,SCR Respectively
		F4	2X1 SCR	BLK

(iv) Non AC MEMU (On-Board) - with Medha electrics (ICF)

S.NO	COUPLER TYPE	SPARE PINS	SPARE CABLES	CABLE COLOUR
1	A	Ba 2,Ba 4	2X 0.75 SCR	WH,BK Respectively
		C1,C2,C3,C4	4X0.5 SCR	WHT1, WHT2, WHT3, WHT4 RESP.
2	G	C1,C2,C3,C4	4X 0.5 SCR	WHT1, WHT2, WHT3, WHT4 RESP.

(v) Non AC MEMU (On- Board) – with Bombardier electrics (ICF)

S.NO	COUPLER TYPE	SPARE PINS	SPARE CABLES	CABLE COLOUR
1	F1	E1,E18,E19,E20	5 No. of 2.5 mm^2	BLK
2	F2	C1 T0 C12 &	12 No. of 2.5 mm^2	BLK
		D1 T0 D8	8 No. of 2.5 mm^2	BLK

(B) Non air conditioned EMU (On-Board):

(i) Non AC EMU (On-Board) - with BHEL electrics

S.NO	COUPLER TYPE	SPARE PINS	SPARE CABLES	CABLE COLOUR
1	C	E3,E14,E9	2X1 SCR	BRN, WHT, SCR, RESP.
		F1,F2,F3,F4	3X1 SCR	YEL,ORG,WHT,SCR RESP.
2	D	F1,F2,F3,F4	3X1 SCR	YEL,ORG,WHT,SCR RESP.

(ii) Non AC EMU (On-Board)- with Medha electrics

S.NO	COUPLER TYPE	SPARE PINS	SPARE CABLES	CABLE COLOUR
1	A	Ef1- 1 to 4	4X0.5 SCR	WHT1, WHT2, WHT3, WHT4 RESP.
2	G	Ef1- 1 to 4	4X 0.5 SCR	WHT1, WHT2, WHT3, WHT4 RESP.

(iii) Non AC EMU (On-Board)- with Bombardier electrics

S.NO	COUPLER TYPE	SPARE PINS	SPARE CABLES	CABLE COLOUR
1	F1	C14,E1,E18,E19,E20	5 No. of 2.5 mm^2	BLK
2	F2	C9 TO C12	4 No. of 2.5 mm^2	BLK
		D1 TO D10	10 No. of 2.5 mm^2	BLK

(iv) Non AC EMU (On-Board)- with Siemens electrics

S.NO	COUPLER TYPE	SPARE PINS	SPARE CABLES	CABLE COLOUR
1	E	A4,A5,A6	3 No. of 2.5 mm^2	BLK
2	F	36 TO 46	10 No. of 2.5 mm^2	BLK

vi) The firm shall submit the Schematics, Design document, QAP, Maintenance manuals to various Railways.

vii) Supplier/OEMs shall ensure availability of spare parts of supplied system for a period of at least 10 years.

8. Testing:

i) The test protocol for Prototype and Routine tests of the system shall be got approved from RCF/RDSO.

ii) The firm shall hand over the rake complete in all respect after checking the functional requirements/ IR testing of the wiring and made ready for functional testing of the FDS by Railways. The firm shall also associate for complete testing undertaken by technical representative nominated by Railways and the faults, if noticed, shall be rectified expeditiously to place the rake in service as per schedule

iii) A joint note for successful commissioning rake wise shall be made by the authorized representative of the firm and Zonal Railways and the copy of the same shall be submitted to RCF.

9. Warranty:

Warranty shall be as per latest standard IRS conditions.

10. Enclosures:

i) RDSO guidelines issued vide letter no. MC/ACF/Fire detection/AC dated 10.06.2022

ii) RDSO guidelines issued vide letter no. MC/ACF/Fire detection/AC dated 09.03.2022

iii) **Annexure 1 -** shed-wise holding and consignee details

iv) **Layout drawings:** As per S.No. A, B & C of clause 1 of this specification.

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MC/ACF/fire detection/AC

Dated 10.06.2022

EDME (Coaching)
Rail Bhawan
Railway Board
New Delhi-110 001

Sub: Guidelines for Automatic Smoke/Fire detection with Alarm system for non-air conditioned EMU/MEMU rakes.

CRS/WC has recommended for provision of "Automatic Smoke/Fire detection with Alarm system in EMU rakes, specifically Air conditioned coaches". Accordingly, necessary guidelines for retro fitment of smoke/fire detection with alarm system in the existing non-air conditioned EMU/MEMU rakes are being issued. These guidelines are already incorporated in relevant specifications for EMU/MEMU rakes (through TCMS) for future production however during retro-fitment work, for obviating the need for changes in TCMS software, its recertification etc, separate dedicated FDCU and in Driver's cab at both ends.

RDSO in past has already issued the guidelines for retro-fitment of automatic smoke/fire detection system for in-service air conditioned EMUs. Keeping the same requirements into consideration, these guidelines are being prepared and attached at Annex-A. The Basic architecture of the system is also enclosed for guidance of Zonal Railways.

All new rakes manufactured now onwards will be fitted with automatic fire/smoke detection system as detailed in Spec No. RDSO/PE/SPEC/EMU/0163-2020 (Rev.-3) however to cover the balance rakes already in service, Board is requested to nominate either ICF or RCF (involved with manufacturing of EMU/MEMU rakes) for carrying out centralized procurement to cover the in-service rakes. During Retro fitment, It is advisable that all the rakes of same propulsion system supplier are fitted with same automatic fire/smoke detection system to ensure that Smoke/fire detection system remains functional without putting any limitation on attaching/detaching of basic units from one rake to another of same propulsion system supplier for in-service rakes.

10/6/2022

(Samir Lohani)
Exe. Director (Std) Carriage

Cc:

1) ED/EE(G), Railway Board
2) PCME/ICF & RCF
3) ED/PS & EMU

} For kind information and necessary action please.

4) ED/Safety, Railway Board- With reference to Point No.6 of MOM on "Fire Safety in Coaches" dated 08.01.2022.

Annexure-A

Guidelines for Automatic Smoke/Fire detection with Alarm system for non-air conditioned EMU/MEMU rakes

A- Description of Rake formation

EMU rake is typically a 12 car formation with 3 coaches Basic Unit. The three coach types are DMC, TC and NDMC and these coaches are placed in following formation:

DTC+MC+TC+NDTC+MC+TC+NDTC+MC+TC+ TC + MC+DTC

MEMU rake is typically an 8 car formation with 4 coaches as basic unit and these coaches are placed in following formation

DMC-TC1-TC2-TC-TC3-TC2-TC1-DMC

The tentative architecture of the Detectors is attached as Annexure-B. Though the requirements are generic and applicable to both non AC-EMU and non AC MEMU, however wherever specific to any of the stock, separate guideline is categorically mentioned.

B- Design requirements

1. Provision of smoke-cum-heat detectors (to EN 54-7 and EN 54-5) in LT room, HT room and in technical enclosures/cubicles/cabinets. The sensitivity and location of detectors in LT and HT compartment has to fulfil the requirements of ARGE guidelines.
2. Provision of Fire Detection & Control Unit (FDCU) and HMI in Driving cab at both ends. Affected area to be located exactly and system's actions to be activated without any delay on real time basis.
3. Provision of audio alert to running staff
4. The system to be self-diagnostic in order to identify failures immediately. In case of malfunctioning of any detector, it should be possible to isolate the affected detector.
5. Fire survival cables according to EN 50200 to be used for supply and other circuits of smoke/fire detection system for their continued functioning to the extent possible in the event of fire. Survival duration classification of PH30 (30min) or higher is desirable
6. Supply of all other hardware/software required to make the system fully functional which is not explicitly mentioned above.
7. Power supply of 110 V DC is available. Smoke/Fire detection system should work with this supply. However, the system should continue to work with battery voltage supply in range between 77V to 137.5V DC
8. Supplier to provide all necessary drawings, reports, technical data and similar documents. The supplier to provide, but not limited to, the following design information of smoke/fire detection system:

a) Detailed Drawing
   i. All Types of Detectors
   ii. FDCU
   iii. Other aggregates of Smoke/Heat detection system.

b) Analysis & Calculation data
c) Smoke & heat detectors simulation to meet the no. of detectors
d) Standard applied to the Fire and Smoke Detection System
e) Type test procedure & record sheet
f) Type test report
g) Routine test procedure & record sheet
h) Routine test report
i) Certificate of conformity
j) Material certification
k) Spare parts catalogues
l) Training manuals
m) Operation and maintenance information for special tools and test equipment
n) Dismounting and mounting instruction

C- General requirements

1. The supplier will carry out all required work and activities with regard to design, testing and commissioning of smoke/fire detection system in the coaches.
2. If specific instructions are issued by railways for undertaking modifications to circuit design/hardware/interfaces proposed etc. to meet the railway's requirements, the supplier will abide with these instructions.
3. FDCU and HMI to be provided in driving cab at both ends. FDCU must provide LED and other hardware interface with HMI for major system status.
4. On detection of a possible smoke/fire by means of suitable detection, the system shall have different levels of response (minimum two i.e. pre alarm and alarm).
5. All the major events (alarms, faults etc.) to be recorded in FDCU and should be retrievable on maintenance terminal for analyzing any issue.
6. The system to have provision of drift compensation in order to decrease the risk of false, or unwanted alarm.
7. The System shall be designed for self-diagnostic to any failure/trouble within The System i.e. wiring break within the system, discontinuity in the circuit etc.
8. The Supplier/OEM to provide necessary diagnostic tools (software, hardware etc.) in order to identify failures immediately.
9. Railways will spare 6 connections points for train control lines for communication and transmission of data between Detectors and FDCU. Any other requirement of hardware/software to make the system fully functional will be in the scope of supplier.
10. The location of mounting points and the design of equipment installation comprising of the Fire Detection System to be defined by the supplier and will be approved by consignee in order to avoid the mechanical interference with other equipment for the vehicle. Supplier shall be responsible for mounting method and providing all materials for mounting in the car body
11. The contractor shall provide one original and five coloured copies and electronic copies of the Training manual for use by the Employer for conducting in-house training. The Manuals shall cover all requirements.
12. All the key components of Smoke/fire detection system shall comply with the standards as mentioned below as the case may be.
13. The system should be SIL-2 compliant

14. **Prototype approval** to ensure the compliance of the system to ARGE guidelines will be arranged by the supplier and will be witnessed by any accredited assessor for these systems in presence of consignee/RDSO.

15. Following standards (latest version) may be referred unless specifies

S. No.	Standards	Description
1.	EN50155	European standard for compatibility of electronic equipment in rolling stock application
2.	EN45545	Railway Applications. Fire protection of Railway vehicles
3.	EN50126	Railway applications -The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)
4.	EN54-5	Fire Detection and Fire alarm systems. Heat detectors -Point detectors.
5.	EN54-7	Fire Detection and Fire alarm systems. Smoke detectors. Point detectors using scattered light, transmitted light or ionization.
6.	EN50128	Railway applications -Communications, signalling and processing systems
7.	ARGE Guideline	Guidelines for fire detection systems in rolling stock applications
8.	IRIS	Railway standard for quality management system
9.	EN 50121-3-2	Railway Application – Electro-Magnetic Compatibility Pt. 3- 2: Rolling Stock Apparatus. Specifies emission and immunity requirements for electrical and electronic apparatus for use on rolling stock. Covers the frequency range DC to 400GHz
10.	EN 50200	Fire Resistant Cables
11.	IEC 60571	Electronic equipment used on railway vehicles
12.	IEC 61373	Railway application- Rolling stock equipment- shock and Vibration tests

D- Detailed Scope of Work

1. All components to comply with the contractual requirements mentioned under Design/General requirements.

2. For cutting of slots for installation of fire detection system in coaches, location to be selected to ensure full coverage as per scope.

3. Approval of Engineer in charge (Sr.DEE/SrDME of concerned maintenance depot) is to be taken for routing of cable. Cables required for the work should be secured properly with cable tie and additional sleeves to be provided wherever it is being routed near sharp edges.

4. Separate CB for Smoke/Fire system for individual coach to be provided. CB shall be connected in such a way such that failure of CB tripping pop up on HMI.

5. All the components/hardware/Transportation etc. required for complete installation, testing & commissioning as well as the smooth operation of the Smoke/Fire Detection system to be provided by the contractor.

6. The Smoke/Fire Detection system event recording from any of the FDCU shall be possible to download using a standard laptop with specified interface cables. The event recording shall be with time and date stamping and

required software to download.

7. The Fire Detection system shall fully meet the requirement of EMI/EMC for Railway application as per EN50155.

8. The list of warranty spares to be maintained by the contractor at site to provide support during warranty period to be furnished by the contractor in his technical offer.

9. The contractor shall provide required training for operation and maintenance of Smoke/Fire Detection System to Concerned staff at the site. After completion of the training, training aids and materials used shall become Railway's property

10. The retrofitting works under this contract shall consists of, but not limited to, all material, labour, equipment, tools, and necessary machinery as required to completely execute shall works in toto manner for commissioning of Smoke/Fire detection system in trains.

11. The supplier shall himself identify and formally document all design, manufacturing and operational interface between the equipment within the train.

12. All other works deemed necessary for installation & commissioning of Fire detection system as per contractual conditions.

13. It should be possible to individually reset/isolate the Smoke or heat detector/ sensor from the HMI/FDCU, in case of requirement.

14. It would be better on the part of supplier to visit and physically assess the existing coaches for better appreciation of the work contents.

15. Supplier may also consider concerned RDSO specification for guidance purpose.

E- Fire Detectors (Smoke & Heat Detectors)

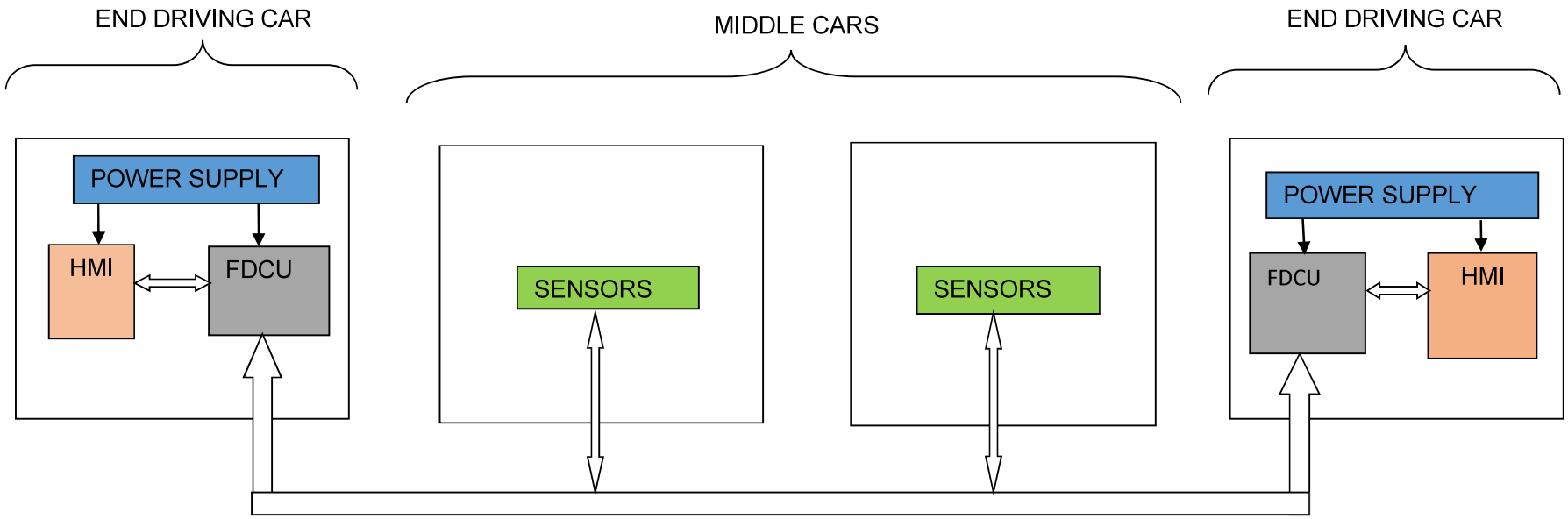
- Adequate no. of Smoke & Heat detectors (multi-sensors) shall be installed in each car. The Detectors to be EN compliant.
- The number and exact location of smoke/heat detectors in LT/HT compartments of non-AC MEMU rakes may vary and to be finalized in compliance with ARGE guidelines.

Proforma for Testing of fire detection with alarm system:

Coach No.				
Supplier Name				
Inspection date				
S.N.	Parameter	Indications on Control Panel	Observations	Remarks
1.	Smoke test for smoke detectors	On simulating smoke: 1. Alarm sounder/Buzzer should activate 2. Controller should give indication of Smoke alarm		
2.	Heat detection test for heat detectors	On simulating Heat: 1. Alarm sounder/Buzzer should activate 2. Controller should give indication of Fire alarm.		
3.	Condition of wiring, fasteners etc.	Check that there is no loose wiring. Fasteners should be tightened properly (Visual Check).		
4.	Demonstration of Faults	Self-diagnostic feature in system to be demonstrated		

- Smoke should be simulated by Smoke Generator etc.
- Heat should be simulated by a hot air gun (400 Watt Approx.) placed at least 250 mm from the detector's surface.
- Supplier will be responsible for carrying out performance tests of the smoke/fire detection system. Commissioning test to be performed at consignee premises.

Annexure-B



1. The no. of detectors, their sensitivity and the location in LT/HT compartment is to be decided so as to meet the requirement of ARGE guidelines part 1.
2. System is also required to also provide audio alert to motor man / guard (either via HMI or via a buzzer).

Above block diagram is indicative. The actual arrangement may as per the requirement and should meet SIL-2.

2162689/2022/O/o SECY/PCME/HQ/WR

भारत सरकार – रेल मंत्रालय
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Lucknow - 226 011
DID (0522) 2450115
DID (0522) 2465310

MC/ACF/fire detection/AC

Dated 9.03.2022

PCME /
Western Railway,
Churchgate, Mumbai

PCME/
Central Railway,
Chatrapati Shivaji Terminus,
Mumbai

Sub: Guidelines for Automatic Smoke/Fire detection with Alarm system for in-service rakes of air conditioned EMU.

Air conditioned EMU rakes are manufactured with propulsion system as per RDSO specification no. RDSO/PE/SPEC/EMU/0111-2008 (rev-0) with amendment-1. In this specification, the fire prevention measures are detailed at clause 1.1.5 and 4.9.2. Presently 11 rakes (BHEL electrics) are available with Western and Central Railways

CRS/WC has recommended for provision of "Automatic Smoke/Fire detection with Alarm system in EMU rakes, specifically Air conditioned coaches". Accordingly, necessary guidelines for retro fitment of smoke/fire detection with alarm system in the existing AC EMU rakes are being issued. Also, these guidelines will be incorporated in relevant specifications for AC EMU/MEMU rakes (through TCMS) for future production.

Study of Delhi Metro system has brought out that similar requirement was felt by Delhi Metro also as no Fire/smoke detection system was available in DMRC's initial rolling stock (RS-1, RS-2 etc.) and during refurbishment of these rakes, smoke/fire detection system is also being retrofitted in these rakes. It is also noticed that even though these trains were fitted with TCMS, however all the retro fitment work of Smoke/Fire detection system was executed by utilizing 6-8 spare train control lines and dedicated FDCU (fire detection and control unit) & HMI in Driver's cab at both ends thereby obviating the need of change(s) in TCMS software and its recertification etc.

The latest specification for these type of rolling stocks is Specification no. DM/RS/COR-OF/0069 which is for procurement of MRTS/RRTS Trains. Based upon the features of the systems available in MRTS/RRTS Trains and in being retrofitted in DMRC stock, following is observed as constituting major requirements of smoke/fire detection and alarm system for AC EMU trains:

1- Earliest detection of occurrence of any fire and Immediate alert to train crew
2- Provision of Smoke & Heat detectors (multi-sensors) in passenger areas
3- Provision of Linear heat detector (LHD) or Point type detectors for Enclosures/cubicles (Electrical cabinets).
4- The affected area to be located exactly by identifying which sensor(s) is actuated and further system's actions to be activated without any delay
5- Fire detection system and layout of detectors to meet the criteria for the performance to be done as per ARGE Guidelines.
6- Provision of Alarm/beacons in Driving cab at a suitable location.

7- All major events (alarm, faults etc.) to be recorded and shall be retrievable on maintenance terminal for analyzing any issue.
8- The system shall provide a dynamic two detector dependency (smoke and/or heat) in order to decrease the risk of false alarm.
9- The system to be self-diagnostic in order to identify failures immediately.

Thus, keeping into consideration the literature survey as well as the discussions with suppliers of Smoke/Heat detection systems, guidelines are prepared for retro fitment of Automatic smoke/heat detection and alarm system in AC-EMU coaches. These are enclosed at Annexure-A. The location of various electrical cubicles etc and Basic architecture of the system is also enclosed for guidance of Zonal Railways.

Zonal Railways (Preferably one zonal railway may coordinate as Nodal) may carry out the work of retro fitment of automatic smoke/fire detection system for in-service AC EMUs as per detailed enclosed. Though sufficient suppliers are available however as the number of rakes to be retrofitted is very less, it is advisable to award the retro fitment work without splitting quantity to ensure interoperability among basic units of these old rakes.

..9/3/2022

(Samir Lohani)
Exe. Director (Std) Carriage

Cc:

1) EDME/chg, Railway Board
2) ED/EE(G), Railway Board
3) PCME/ICF/Chennai-

} For information please.

4) ED/Safety, Railway Board- With reference to Point No.6 of MOM on "Fire Safety in Coaches" dated 08.01.2022.

Annexure-A

Guidelines for Automatic Smoke/Fire detection with Alarm system for air conditioned EMU rakes

A- Description of Rake formation

Air conditioned EMU rake is typically a 12 car formation with 3 coaches Basic Unit. The three coach types are DMC, TC and NDMC and these coaches are placed in following formation: DMC-TC-TC-TC-TC-NDMC-NDMC-TC-TC-TC-TC-DMC

Number of detectors per coach to be provided in each type of coach is tabulated below.

SN	Location	DMC coach	NDMC coach	TC coach
1	Passenger area	Number of Detectors, their sensitivity and location of detectors should be in conformity to meet the requirements of ARGE guidelines. Detectors in passenger area should not be less than two.		
2	LT compartment			
3	HT compartment			
4	ECAB cabinet	1	1	-
5	MCB panel	1	1	-
6	EWP1 cabinet	1	1	1
7	EWP2 cabinet	1	1	1
8	EWP3 cabinet	1	1	1
9	EWP4 cabinet	-	-	1
Fire detection & control unit and Driver display(HMI) requirement is as below				
1	FDCU	1	-	-
2	HMI	1	-	-

The tentative architecture of the Detectors and the location of various cubicles/cabinets (marked on respective layouts) is attached as Annexure-B

B- Design requirements

1. Provision of smoke-cum-heat detectors (to EN 54-7 and EN 54-5) in passenger area, LT room, HT room and in technical areas (enclosures/cubicles). The sensitivity and location of detectors has to fulfil the requirements of ARGE guidelines as mentioned above. The details of various electrical cubicles/cabinets are attached at Annexure-B

2. Provision of Fire Detection & Control Unit (FDCU) and HMI in Driving cab at both ends. Affected area to be located exactly and system's actions to be activated without any delay on real time basis.
3. Provision of audio alert to running staff
4. The system to be self-diagnostic in order to identify failures immediately
5. Fire survival cables according to EN 50200 to be used for supply and other circuits of smoke/fire detection system for their continued functioning to the extent possible in the event of fire. Survival duration classification of PH30 (30min) or higher is desirable
6. Supply of all other hardware/software required to make the system fully functional which is not explicitly mentioned above.
7. Power supply of 110 V DC is available. Smoke/Fire detection system should work with this supply. However, the system should continue to work with battery voltage supply in range between 77V to 137.5V DC
8. Supplier to provide all necessary drawings, reports, technical data and similar documents. The supplier to provide, but not limited to, the following design information of smoke/fire detection system:

a) Detailed Drawing
   i. All Types of Detectors
   ii. FDCU
   iii. Other aggregates of Smoke/Heat detection system.

b) Analysis & Calculation data
c) Smoke & heat detectors simulation to meet the no of detectors
d) Standard applied to the Fire and Smoke Detection System
e) Type test procedure & record sheet
f) Type test report
g) Routine test procedure & record sheet
h) Routine test report
i) Certificate of conformity
j) Material certification
k) Spare parts catalogues
l) Training manuals
m) Operation and maintenance information for special tools and test equipment
n) Dismounting and mounting instruction

C- General requirements

1. The supplier will carry out all required work and activities with regard to design, testing and commissioning of smoke/fire detection system in the coaches.
2. If specific instructions are issued by railways for undertaking modifications to circuit design/hardware/interfaces proposed etc. to meet the railway's requirements, the supplier will abide with these instructions.
3. FDCU and HMI to be provided in driving cab at both ends. FDCU must provide LED and other hardware interface with HMI for major system status.
4. On detection of a possible smoke/fire by means of suitable detection, the system shall have different levels of response (minimum two i.e. pre alarm and alarm).

5. All the major events (alarms, faults etc.) to be recorded in FDCU and should be retrievable on maintenance terminal for analyzing any issue.
6. The system shall provide drift compensation in order to decrease the risk of false, or unwanted alarm.
7. The System shall be designed for self-diagnostic to any failure/trouble within The System i.e. wiring break within the system, discontinuity in the circuit etc.
8. The Supplier/OEM to provide necessary diagnostic tools (software, hardware etc.) in order to identify failures immediately.
9. Railways will spare 6 connections points for train control lines for communication and transmission of data between coaches for Detectors and FDCU. Any other requirement of hardware/software to make the system fully functional will be in the scope of supplier.
10. The location of mounting points and the design of equipment installation comprising of the Fire Detection System to be defined by the supplier and will be approved by consignee in order to avoid the mechanical interference with other equipment for the vehicle. Supplier shall be responsible for mounting method and providing all materials for mounting in the car body
11. The contractor shall provide one original and five coloured copies and electronic copies of the Training manual for use by the Employer for conducting in-house training. The Manuals shall cover all requirements.
12. All the key components of Smoke/fire detection system shall comply with the standards as mentioned below as the case may be.
13. The system should be SIL-2 compliant
14. **Prototype approval** to ensure the compliance of the system to ARGE guidelines will be arranged by the supplier and will be witnessed by any accredited assessor for these systems in presence of consignee/RDSO.
15. Following standards (latest version) may be referred unless specifies

S. No.	Standards	Description
1.	EN50155	European standard for compatibility of electronic equipment in rolling stock application
2.	EN45545	Railway Applications. Fire protection of Railway vehicles
3.	EN50126	Railway applications -The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)
4.	EN54-5	Fire Detection and Fire alarm systems. Heat detectors -Point detectors.
5.	EN54-7	Fire Detection and Fire alarm systems. Smoke detectors. Point detectors using scattered light, transmitted light or ionization.
6.	EN50128	Railway applications -Communications, signalling and processing systems
7.	ARGE Guideline	Guidelines for fire detection systems in rolling stock applications
8.	IRIS	Railway standard for quality management system

9.	EN 50121-3-2	Railway Application – Electro-Magnetic Compatibility Pt. 3- 2: Rolling Stock Apparatus. Specifies emission and immunity requirements for electrical and electronic apparatus for use on rolling stock. Covers the frequency range DC to 400GHz
10.	EN 50200	Fire Resistant Cables
11.	IEC 60571	Electronic equipment used on railway vehicles
12.	IEC 61373	Railway application- Rolling stock equipment- shock and Vibration tests

D- Detailed Scope of Work

1. All components to comply with the contractual requirements mentioned under Design/General requirements.
2. For cutting of slots for installation of fire detection system in coaches, location to be selected to ensure full coverage in every coach.
3. Approval of Engineer in charge (Sr.DEE/SrDME of concerned maintenance depot) is to be taken for routing of cable. Cables required for the work should be secured properly with cable tie and additional sleeves to be provided wherever it is being routed near sharp edges.
4. Separate CB for Smoke/Fire system for individual coach to be provided. CB shall be connected in such a way such that failure of CB tripping pop up on HMI.
5. All the components/hardware/Transportation etc. required for complete installation, testing & commissioning as well as the smooth operation of the Smoke/Fire Detection system to be provided by the contractor.
6. The Smoke/Fire Detection system event recording from any of the FDCU shall be possible to download using a standard laptop with specified interface cables. The event recording shall be with time and date stamping and required software to download.
7. The Fire Detection system shall fully meet the requirement of EMI/EMC for Railway application as per EN50155.
8. The list of warranty spares to be maintained by the contractor at site to provide support during warranty period to be furnished by the contractor in his technical offer.
9. The contractor shall provide required training for operation and maintenance of Smoke/Fire Detection System to Concerned staff at the site. After completion of the training, training aids and materials used shall become Railway's property
10. The retrofitting works under this contract shall consists of, but not limited to, all material, labour, equipment, tools, and necessary machinery as required to completely execute shall works in toto manner for commissioning of Smoke/Fire detection system in trains.
11. The supplier shall himself identify and formally document all design, manufacturing and operational interface between the equipment within the train.
12. All other works deemed necessary for installation & commissioning of Fire

detection system as per contractual conditions.

14. It should be possible to individually reset/isolate the Smoke or heat detector/ sensor from the HMI/FDCU, in case of requirement.

15. It would be better on the part of supplier to visit and physically assess the existing coaches for better appreciation of the work contents.

16. Supplier may also consider concerned RDSO specification for guidance purpose.

E- Fire Detectors (Smoke & Heat Detectors)

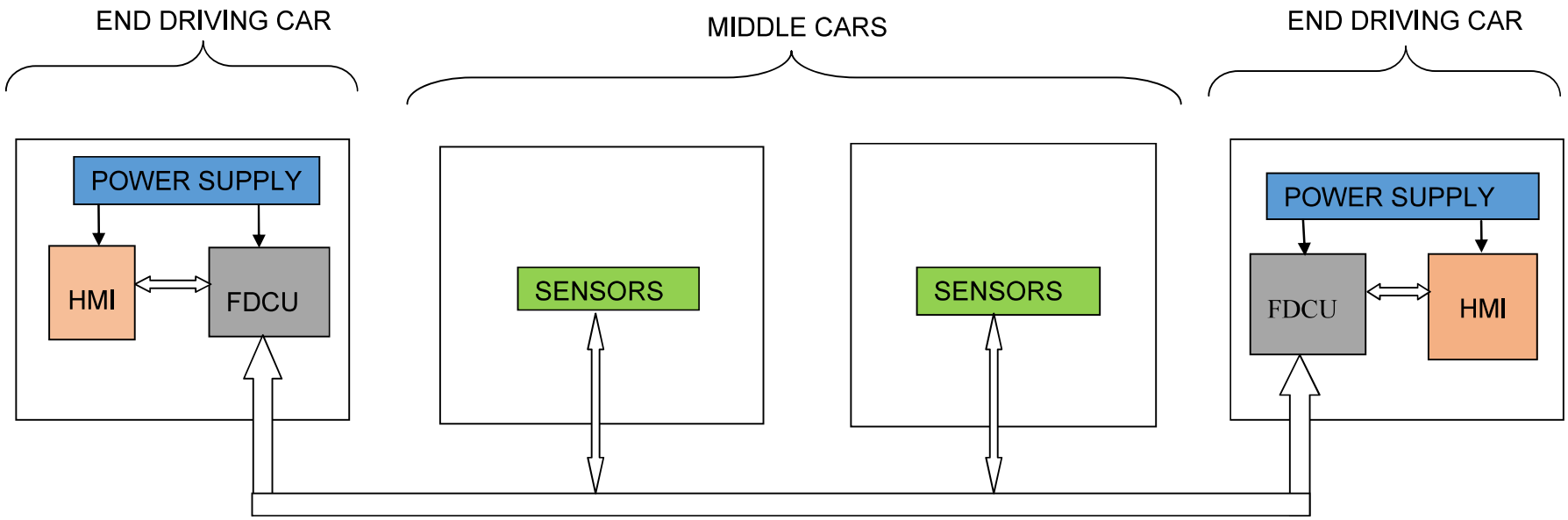
- Adequate no. of Smoke & Heat detectors (multi-sensors) shall be installed. The Detectors to be EN compliant.
- The number of smoke/heat detectors and their exact location may vary and to be finalized in compliance with ARGE guidelines.

Proforma for Checking of fire detection with alarm system for EMU AC Trains:

Coach No.				
Supplier Name				
Inspection date				
S.N.	Parameter	Indications on Control Panel	Observations	Remarks
1.	Smoke test	On simulating smoke: 1. Alarm sounder/Buzzer should activate 2. Controller should give indication of Smoke alarm		
2.	Heat detection test	On simulating Heat: 1. Alarm sounder/Buzzer should activate 2. Controller should give indication of Fire alarm.		
3.	Condition of wiring, fasteners etc.	Check that there is no loose wiring. Fasteners should be tightened properly (Visual Check).		
4.	Demonstration of Faults	Self-diagnostic feature in system to be demonstrated		

- Smoke should be simulated by Smoke Generator etc.
- Heat should be simulated by a hot air gun (400 Watt Approx.) placed at least 250 mm from the detector's surface.
- Fire detection system and layout of detectors to meet the criteria for the performance to be done as per ARGE Guidelines
- Supplier will be responsible for carrying out performance tests of the smoke/fire detection system. Commissioning test to be performed at consignee premises.

Annexure-B

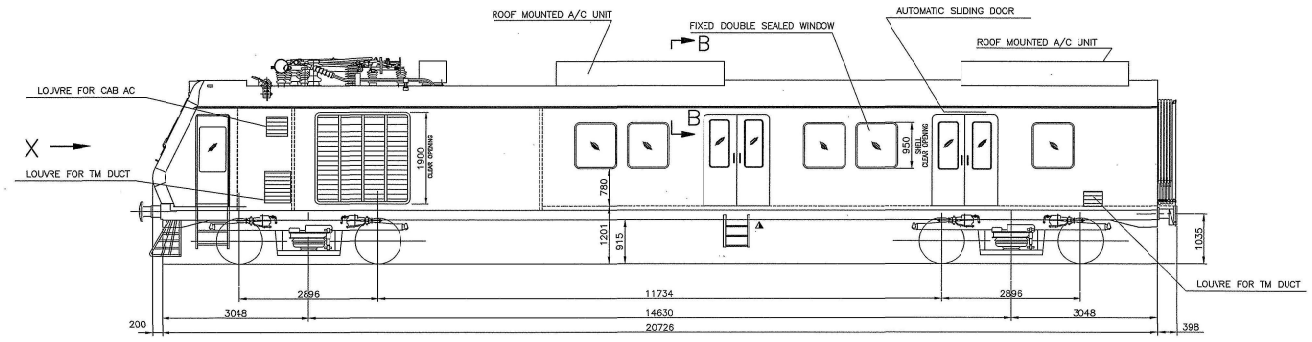


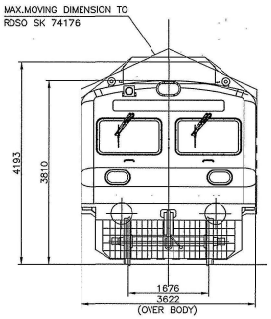
FDCU DATA LINK (TRAIN LINES)

1. In metro systems typically 6 to 8 detectors are provided in passenger areas. The no. of detectors, their sensitivity and the location is to be decided so as to meet the requirement of ARGE guidelines part 1. However, no. of detectors in passenger area of AC-EMU must not be less than two, to meet the double dependency requirement.
2. System is also required to also provide audio alert to motor man / guard (either via HMI or via a buzzer).

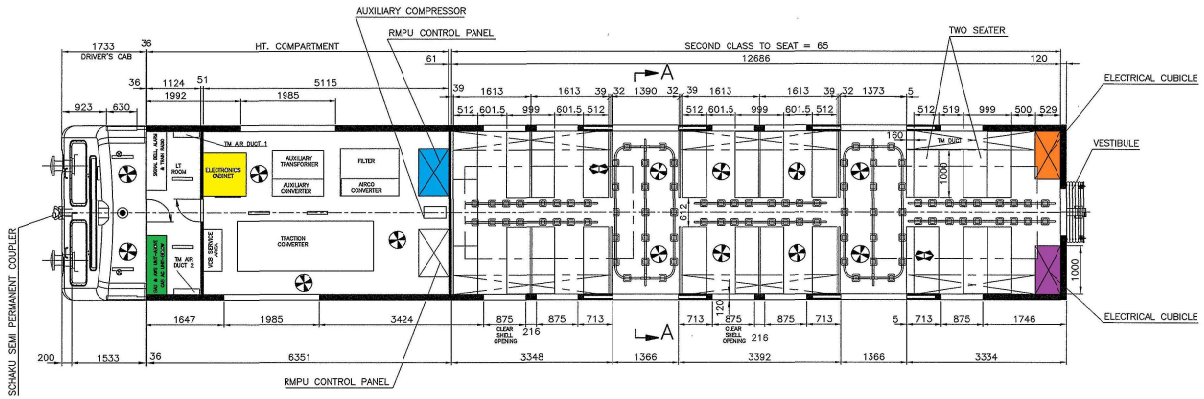
Above block diagram is indicative. The actual arrangement may as per the requirement and should meet SIL-2.

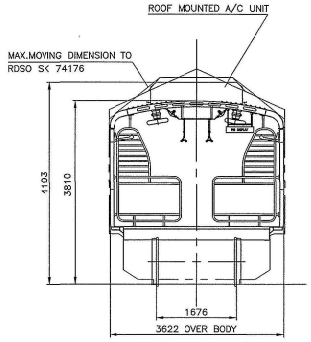
ICF/SK3-9-0-115





VIEW FROM–X



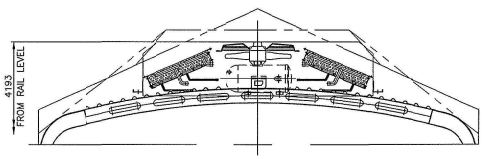


SECTION–AA



12 COACH FORMATION AS PER WESTERN RLY'S REQJIREMENT (WITH VESTIBULE)

V– Vestibule
A– Alarm End



SECTION–BB

1. BOGIE–AIR SPRING BOGIE
2. AXLE CAPACITY–20.32 TONNES
3. NO. OF PASSENGERS TO SEAT (II CLASS)– 65
4. SEATED PASSENGER LOAD (65X60kg) + DRIVER– 3.96 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL–258x60kg)–15.48 TONNES

TOTAL PAY LOAD –19.44 TONNES

6. TARE WEIGHT – 57.52 TONNES (APPROX.)
   - AIR CONDITIONED UNIT (0.75X2) 1.5 TONNES
   - INCREASE IN WEIGHT OF ELECTRICS AND MISC. ITEMS LIKE CATTLE GUARD, VESTIBULE, BUFFER, BOGIE, ETC. COMPARED TO MRVC PHASE–I 1.82 TONNES
   - MRVC PHASE–I MOTOR COACH WEIGHT 54.20 TONNES
7. GROSS WEIGHT UNDER SDCL 76.96 TONNES (APPROX.)

(16 PASSENGERS / SQ. M.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP

Various Electrical Cabinets/Cubicles with colour codes-

ECAB Cabinet - Yelow
MCB Cabinet - Green
EWP3 Cabinet- Blue
EWP2 Cabinet- Voilet
EWP1 Cabinet- Orange

ALTERATIONS

ⓐ	11/2012
	LAYOUT REVISED.
	sd/– SSE/D sd/– SME/DSS
ⓑ	12/2012
	LAYOUT REVISED.
	SSE/D SME/DSS
ⓒ	01/2013
	1085MM OPENING IN HT COMPARTMENT ELIMNATED. PASSENGER END DOORWAY REVISED. SEATING & STANDING CAPACITY, TARE & GROSS WT. REVISED.
	SSE/D SME/DSS
ⓓ	06/2013
	FLOOR HEIGHT & VESTIBULE REVISED NOTE DELETED. LAYOUT REVSD.
	SSE/D SME/DSS
ⓔ	06/2013
	SEATING REVISED TO ACCOMODATE TM DUCT.
	SSE/D SME/DSS
ⓕ	07/2013
	LAYOUT REVISED.
	SSE/D SME/DSS

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
	LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU MOTOR COACH				SUPERSEDES: ICF/SK3-9-0-115/ALT e	
					SCALE 1:50 1:20	SSE/D N.Shanmugavel
						CHD
						ALTD N.Shanmugavel
						DRN N.Shanmugavel
					Alpha Alt:– f	

ASSEMBLY DRAWINGS

0 Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME
	5-07-2013	15-09-2012	

DATA CODE NO. 329 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1

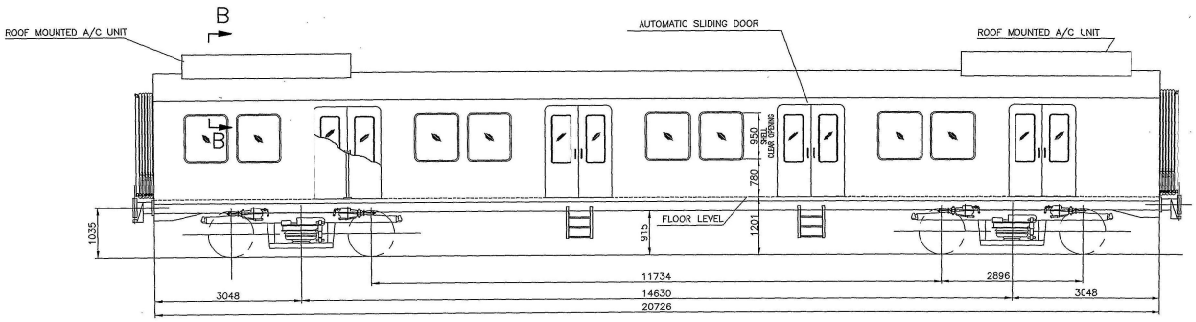
INTEGRAL COACH FACTORY CHENNAI–38

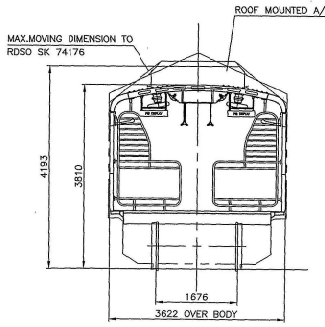
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FORM:–ICF.A1–840X600

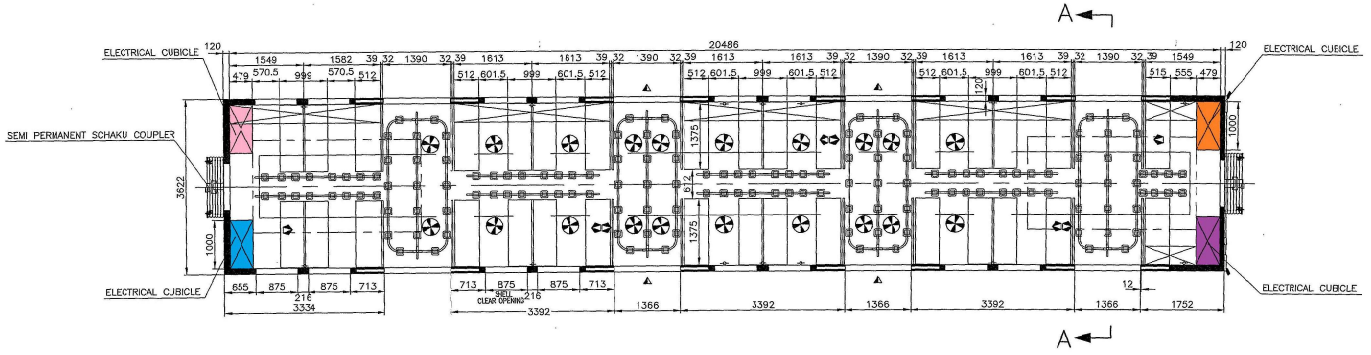
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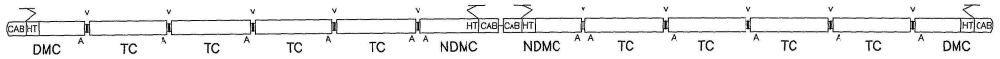
ALTERATIONS	
(a)	11/2012
	LAYOUT REVISED.
	sd/- SSE/D, sd/- SME/DSS
(b)	06/2013
	FLOOR HEIGHT & VESTBULE REVISED. NOTE DELETED. LAYOUT REVSD.
	SSE/D, SME/DSS
(c)	07/2013
	LAYOUT REVISED
	SSE/D, SME/DSS





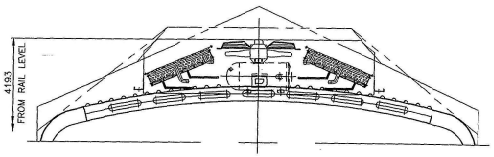
SECTION–AA





12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT (WITH VESTIBULE)

V– Vestibule
A– Alarm End



SECTION–BB

1. BOGIE ---------- AIR SPRING BOGIE
2. AXLE CAPACITY ---------- 20.32 TONNES
3. NO. OF PASSENGERS TO SEAT (II CLASS) ---------- 96
4. SEATED PASSENGER LOAD (96X60kg) ---------- 5.76 TONNES
5. ADDL. STANDING PASSENGER LOAD (SDCL-488x60kg) --- 29.28 TONNES

   TOTAL PAY LOAD ------- 35.04 TONNES
6. TARE WEIGHT ---------- 39.5 TONNES (APPROX.)
   - AIR CONDITIONED UNIT (3.75x2) — 1.5 TONNE (APPROX.)
   - WEIGHT OF BATTERY BOX + COMPRESSOR — 1.0 TONNE (APPROX.)
   - MSVC PHASE-I TRAILER COACH WEIGHT — 37.0 TONNES
7. GROSS WEIGHT UNDER SDCL — 74.54 TONNES (APPROX.)
   (13 PASSENGERS / SQ. M.)

Various Electrical Cabinets,Cubicles Colour Codes-

EWP4 Cabine:- Pink — EWP3 Cabinet- Blue
EWP2 Cabine:- Voilet — EWP1 Cabinet- Orange

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
	LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU C COACH				SUPERSEDES: ICF/SK3-9-0-116/ Alt 'b'	
					SCALE 1:20	SSE/D, CHD, ALTD N.Shanmugave, DRN N.Shanmugave
					Alpha Alt:- c	INTEGRAL COACH FACTORY CHENNAI-38

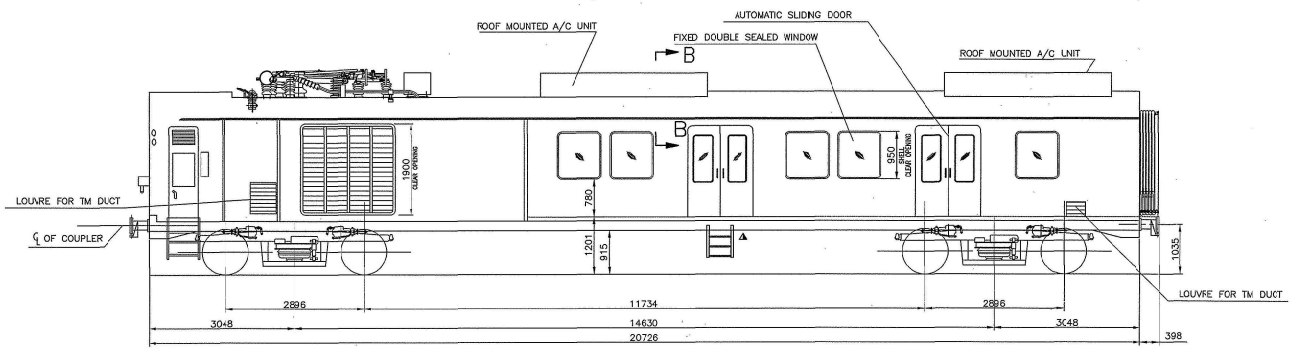
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0	Num. Alt.	1-07-2013 DATE OF LATEST ALT	15-09-2013 DATE OF FIRST ISSUE	AME/SME

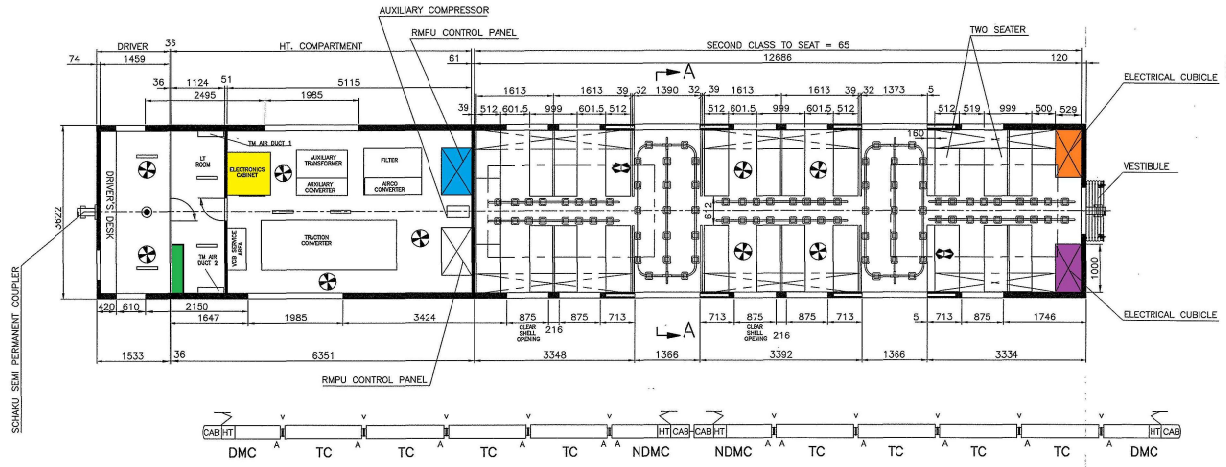
DATA CODE NO. 329 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1 — ICF/SK3-9-0-116

FORM:-IR.A1-840X600

ICF/SK3-9-0-119

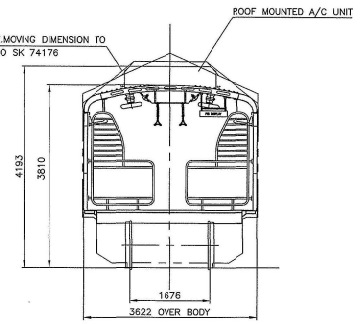
ALTERATIONS
ⓐ 01/2013 1095MM OPENING IN HT COMPARTMENT ELIMINATED. PASSENGER END DOORWAY REVISED. SEATING & STANDING CAPACITY, TARE & GROSS WT. REVISED. SSE/D SME/DSS
ⓑ 06/2013 FLOOR HEIGHT & VESTIBULE REVISED. NOTE DELETED. LAYOUT RE/SD. SSE/D SME/DSS
ⓒ 06/2013 SEATING REVISED TO ACCOMODATE TM DUCT. SSE/D SME/DSS
ⓓ 07/2013 LAYOUT REVISED. SSE/D SME/DSS



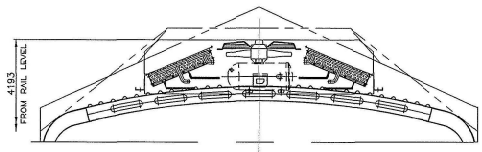


12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT (WITH VESTIBULE)

V– Vestibule
A– Alarm End



SECTION–AA



SECTION–BB

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT (II CLASS)---------- 65
4. SEATED PASSENGER LOAD (65X60kg) + DRIVER-------- 3.96 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL–258x60kg)---15.48 TONNES

TOTAL PAY LOAD -------19.44 TONNES

6. TARE WEIGHT ---------- 56.71 TONNES (APPROX.)

AIR CONDTIONING UNIT	(0.75X2)	1.5 TONNES
INCREASE IN ELECTRICS AND MISC. ITEMS LIKE VESTIBULE BOGIE COMPARED TO MRVC PHASE–I		1.01 TONNES
MRVC PHASE–I MOTOR COACH WEIGHT		54.20 TONNES

7. GROSS WEIGHT UNDER SDCL 76.15 TONNES (APPROX.)
(16 PASSENGERS / SQ. M.)

FAN
ALARM PULL HANDLE
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

Various Electrical Cabinets/Cubicles Colour Codes-

ECAB Cabinet- Yellow
MCB Cabinet - Green
EWP3 Cabinet- Blue
EWP2 Cabinet- Voilet
EWP1 Cabinet- Orange

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
	LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU NON DRIVING MOTOR COACH				SUPERSEDES: ICF/SK3-9-0-119/al. 'c'	

ASSEMBLY DRAWINGS					SCALE :50 :20	SSE/D	N. Shanmugavel
						CHD	
						ALTD	N.Shanmugavel
						DRN	N.Shanmugavel
0	Num. Alt.	07–2013	24–12–2012	AME/SME	Alpha Alt:– d		

DATA CODE NO. 329 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1 | INTEGRAL COACH FACTORY CHENNAI–38 | CF/SK3-9-0-119

FORM:–IR.A1 –840X600

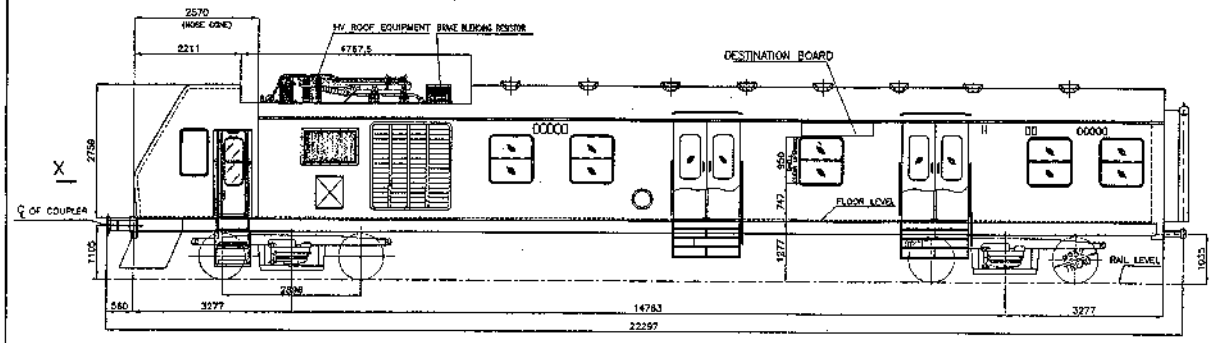
Annexure-1

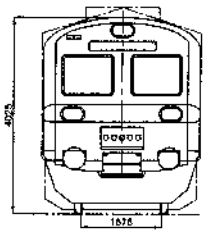
Consignee details of 3 Phase EMUs and MEMUs

S.NO.	Railway	Rolling stock	No. of Cars	No. of Rakes	Propulsion system Make	EMU car shed (respective)	Consignee details
1	CR	EMU	12	26	Siemens	Kurla Carshed	Sr.DEE(TRS)CLA EMU CARSHED KURLA Mumbai-400070
			15	2	Siemens	Kurla Carshed	
			12	34	Bombardier	Kurla Carshed	
			12	4	Medha	Kurla Carshed	
			12	38	Siemens	Kalva carshed	Sr.DEE(TRS)KLVA EMU CARSHED KALVA Mumbai- 400605
			12	47	Siemens	Sanpada Carshed	Sr.DEE(TRS)SNPD EMU CARSHED Sanpada Navi Mumbai- 400705
		MEMU	12	1	Alstom	EMU Carshed, Kalva	Sr.DEE(TRS)KLVA EMU CARSHED KALVA Mumbai- 400605
			8	15	Medha	Coaching complex Bhusawal	Sr.DME /Bhusawal MEMU shed Bhusawal-425201
			8	1	Alstom		
2	ER	EMU	12	5	Medha	HWH EMU Carshed	Sr.DEE, Howrah, Eastern railway
			12	5	Medha	BDC EMU Carshed	
			12	6	Bombardier	EMU Carshed Barasat	Sr. DEE, Sealdah, Eastern Railway
		MEMU	12	4	Alstom	RHA Carshed	
			12	1	BHEL	ASN MEMU Shed	DEE/MEMU/ASN, Eastern Railway
3	WR	EMU	12	90	Siemens Bomardier Medha	MMCT Carshed	Sr. DEE(RS) EMU Carshed, WR Mumbai Central Mumbai - 034
			15	13	Siemens Bomvbardier	MMCT Carshed	
4	SER	EMU	12	18	Medha	I) EMU Carshed, TPKR & (II) MEMU car shed (KGP)	SR.DEE/TRS/TPKR, EMU CAR SHED, TIKIAPARA, HOWRAH, S.E. RLY
		MEMU	8	3	BHEL		
				1	Medha		
5	ECR	MEMU	8	5	Bomardier BHEL	MEMU carshed, Gaya	DEE/MEMU shed/Gaya, ECR
			12	4	Bomardier		
6	ECoR	MEMU	8	1	Bomardier	MEMU car shed, Khurda Road, ECoR	ADEE/MEMU/KUR, MEMU carshed, khurda Road, ECoR
				3	Medha		
				4	BHEL		
			12	2	Bomardier		
7	NR	MEMU	8	1	Medha	EMU Car Shed, Ghaziabad	Sr. DEE/EMU Car Shed, Ghaziabad (NR)
			16	1	Medha		
8	NCR	MEMU	8	8	Bomardier	MEMU car shed, Kanpur	DME/MEMU/CNB
				7	Medha		
9	SR	MEMU	8	11	Medha BHEL	EMU Car shed AVD EMU Car shed TBM	EMU Car Shed AVD EMU Car Shed TBM
			12	6	Medha	EMU Carshed PGT EMU Carshed QLN	MEMU Car Shed PGT MEMU Car Shed QLN
10	SCR	MEMU	8	5	Medha	EMU Car Shed/MLY	Sr. DME/EMU car shed, Maula Ali, SCR
			12	6			
11	SWR	MEMU	8	1	Medha	MEMU Shed, BAND	Sr. DEE/MEMU shed, Banaswadi, SWR
			12	2	Alstom		
			16	3	Medha		
12	SECR	MEMU	8	5	Medha	Bhilai	Sr. DEE/TRS, Loco shed Bhilai, SECR
			8	9		Gondia	Sr. DME, Motibagh, SECR
13	WCR	MEMU	8	12	Medha	MEMU car shed BINA	DEE/MEMU/BINA
			12	1			

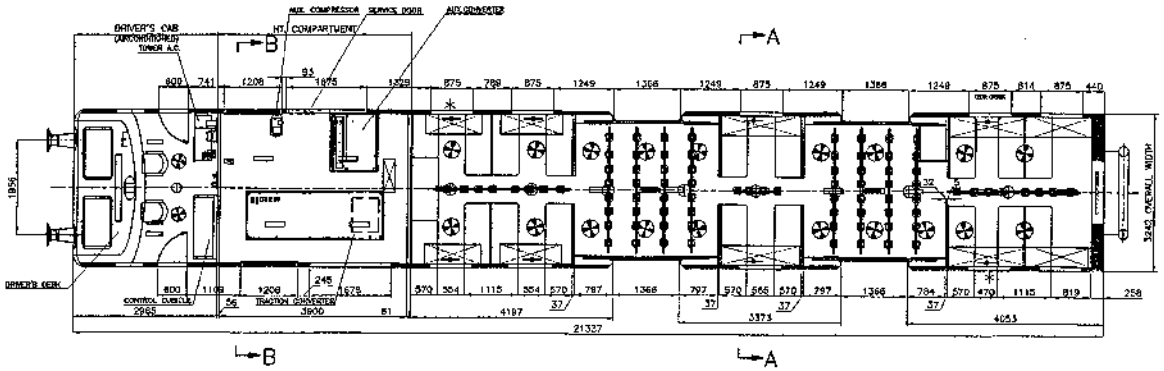
MEMU/DMC-9-0-301

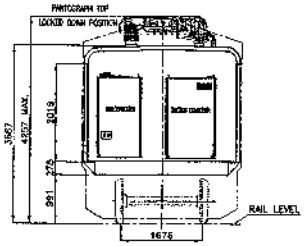
ALTERATIONS
④ 7/1998 LAYOUT REVISED. -Sd- SSE/D -Sd- SME/DSS
⑤ 09/2017 LAYOUT REVISED. SSE/D SME/DSS



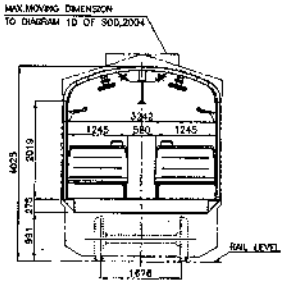


VIEW – X

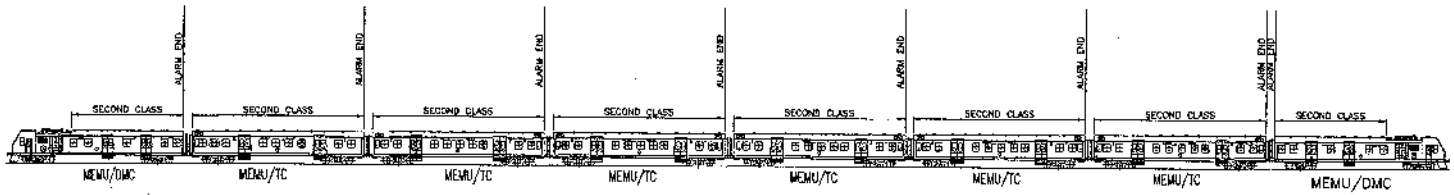




SECTION–BB



SECTION–AA



1 : [illegible] 2019

* EMERGENCY WINDOW
RAILWAY CREST
RAILWAY INITIALS
00000 COACH NUMBER
FAN
LED LIGHT
EMERGENCY LIGHT
ALARM PULL
VENTILATORS

PASSENGERS TO SEAT ——— 55
NO.OF STANDING PASSENGERS — 171
NO.OF DOORS ASIDE ——— 2
PASSENGERS PER DOOR ASIDE — 113
AXLE LOAD CAPACITY ——— 20.32 tonnes

QTY	DESCRIPTION & DIMENSION	MTRL	REF.DRGS	MAT.SPEC.	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
					SUPERSEDES MEMU/DMC-9-0-301 AT W/-	

LAYOUT OF MEMU/DMC(3 PHASE)

SCALE 1:50	SSE/D	
	CHD	
	ALTD	V.S.SRIDHARAN
	DRN	SK.MAHAMOOD

Alpha AT-4

INTEGRAL COACH FACTORY CHENNAI-38

ASSEMBLY DRAWINGS			
18-09-2017	25-07-1998		
D Num. AR.	DATE OF EARLIEST ALT.	DATE OF FIRST ISSUE	ANIE/SME

DATA CODE NO. 161

INDIAN RAILWAY STANDARDS

SHEET 1 OF 1

MEMU/DMC-9-0-301

FORM-IRLA1-840X600

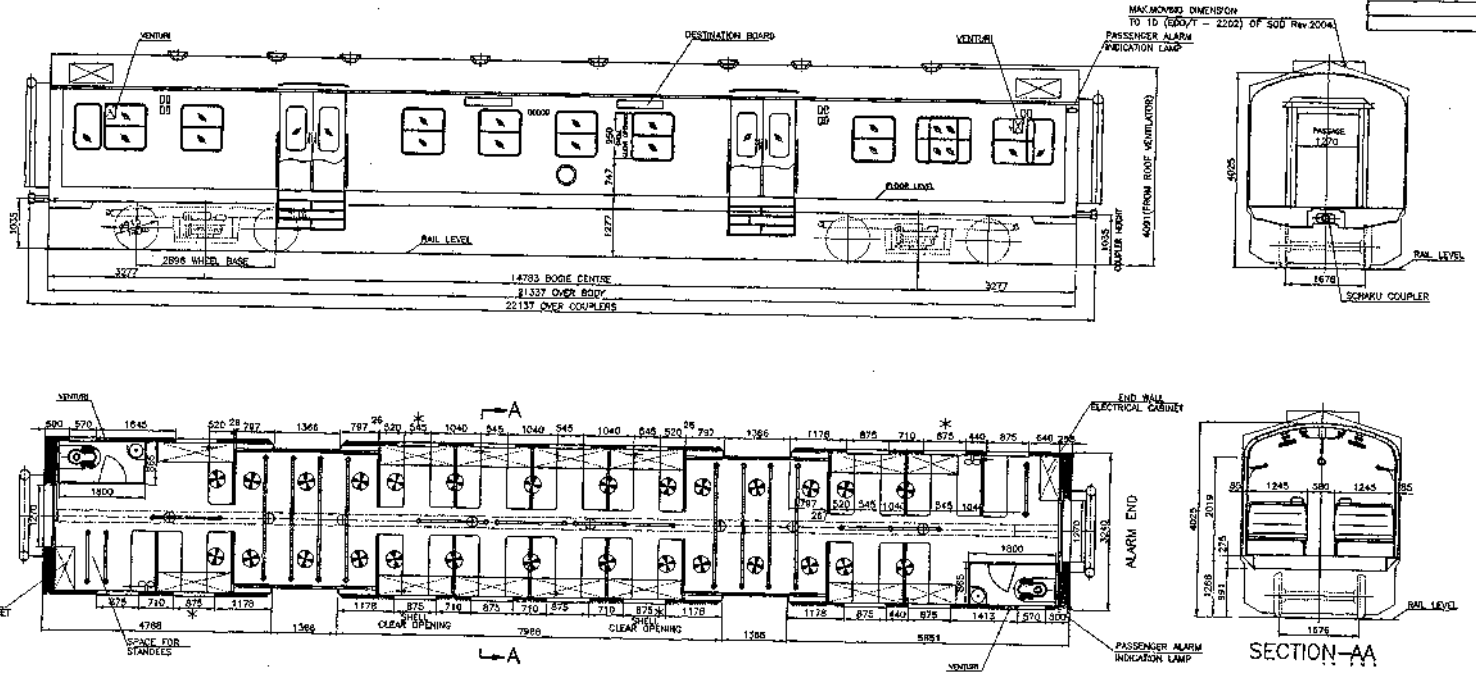
MEMU/TC$_2$-9-0-201

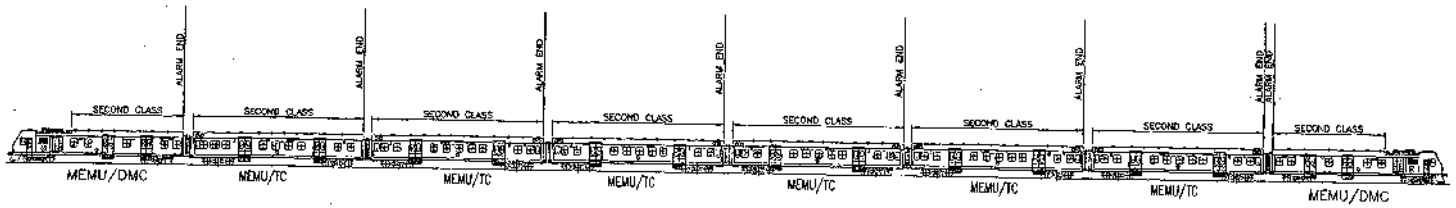
▽ ROUGH MACHINED	▽▽ ROUGH CLEANING
▽▽ FINISH MACHINED	
▽▽▽ FINE FINISH MACHINED	

ALTERATIONS

ⓐ 7/1998
DRAWING REDRAWN AND UPDATED.
-Sd- SSE/D -Sd- SME/DSS

ⓑ 9/2017
LAYOUT REVISED.
SSE/D SME/DSS





17 DEC 2015

- RAILWAY CREST
- RAILWAY INITIALS
- 00000 COACH NUMBER
- FAN
- VENTILATORS
- ALARM PULL
- EMERGENCY WINDOW
- FAN

PASSENGERS TO SEAT	84
NO. OF STANDING PASSENGERS	241
TOTAL NO. OF PASSENGERS	325
NO. OF DOORS ASIDE	2
PASSENGERS PER DOOR ASIDE	162
AXLE LOAD CAPACITY	20.3 Tonnes

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
GROUP: 9-0					SUPERSEDED BY:	
					SUPERSEDES MEMU/TC2-9-0-201 Alt "A"	

LAYOUT OF MEMU/TC

SCALE 1:50	SSE/D		
	CHD		
	ALTD	V.S.SRIDHARAN	
	DRN	SHAIK MAHAMOOD	
Alpha AF:– 5			

ASSEMBLY DRAWINGS

0	Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME
		18-09-2017	25-07-1998	

DATA CODE NO. 162

INDIAN RAILWAY STANDARDS

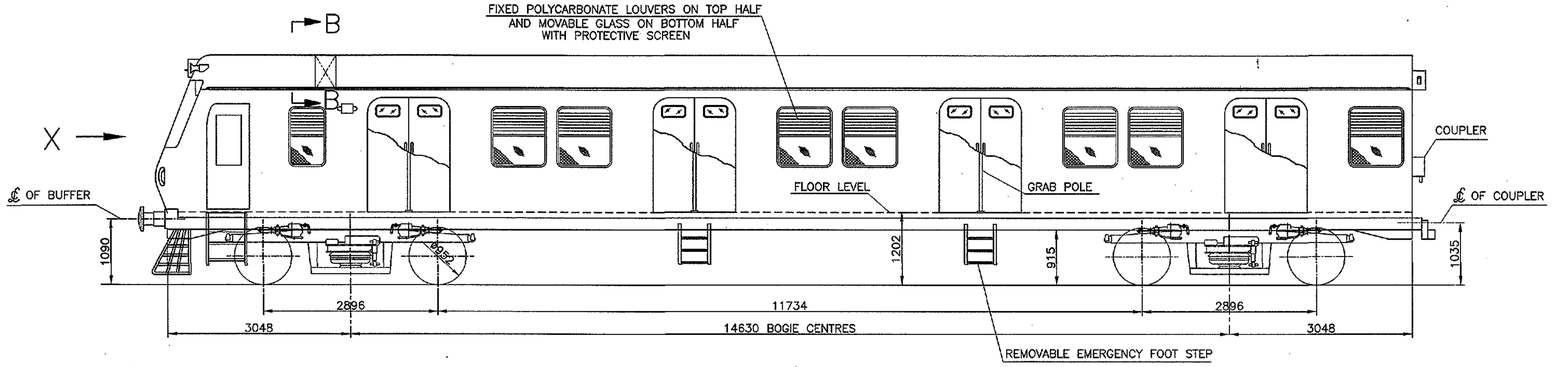
SHEET 1 OF 1

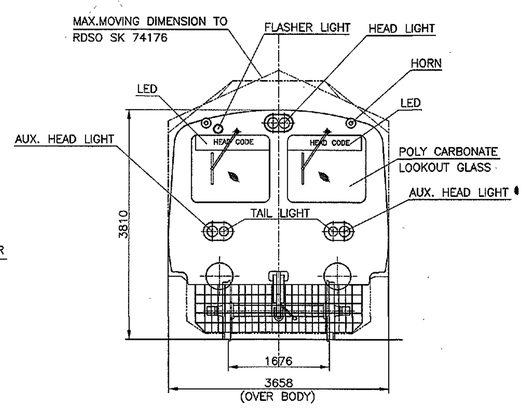
INTEGRAL COACH FACTORY CHENNAI–38

MEMU/TC$_2$-9-0-201

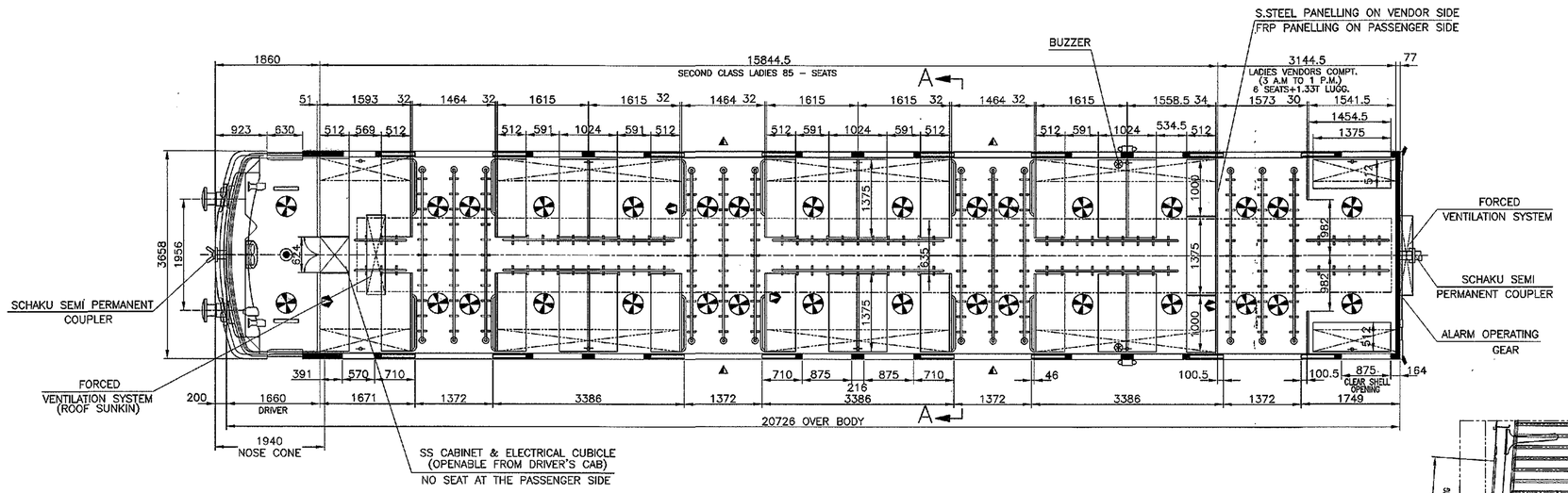
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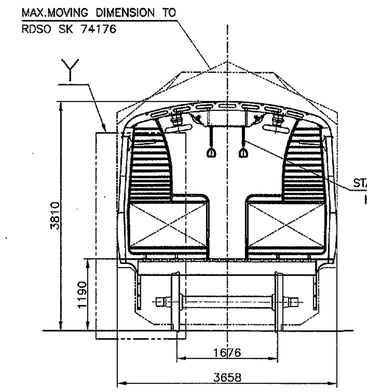
ICF/MRVC/D-9-0-001





VIEW FROM–X

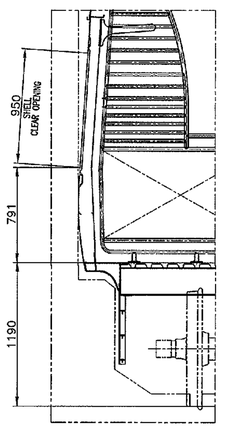




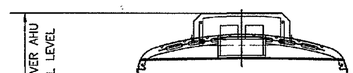
SECTION– AA



12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT



DETAIL AT– Y



SECTION– BB

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS LADIES------	85
LADIES VENDORS COMPT. (3 A.M TO 1 P.M.)------	6
TOTAL SEATING CAPACITY -----	91

4. SEATED PASSENGER LOAD (91x60kg) ----------5.46 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL, STANDING PASSENGER LOAD(SDCL–440x60kg)--26.4 TONNES

TOTAL PAY LOAD -------33.19 TONNES

7. TARE WEIGHT ---------- 39 TONNES (APPROX.)

- FLUORESCENT LIGHT
- FAN
- ALARM PULL
- PASSENGER ALARM INDICATION LIGHT
- REMOVABLE EMERGENCY FOOT STEP
- BUZZER
- CAB LIGHT

NOTE:

1. HAND HOLDS, LUGGAGE RACKS, BULK HEADS, SEMI BULK HEADS, SEAT FRAMES, SUPPORT FRAMES, GRAB POLES AND PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. FLOORING–ALUMINIUM CHEQUERED SHEET
3. INSIDE FRP PANELLING
4. ROOF & DUCTS–S.S. MICROMAT FINSIH
5. PASSENGER INFORMATION SYSTEM @ 4 LOCATIONS
6. EXTERIOR PU PAINTING
7. COMPRESSOR WITH RESERVOIR AND AIR DRIER & BATTERY BOX TO BE MOUNTED ON UNDERFRAME.
8. SEATS AND BACK RESTS ARE OF POLYCARBONATE MATERIAL.

ALTERATIONS

ⓐ 05/2006 SDCL REVISED .	Sd/– SSE/D	Sd/– SME/DSS
ⓑ 08/2006 DOORWAY PARTITION DIMENSION &LOCATING DIMENSION REVISED. PARTITION IN SECTION–AA REVISED. SEATING DIMENSIONS REVISED. RAIN WATER GUTTER DELETED. PARTITION AT DRIVER'S CAB REVISED. LOCATION OF FORCED VENTILATION SYSTEM NEAR DRIVER'S CAB REVISED. FANS BELOW FORCED VENTILATION UNIT DELETED. WINDOWS ON DOOR, SDCL, ENDWALL DIM. AND NOTES–4 & 7 REVISED.	Sd/– SSE/D	Sd/– SME/DSS
ⓒ 11/2006 MAX.MOVING DIMENSION & 12 COACH FORMATION REVISED.	Sd/– SSE/D	Sd/– SME/DSS
ⓓ 08/2012 LAYOUT REVISED.	Sd/– SSE/D	Sd/– SME/DSS
ⓔ 01/2014 FLOOR HEIGHT REVISED.	SSE/D	SME/DSS
ⓕ 12/2014 HEIGHT OVER AHU SHOWN SECTION–BB ADDED.	SSE/D	SME/DSS

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: ICF/MRVC/D-9-0-001, Alt e/–	

LAYOUT OF AC/DC EMU
DRIVING TRAILER COACH–D
FOR MRVC (SIEMENS ELECTRICS)

SCALE	SSE/D		
1:50 1:25	CHD		
	ALTD	N.Shanmugavel	
	DRN	SURESH 04/06	

Alpha Alt:– f

0	Nom. Alt.	.1–12–2014 DATE OF LATEST ALT	21–04–2006 DATE OF FIRST ISSUE

ASSEMBLY DRAWINGS — AME/SME

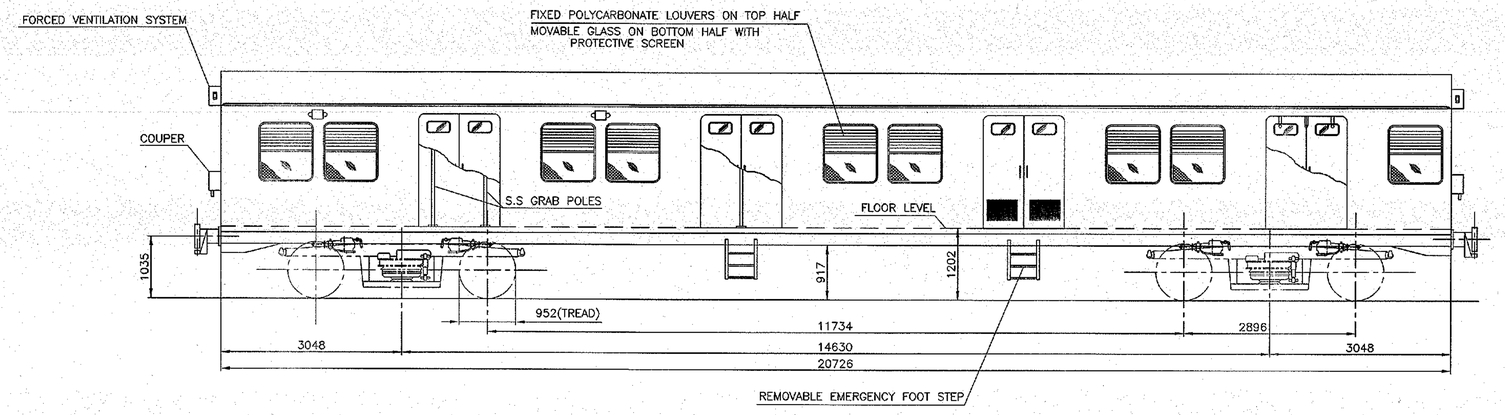
DATA CODE NO. 375 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1

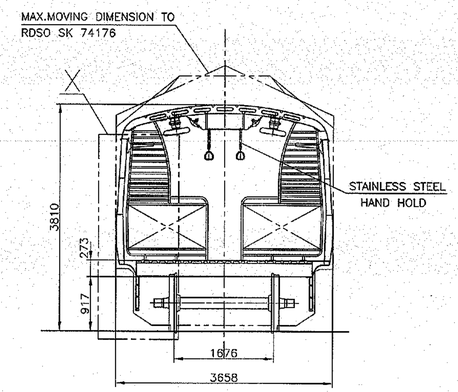
INTEGRAL COACH FACTORY CHENNAI–38

ICF/MRVC/D-9-0-001

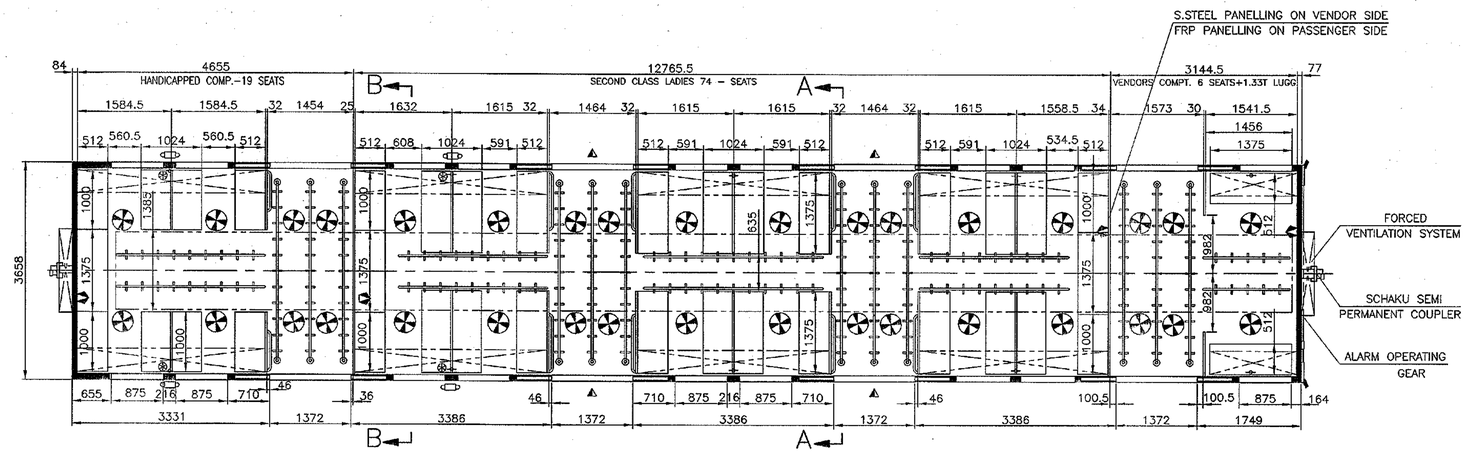
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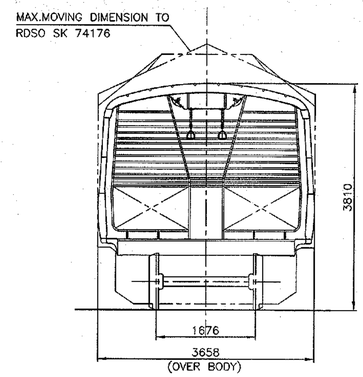
ICF/MRVC/D/HC-9-0-001





SECTION– AA

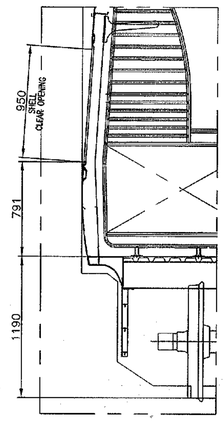




SECTION– BB



12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT



DETAILS AT– X

FAN
ALARM PULL
PASSENGER ALARM INDICATION LIGHT
REMOVABLE EMERGENCY FOOT STEP
BUZZER

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT
   - II CLASS LADIES---------- 74
   - VENDORS COMPT.-------- 6
   - HANDICAPPED COMPT.---- 19
   - TOTAL SEATING CAPACITY – 99
4. SEATED PASSENGER LOAD (99X60kg)----------5.94 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL, STANDING PASSENGER LOAD(SDCL–407x60kg)--24.42 TONNES
   - TOTAL PAY LOAD ------31.69 TONNES
7. TARE WEIGHT ---------- 38 TONNES (APPROX.)

NOTE:

1. HAND HOLDS, LUGGAGE RACKS, BULK HEADS, SEMI BULK HEADS, SEAT FRAMES, SUPPORT FRAMES, GRAB POLES AND PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. FLOORING–ALUMINIUM CHEQUERED SHEET.
3. INSIDE FRP PANELLING
4. ROOF & DUCTS–S.S. MICROMAT FINISH
5. PASSENGER INFORMATION SYSTEM @ 4 LOCATIONS
6. EXTERIOR PU PAINTING
7. COMPRESSOR WITH RESERVOIR AND AIR DRIER & BATTERY BOX TO BE MOUNTED ON UNDERFRAME.
8. SEATS AND BACK RESTS ARE OF POLYCARBONATE MATERIAL.

ALTERATIONS
ⓐ 05/2006 SDCL REVISED. Sd/– SSE/D Sd/– SME/DSS
ⓑ 08/2006 DOORWAY PARTITIONS & LOCATING DIMS. REVISED. SEATING DIM. REVISED.PARTITION IN SECTION–AA & BB REVISED. SDCL REVISED. WINDOWS ON DOOR REVISED. RAIN WATER GUTTER DELETED. ENDWALLS DIM. AND NOTES–4&7 REVISED. Sd/– SSE/D Sd/– SME/DSS
ⓒ 11/2006 MAX.MOVING DIMENSION & 12 COACH FORMATION REVISED. Sd/– SSE/D Sd/– SME/DSS
ⓓ 08/2012 LAYOUT REVISED. Sd/– SSE/D Sd/– SME/DSS
ⓔ 01/2014 FLOOR HEIGHT REVISED. SSE/D SME/DSS

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:ICF/MRVC/D/HC-9-0-001 ALT. d/–	

LAYOUT OF AC/DC/EMU TRAILER 'D' COACH WITH HANDICAPPED COMPT. FOR MRVC (SIEMEN'S ELECTRICS)

SCALE	1:50 1:25
SSE/D	
CHD	
ALTD	N.Shanmugavel
DRN	SURESH 04/06

Alpha Alt:– e

INTEGRAL COACH FACTORY CHENNAI–38

ASSEMBLY DRAWINGS

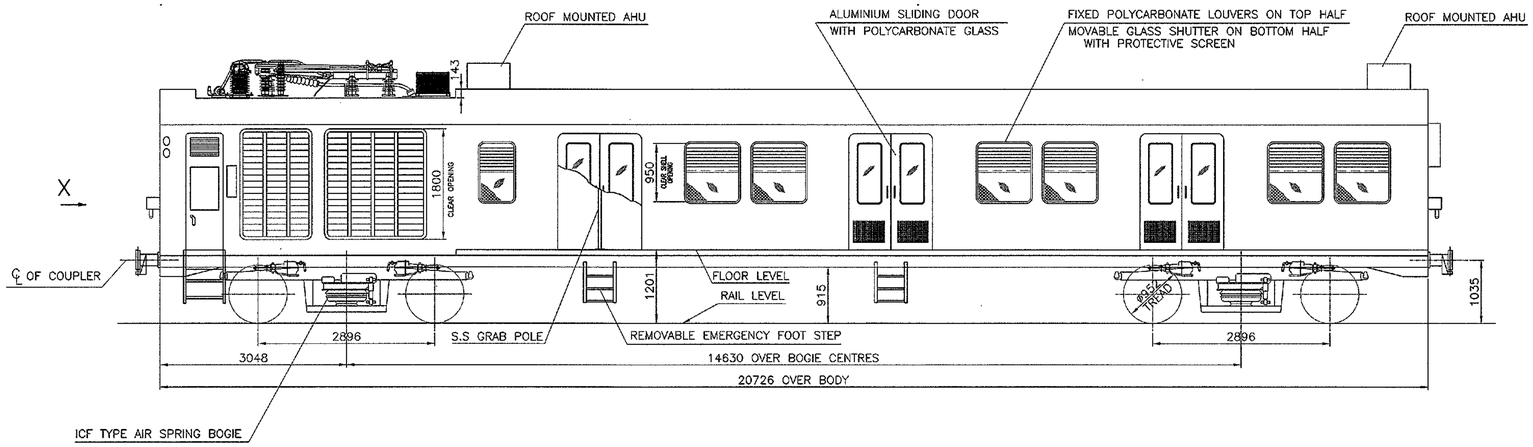
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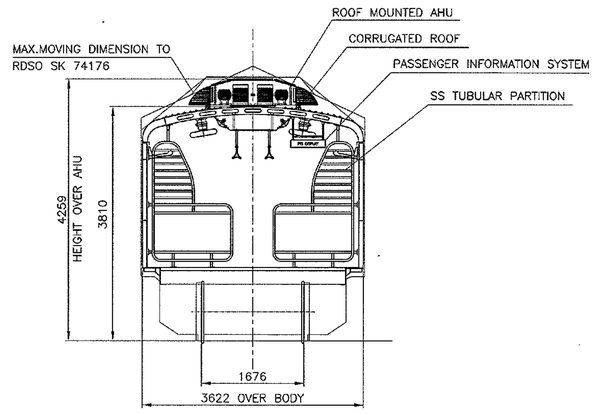
DATA CODE NO. 376 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1 | ICF/MRVC/D/HC–9–0–001

FORM:–IR.A1–840X600

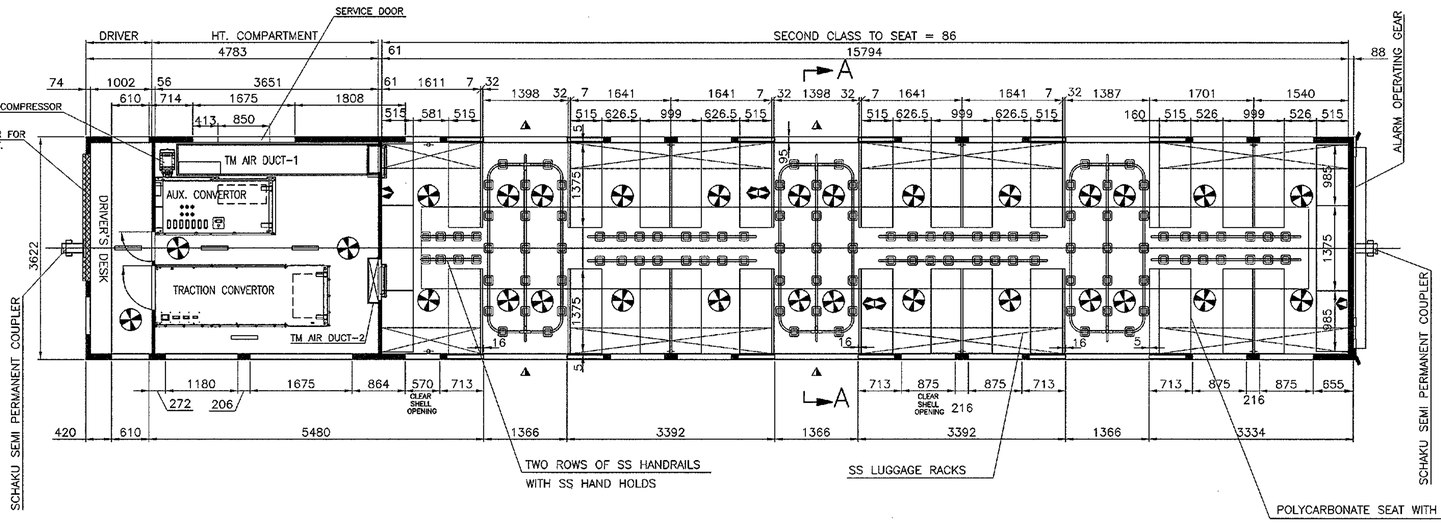
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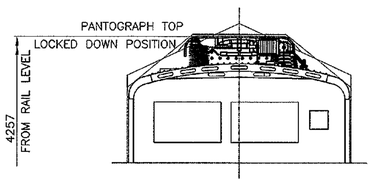
ALTERATIONS



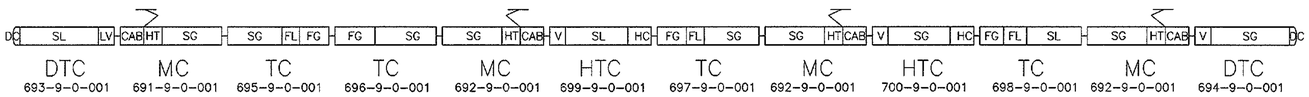


SECTION–AA

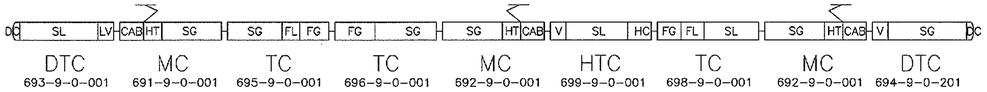




VIEW – X



12 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT----------86
4. SEATED PASSENGER LOAD (86x60kg ----------5.16 TONNES
5. ADDL, STANDING PASSENGER LOAD(SDCL–352x60kg) –21.12 TONNES
   TOTAL PAY LOAD ------26.28 TONNES
6. TARE WEIGHT ---------- 54 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- FLUORESCENT LIGHT

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:	

LAYOUT OF 3 PHASE AC EMU
MOTOR COACH
FOR HARBOUR LINE & CIDCO

						SCALE 1:50	SSE/D
							CHD
							ALTD
							DRN N.Shanmugavel

Alpha Alt:–

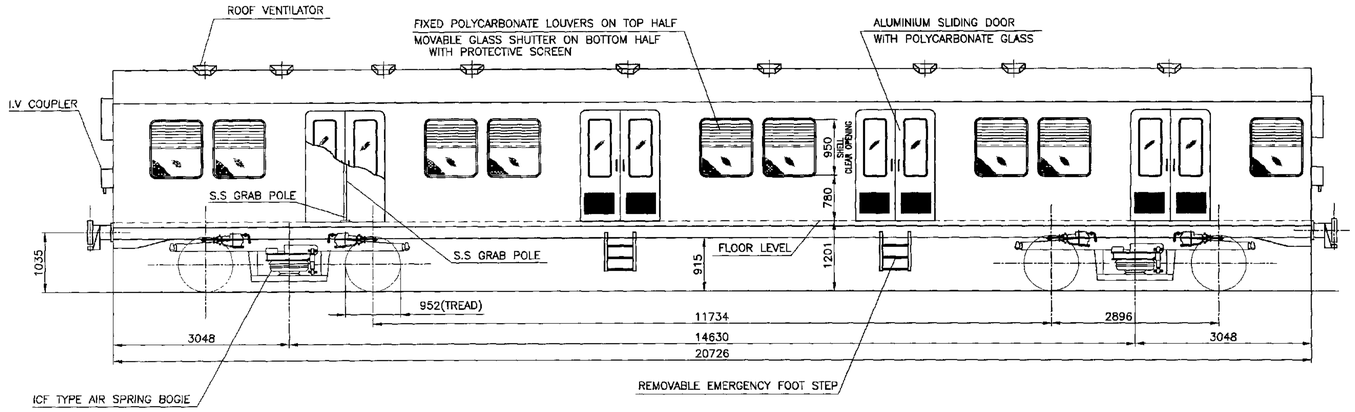
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0	Num. Alt.	DATE OF LATEST ALT		DATE OF FIRST ISSUE	30-03-2017	AME/SME		SHEET 1 OF 1

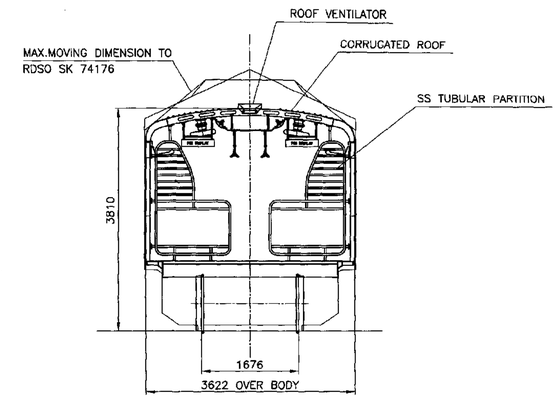
INTEGRAL COACH FACTORY
CHENNAI–38

EMU/M/3PH/HL-9-0-001

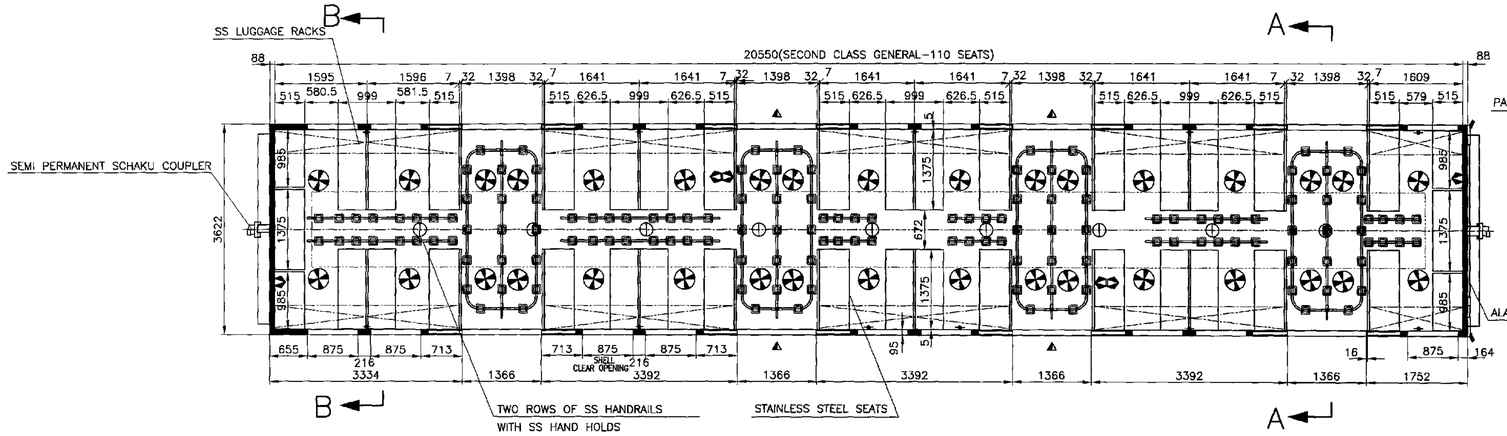
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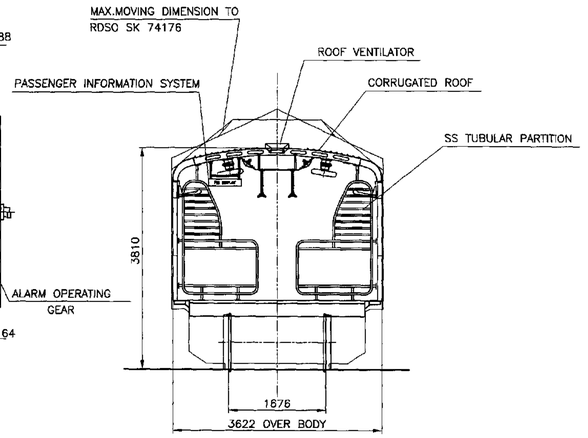
EMU/C/MMTS-9-0-001



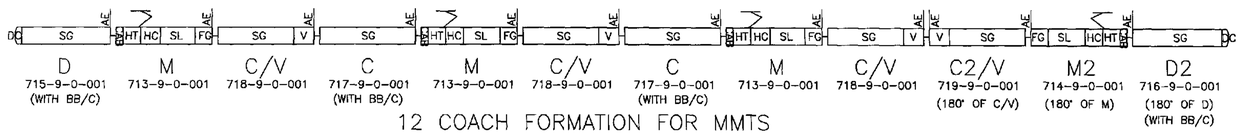


SECTION–AA

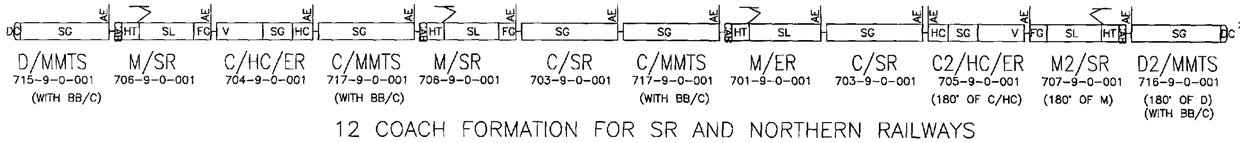




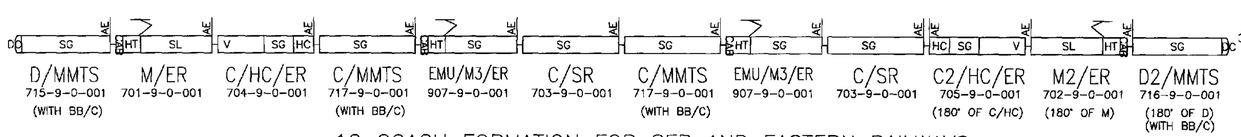
SECTION–BB



12 COACH FORMATION FOR MMTS



12 COACH FORMATION FOR SR AND NORTHERN RAILWAYS



12 COACH FORMATION FOR SER AND EASTERN RAILWAYS

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

1. BOGIE——AIR SPRING BOGIE
2. AXLE CAPACITY——20.32 TONNES
3. NO. OF PASSENGERS TO SEAT II CLASS GENERAL ——110
4. SEATED PASSENGER LOAD (110X60kg) ——6.60 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL–468x60kg)——28.08 TONNES

TOTAL PAY LOAD ——34.68 TONNES

6. TARE WEIGHT —— 37 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- PASSENGER ALARM INDICATION LIGHT
- ROOF VENTILATOR

ALTERATIONS

(a) 05/2017 COACH FORMATION REVISED.	Sd/- SSE/D	Sd/- SME/DSD
(b) 07/2017 COACH FORMATION REVISED.	Sd/- SSE/D	Sd/- SME/DSD
(c) 05/2018 MMTS COACH FORMATION REVISED FROM 9CAR TO 12CAR.	Sd/- SSE/D	Sd/- SME/D
(d) 03/2022 COACH FORMATION REVISED. RMVU REMOVED & VENTILATOR ADDED.	SSE/D	AME/D

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: EMU/C/MMTS-9-0-001,Alt:c/-	

LAYOUT OF 3 PHASE AC EMU TRAILER 'C' COACH (FOR MMTS)

SCALE 1:50	SSE/D
	CHD
ALTD	N.Shanmugavel
DRN	SURESH KUMAR.S

Alpha Alt:– d

ASSEMBLY DRAWINGS					
0 Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME	DATA CODE NO. 717	INDIAN RAILWAY STANDARDS
	21-03-2022	28-04-2017			

SHEET 1 OF 1

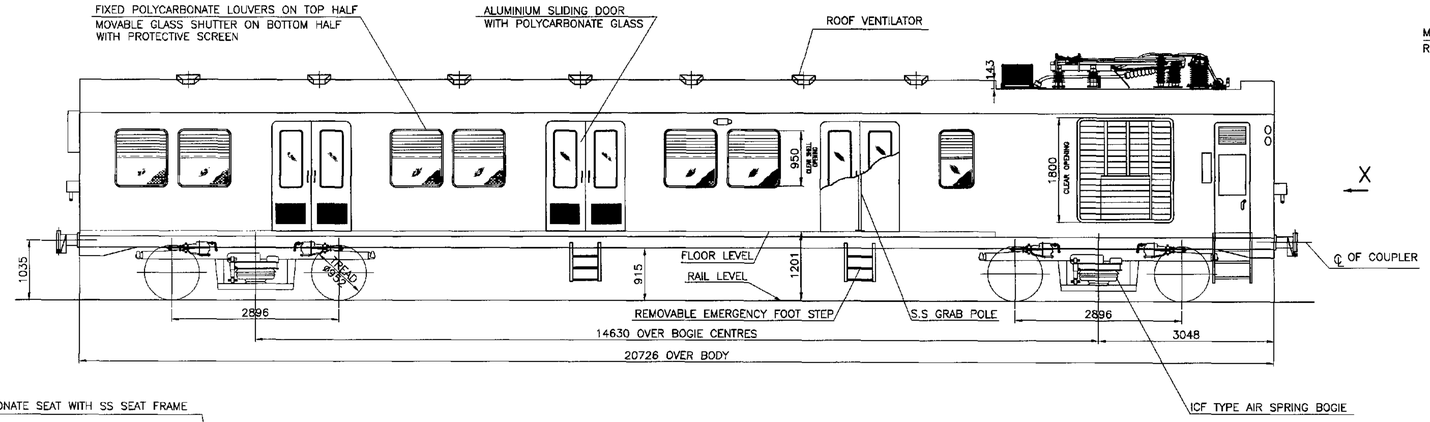
INTEGRAL COACH FACTORY CHENNAI–38

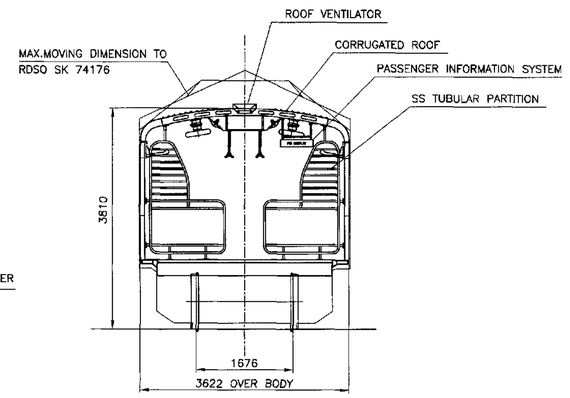
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FORM:–IR.A1–840X600

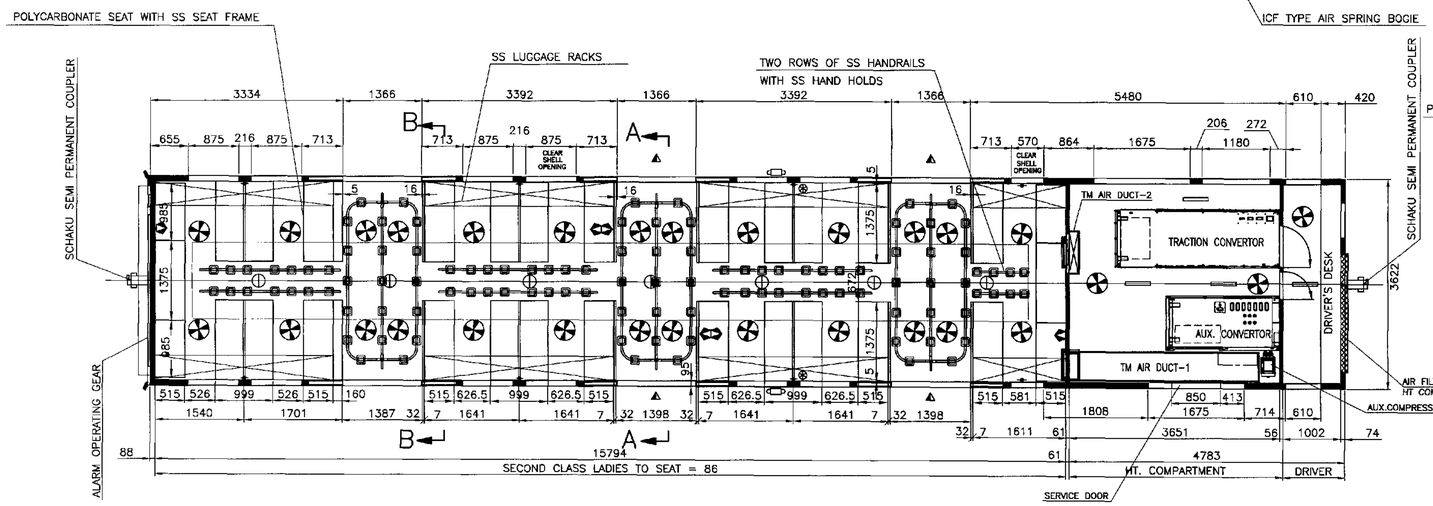
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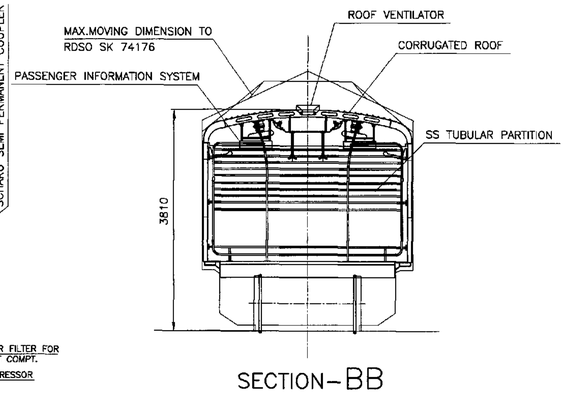
ALTERATIONS	
(c) 07/2017	COACH FORMATION REVISED. Sd/- SSE/D, Sd/- SME/DSD
(b) 03/2022	COACH FORMATION REVISED. RMVU REMOVED & VENTILATOR ADDED. SSE/D, AME/D



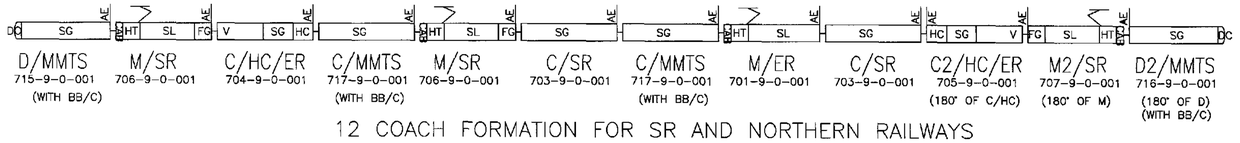


SECTION–AA

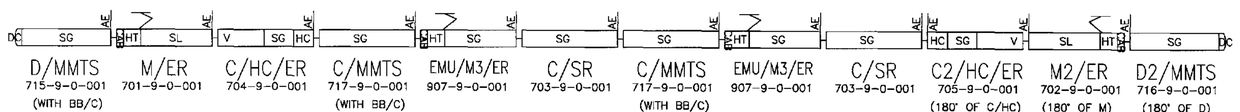




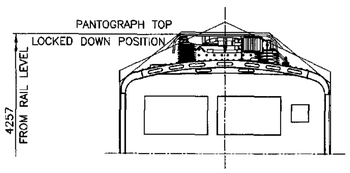
SECTION–BB



12 COACH FORMATION FOR SR AND NORTHERN RAILWAYS



12 COACH FORMATION FOR SER AND EASTERN RAILWAYS



VIEW – X

1. BOGIE ---------- AIR SPRING BOGIE
2. AXLE CAPACITY ---------- 20.32 TONNES
3. NO. OF PASSENGERS TO SEAT ---------- 86
4. SEATED PASSENGER LOAD (86x60kg ---------- 5.16 TONNES
5. ADDL, STANDING PASSENGER LOAD(SDCL-352x60kg) -21.12 TONNES

   TOTAL PAY LOAD ------ 26.28 TONNES
6. TARE WEIGHT ---------- 54 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- FLUORESCENT LIGHT
- PASSENGER ALARM INDICATION LIGHT
- BUZZER
- ROOF VENTILATOR

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
					SUPERSEDES: EMU/M2/ER-9-0-001,Alt.:c	

ASSEMBLY DRAWINGS

0	Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME
		21-03-2022	23-06-2017	

LAYOUT OF 3 PHASE AC EMU MOTOR COACH FOR EASTERN RAILWAY

SCALE 1:50	SSE/D	
	CHD	
	ALTD	N.Shanmugavel
	DRN	N.Shanmugavel

Alpha Alt:- b

DATA CODE NO. 702

INDIAN RAILWAY STANDARDS

SHEET 1 OF 1

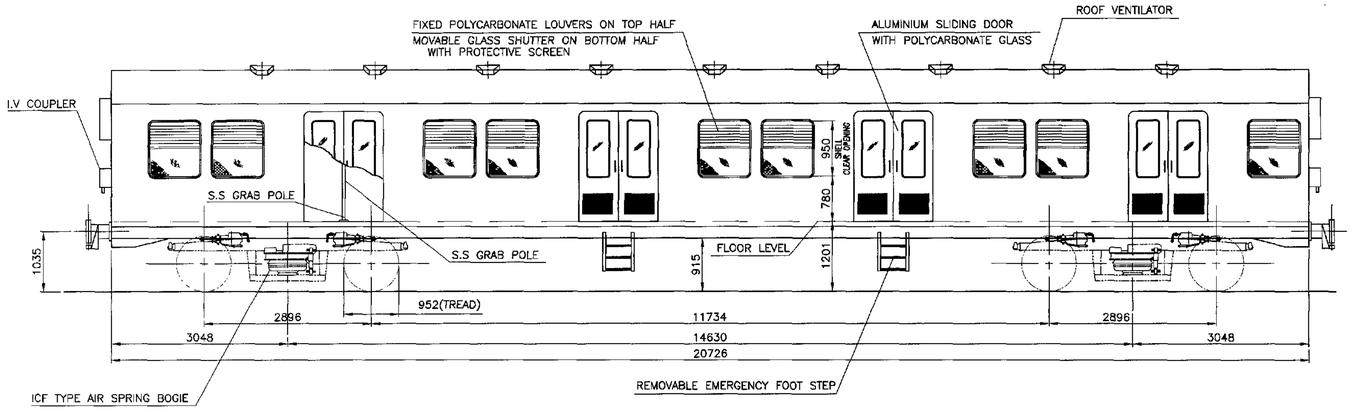
INTEGRAL COACH FACTORY CHENNAI-38

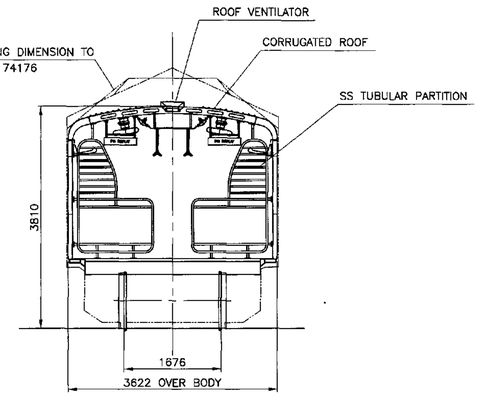
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FORM:-IR.A1-840X600

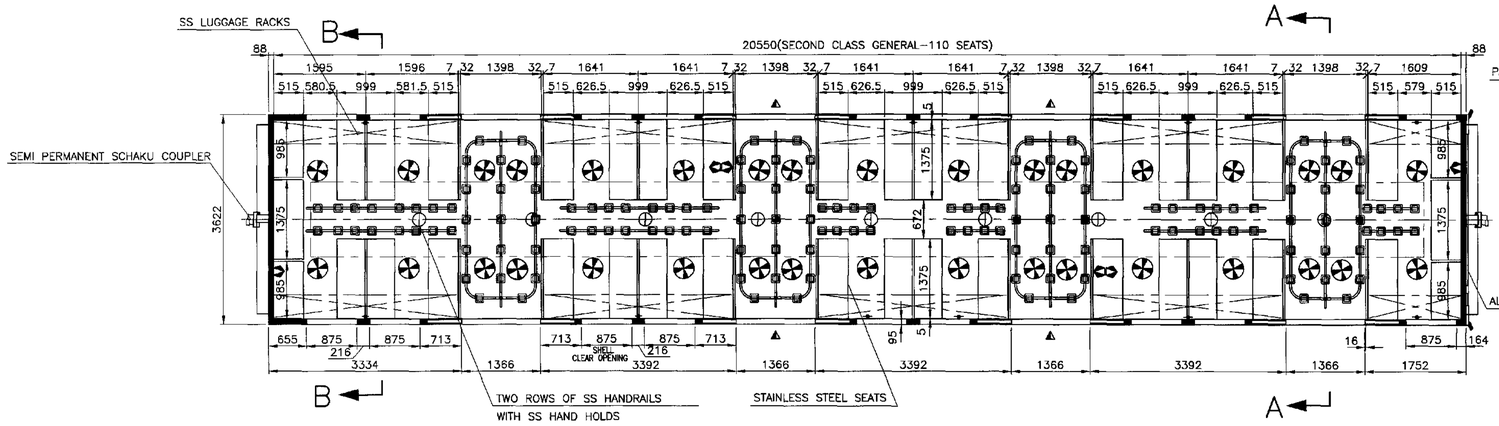
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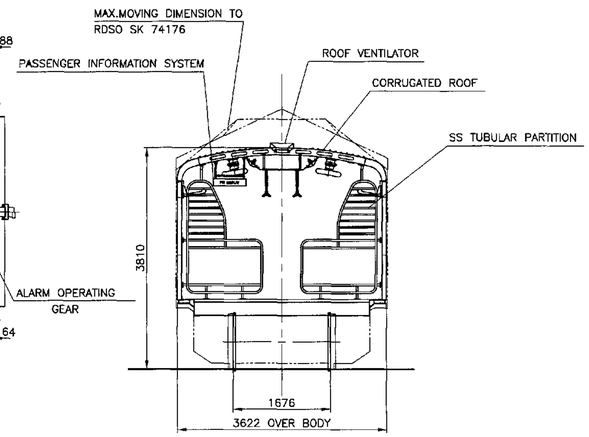
ALTERATIONS	
(a)	07/2017 COACH FORMATION REVISED. Sd/- SSE/D Sd/- SME/DSD
(b)	03/2022 COACH FORMATION REVISED. RMVJ REMOVED & VENTILATOR ADDED. SSE/D AME/D



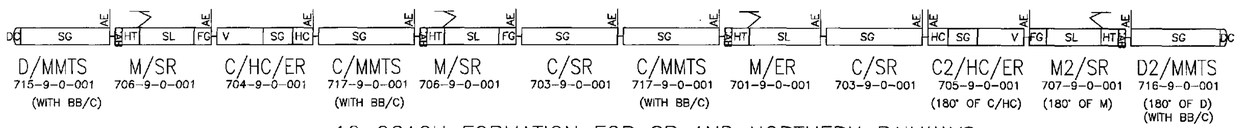


SECTION–AA

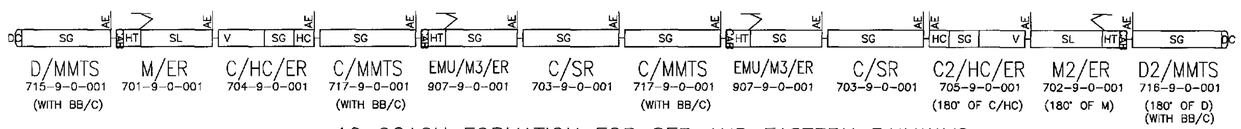




SECTION–BB



12 COACH FORMATION FOR SR AND NORTHERN RAILWAYS



12 COACH FORMATION FOR SER AND EASTERN RAILWAYS

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. THIS LAYOUT IS FOR COACH WITHOUT BATTERY BOX AND COMPRESSOR.

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT II CLASS GENERAL ---110
4. SEATED PASSENGER LOAD (110X60kg) ----------6.60 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL-468x60kg)-----28.08 TONNES

TOTAL PAY LOAD -------34.68 TONNES

6. TARE WEIGHT ---------- 37 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- PASSENGER ALARM INDICATION LIGHT
- ROOF VENTILATOR

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC
	GROUP: 9-0			

ASSEMBLY DRAWINGS		
21-03-2022	15-06-2017	AME/SME
DATE OF LATEST ALT	DATE OF FIRST ISSUE	

0 Num. Alt.

LAYOUT OF 3 PHASE AC EMU TRAILER COACH FOR SOUTHERN RAILWAY

DATA CODE NO. 703 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1

WEIGHT/UNIT	REMARKS
SUPERSEDED BY:	
SUPERSEDES: EMU/C/SR-9-0-001,Alt:'a'	

SCALE 1:50	
SSE/D	M
CHD	
ALTD	N.Shanmugavel
DRN	SURESH KUMAR.S

Alpha Alt:- b

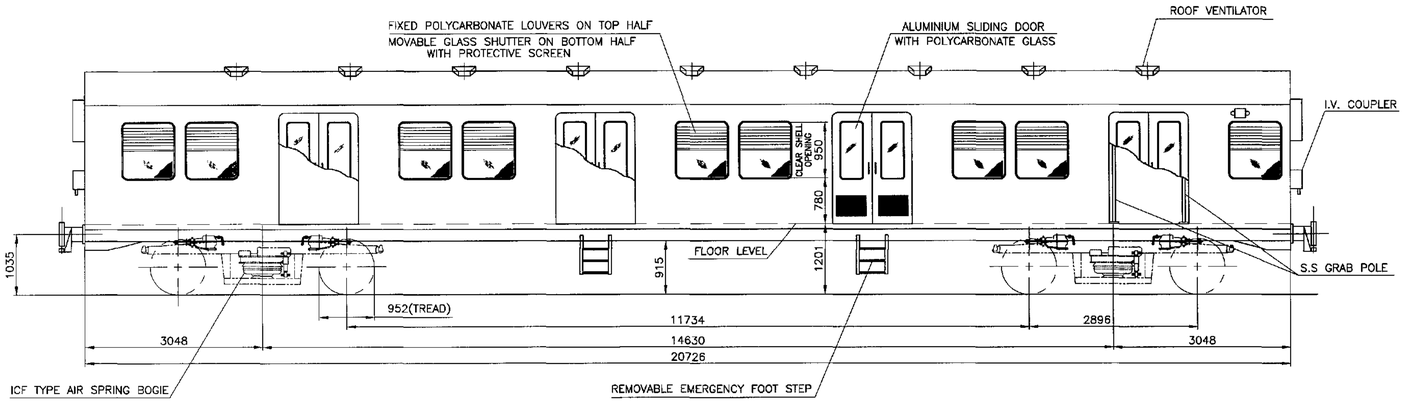
INTEGRAL COACH FACTORY CHENNAI-38

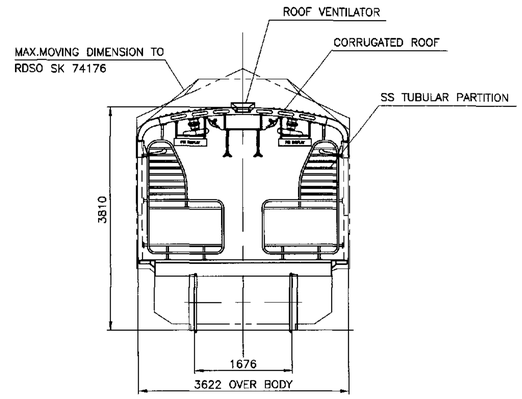
EMU/C/SR-9-0-001

FORM:-IR.A1-840X600

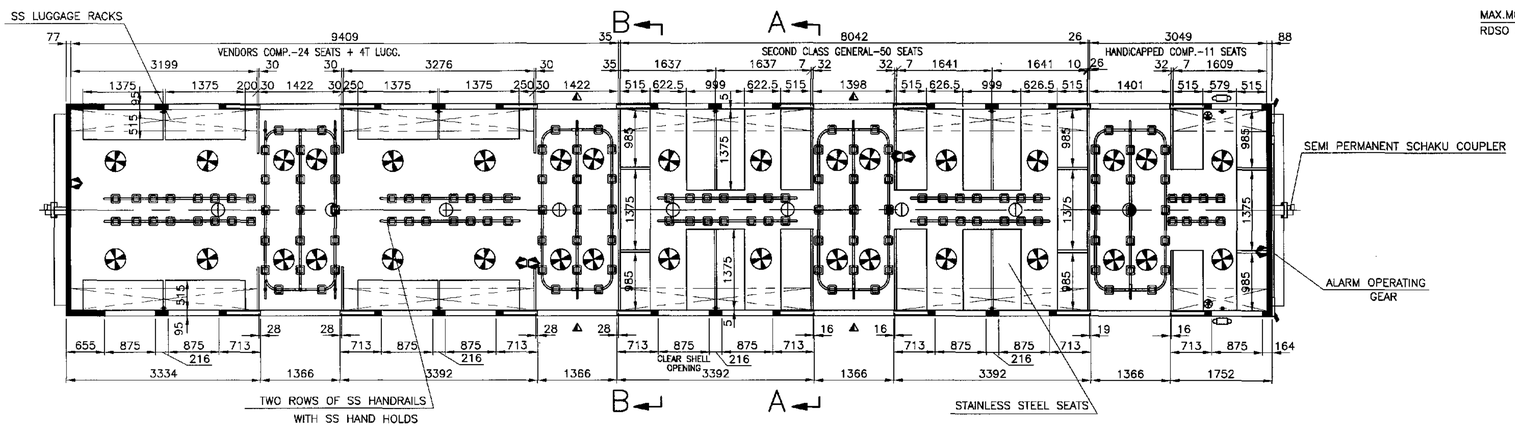
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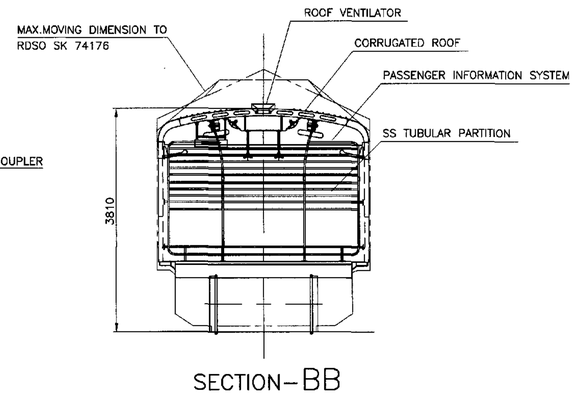
ALTERATIONS	
(a) 07/2017	COACH FORMATION REVISED. Sd/- SSE/D, Sd/- SME/DSD
(b) 03/2022	COACH FORMATION REVISED. RMVU REMOVED & VENTILATOR ADDED. SSE/D, AME/D



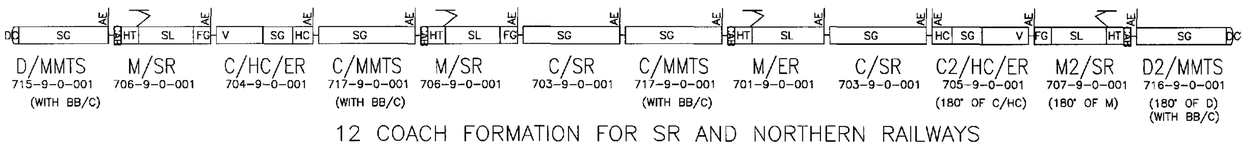


SECTION–AA

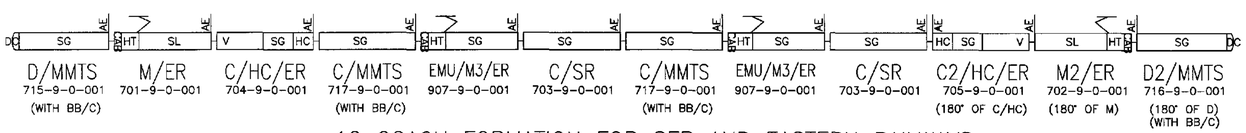




SECTION–BB



12 COACH FORMATION FOR SR AND NORTHERN RAILWAYS



12 COACH FORMATION FOR SER AND EASTERN RAILWAYS

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

FAN
ALARM PULL HANDLE
PASSENGER ALARM INDICATION LIGHT
REMOVABLE EMERGENCY FOOT STEP
BUZZER
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
ROOF VENTILATOR

1. BOGIE——AIR SPRING BOGIE
2. AXLE CAPACITY——20.32 TONNES
3. NO. OF PASSENGERS TO SEAT
   - II CLASS GENERAL—— 50
   - VENDORS COMPT.—— 24
   - HANDICAPPED COMPT.—— 11
   - TOTAL SEATING CAPACITY —— 85
4. SEATED PASSENGER LOAD(85X60kg)——5.10 TONNES
5. LUGGAGE——4.00 TONNES
6. ADDL. STANDING PASSENGER LOAD(SDCL-399x60kg)——23.94 TONNES
   - TOTAL PAY LOAD ——33.04 TONNES
7. TARE WEIGHT —— 38 TONNES (APPROX.)

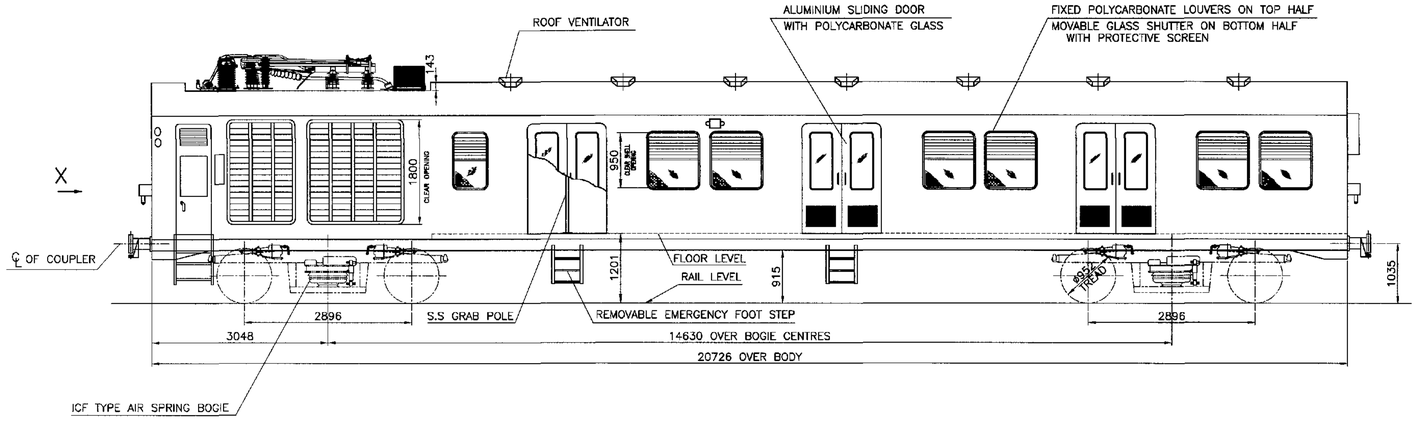
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	GROUP: 9-0				SUPERSEDED BY:	
					SUPERSEDES: EMU/C/HC/ER-9-0-001,Alt:'a'	
	LAYOUT OF 3 PHASE AC EMU TRAILER COACH WITH HANDICAPPED COMPT. FOR EASTERN RAILWAY				SCALE 1:50	SSE/D
						CHD
						ALTD N.Shanmugavel
						DRN SURESH KUMAR.S
					Alpha Alt:– b	
						INTEGRAL COACH FACTORY CHENNAI–38
	DATA CODE NO. 704 INDIAN RAILWAY STANDARDS				SHEET 1 OF 1	EMU/C/HC/ER-9-0-001

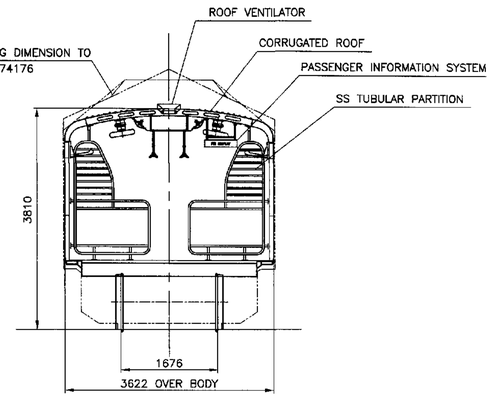
ASSEMBLY DRAWINGS		
0 Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME
	21-03-2022	22-06-2017	

FORM:–IR.A1–840X600

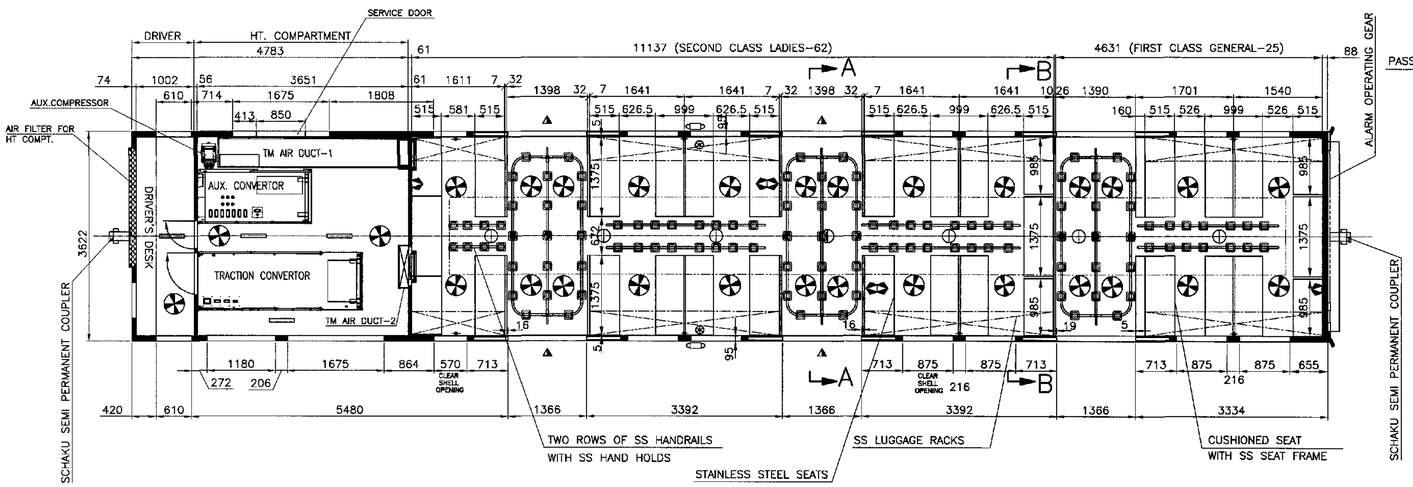
EMU/M/SR-9-0-001

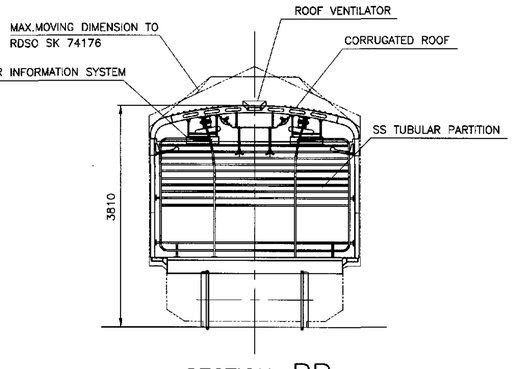
ALTERATIONS	
(a)	03/2022
COACH FORMATION REVISED. RMVU REMOVED & VENTILATOR ADDED.	
SSE/D	AME/D



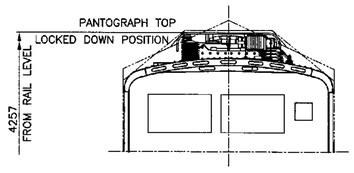


SECTION–AA

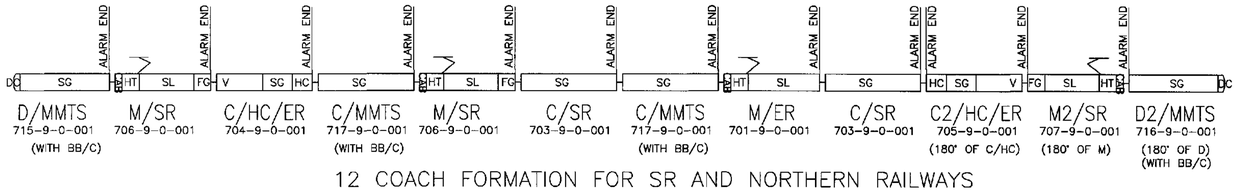




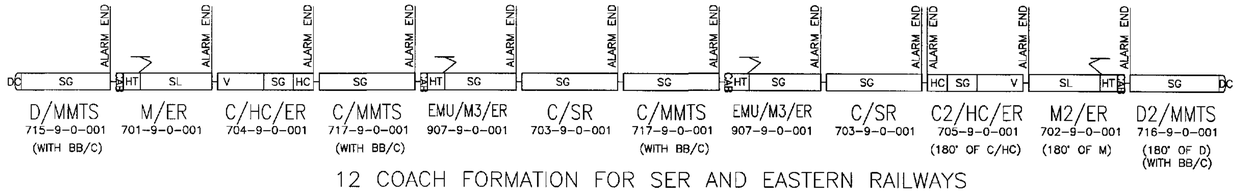
SECTION–BB



VIEW – X



12 COACH FORMATION FOR SR AND NORTHERN RAILWAYS



12 COACH FORMATION FOR SER AND EASTERN RAILWAYS

1. BOGIE ——— AIR SPRING BOGIE
2. AXLE CAPACITY ——— 20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS LADIES	–62
I CLASS GENERAL	–25
TOTAL SEATING CAPACITY	– 87

4. SEATED PASSENGER LOAD (87X60kg) ——— 5.22 TONNES
5. ADDL, STANDING PASSENGER LOAD(SDCL–341x60kg) ——— 20.46 TONNES

TOTAL PAY LOAD ——— 25.68 TONNES

6. TARE WEIGHT ——— 54 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- FLUORESCENT LIGHT
- PASSENGER ALARM INDICATION LIGHT
- BUZZER
- ROOF VENTILATOR

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

ASSEMBLY DRAWINGS			
0	Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME
		21-03-2022	01-07-2017	

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC
	GROUP: 9–0			

LAYOUT OF 3 PHASE AC EMU MOTOR COACH FOR SOUTHERN RAILWAY

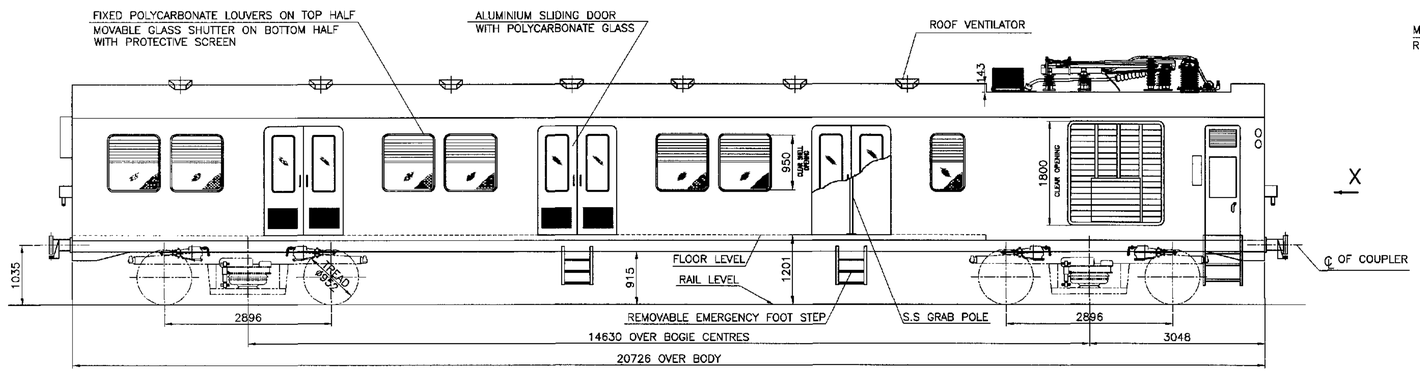
DATA CODE NO. 706 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1

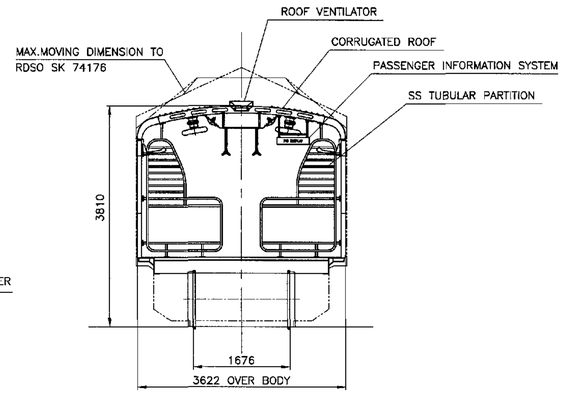
WEIGHT/UNIT	REMARKS
SUPERSEDED BY:	
SUPERSEDES: EMU/M/SR–9–0–001:Alt nil	
SCALE 1:50	SSE/D
CHD	
ALTD	N.Shanmugavel
DRN	SURESH KUMAR.S
Alpha Alt:– a	
INTEGRAL COACH FACTORY CHENNAI–38	
EMU/M/SR–9–0–001	

FORM:–IR.A1–840X600

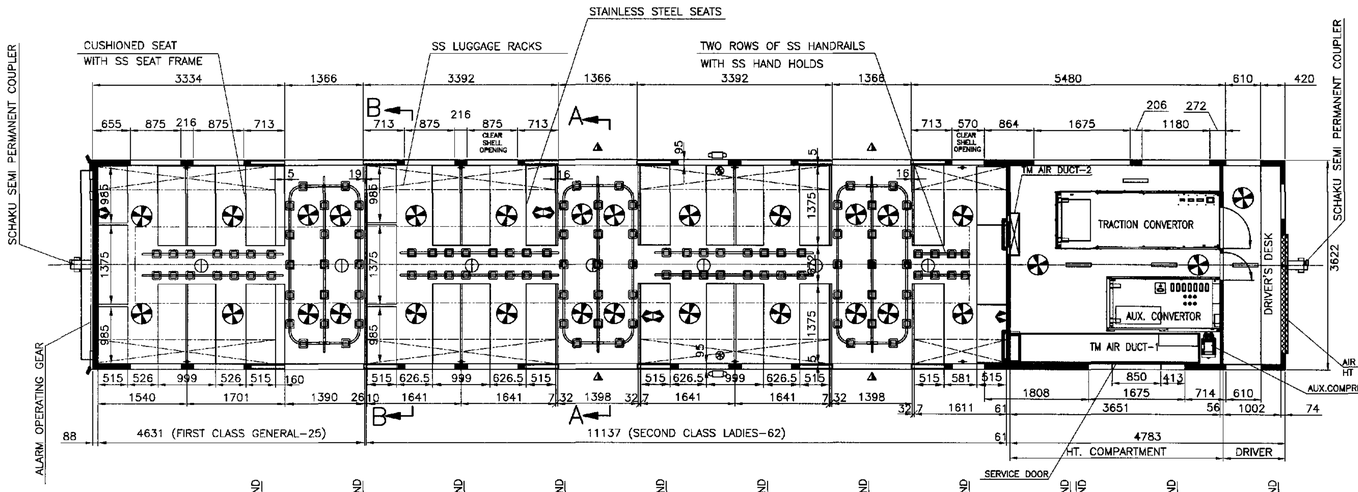
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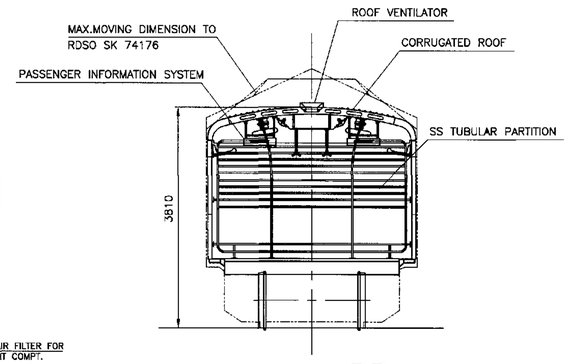
ALTERATIONS		
(a)	03/2022	COACH FORMATION REVISED. RMVU REMOVED & VENTILATOR ADDED.
SSE/D		AME/D



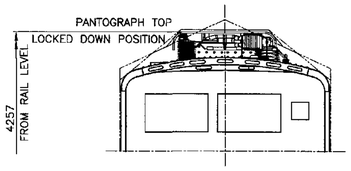


SECTION–AA

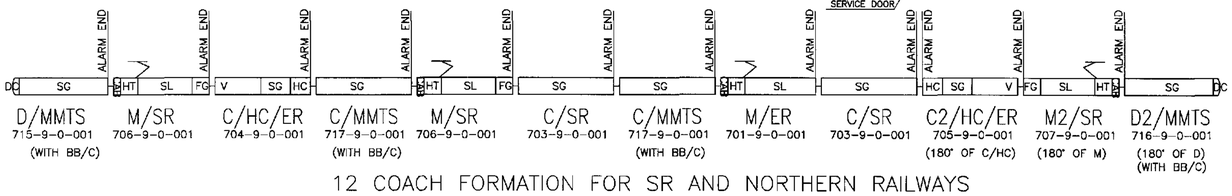




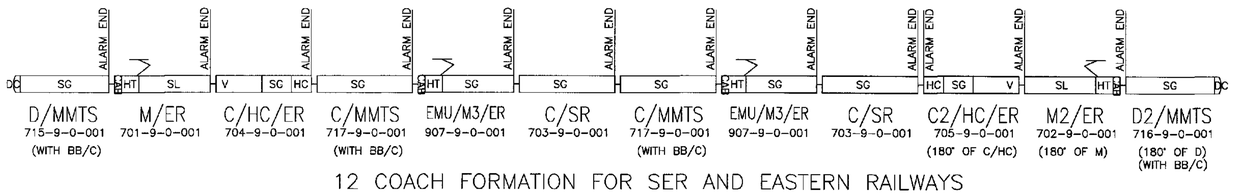
SECTION–BB



VIEW – X



12 COACH FORMATION FOR SR AND NORTHERN RAILWAYS



12 COACH FORMATION FOR SER AND EASTERN RAILWAYS

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS LADIES	–62
I CLASS GENERAL	–25
TOTAL SEATING CAPACITY	– 87

4. SEATED PASSENGER LOAD (87X60kg) ----------5.22 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL–341x60kg)---20.46 TONNES

TOTAL PAY LOAD ------25.68 TONNES

6. TARE WEIGHT ---------- 54 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- FLUORESCENT LIGHT
- PASSENGER ALARM INDICATION LIGHT
- BUZZER
- ROOF VENTILATOR

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: EMU/M2/SR–9–0–001 alt nil	

LAYOUT OF 3 PHASE AC EMU MOTOR COACH FOR SOUTHERN RAILWAY

SCALE 1:50	SSE/D
	CHD
	ALTD N.Shanmugavel
	DRN SURESH KUMAR.S

Alpha Alt:– a

ASSEMBLY DRAWINGS		
21-03-2022	01-07-2017	AME/SME
0 Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE

DATA CODE NO. 707 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1

INTEGRAL COACH FACTORY CHENNAI–38

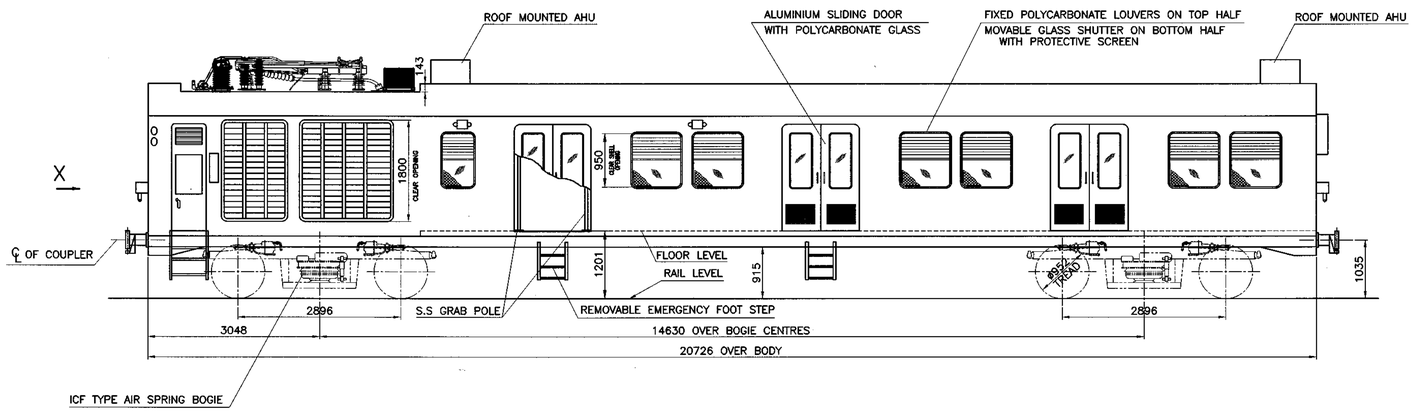
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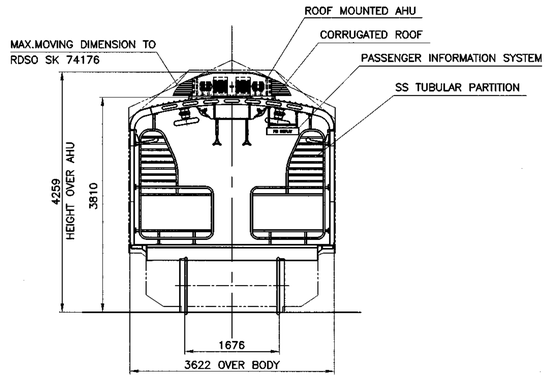
FORM:–IR.A1–840X600

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

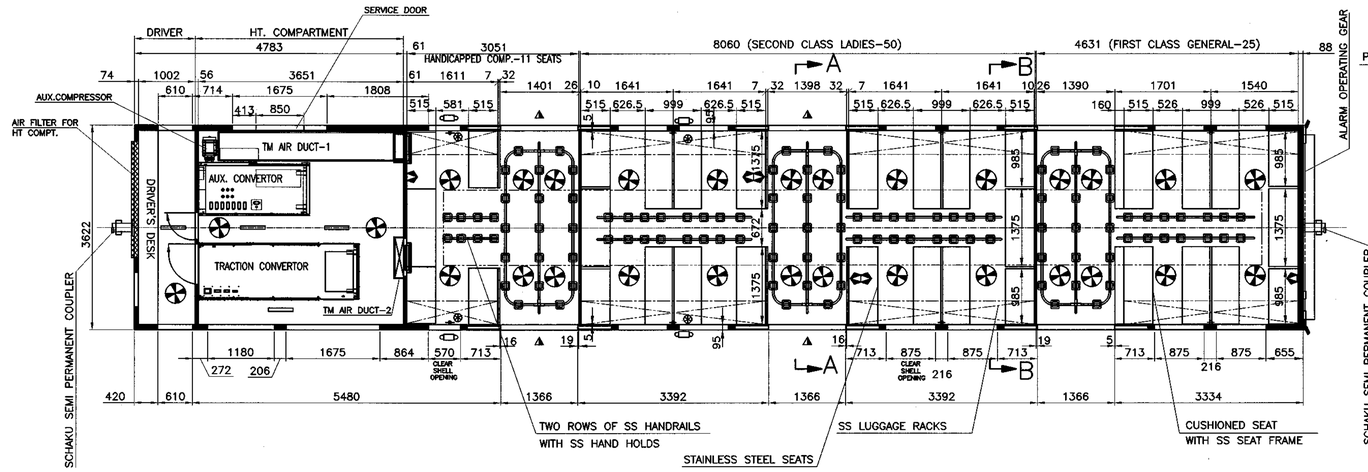
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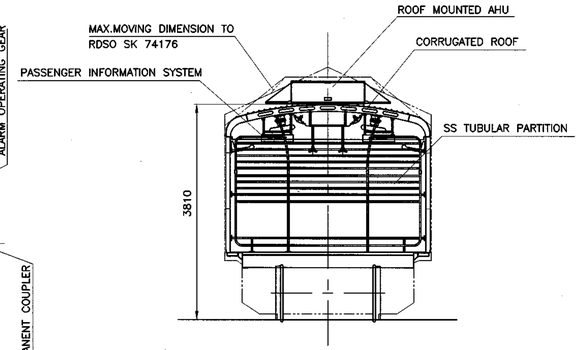
ALTERATIONS
(a) 05/2017 — COACH FORMATION REVISED. Sd/- SSE/D, Sd/- SME/DSD
(b) 07/2017 — HANDICAPPED COMPT. ADDED. LAYOUT AND COACH FORMATION REVISED. Sd/- SSE/D, Sd/- SME/DSS
(c) 05/2018 — 12 COACH FORMATION ADDED. SSE/D, SME/D



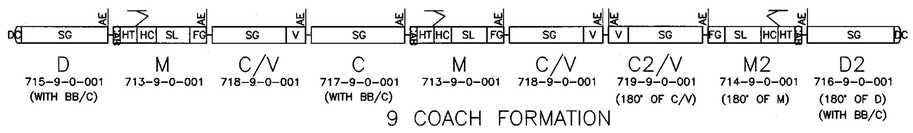


SECTION–AA

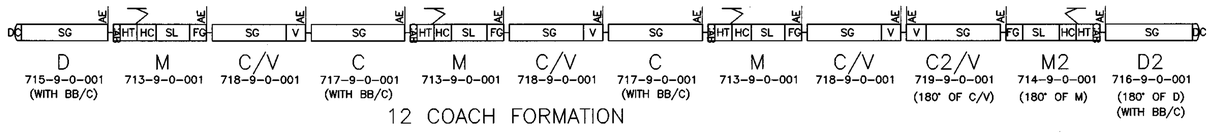




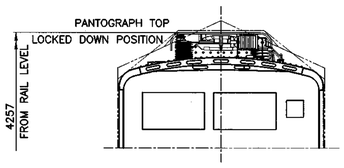
SECTION–BB



9 COACH FORMATION



12 COACH FORMATION



VIEW – X

1. BOGIE ---------- AIR SPRING BOGIE
2. AXLE CAPACITY ---------- 20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

HANDICAPPED COMPT. ----	11
II CLASS LADIES	–50
I CLASS GENERAL	–25
TOTAL SEATING CAPACITY	– 86

4. SEATED PASSENGER LOAD (86X60kg) ---------- 5.16 TONNES
5. ADDL, STANDING PASSENGER LOAD(SDCL–342x60kg) ---- 20.52 TONNES

TOTAL PAY LOAD ------- 25.68 TONNES

6. TARE WEIGHT ---------- 54 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- FLUORESCENT LIGHT
- PASSENGER ALARM INDICATION LIGHT
- BUZZER

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: EMU/M/MMTS-9-0-001/Alt:b/-	

LAYOUT OF 3 PHASE AC EMU MOTOR COACH (FOR MMTS)

SCALE 1:50	SSE/D		
	CHD		
	ALTD	SURESH KUMAR.S	
	DRN	SURESH KUMAR.S	

Alpha Alt:– c

INTEGRAL COACH FACTORY CHENNAI–38

DATA CODE NO. 713 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1

EMU/M/MMTS-9-0-001

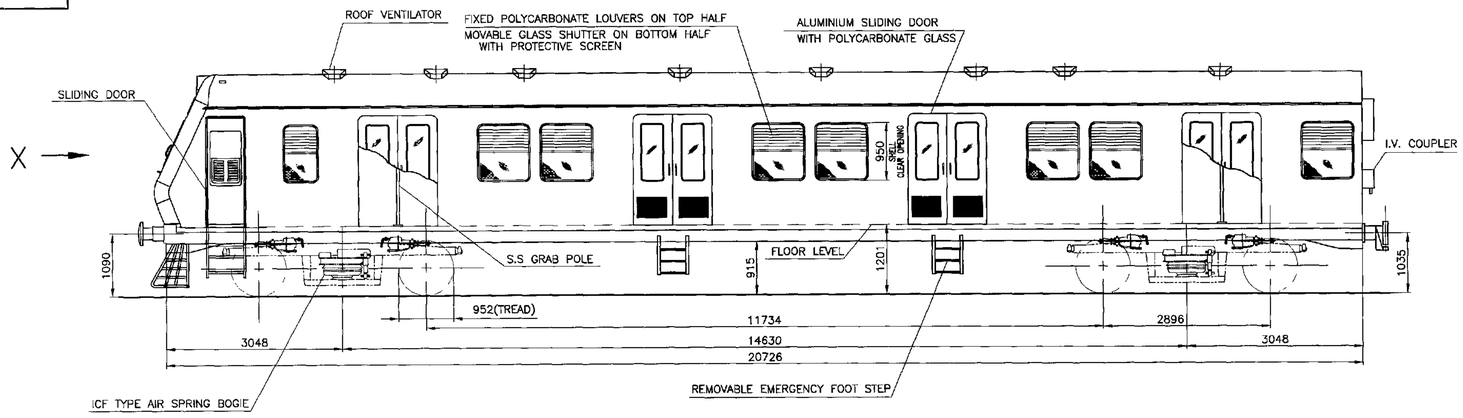
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0	Num. Alt.	16–05–2018 DATE OF LATEST ALT	28–04–2017 DATE OF FIRST ISSUE / AME/SME

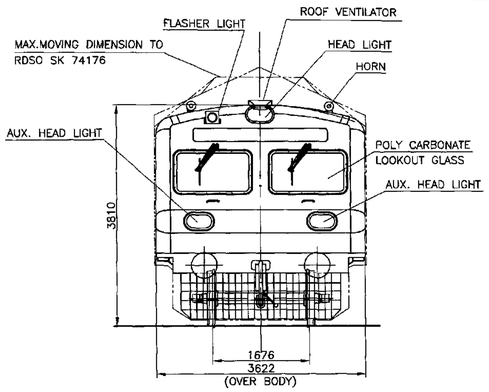
FORM:–IR.A1–840X600

d.00

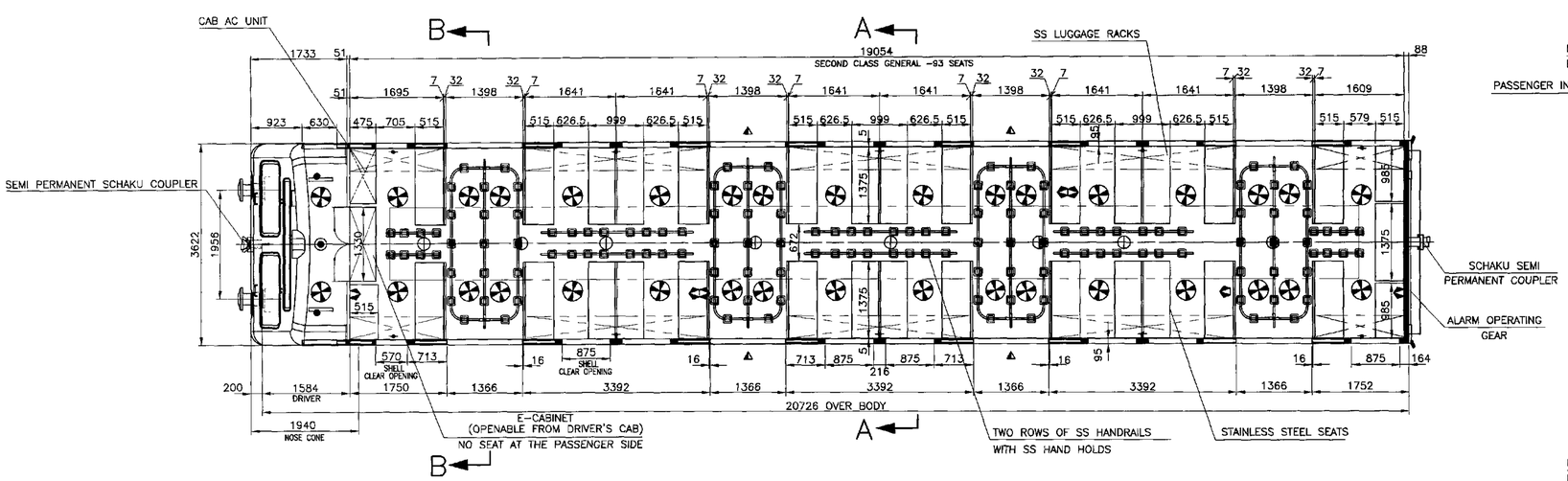
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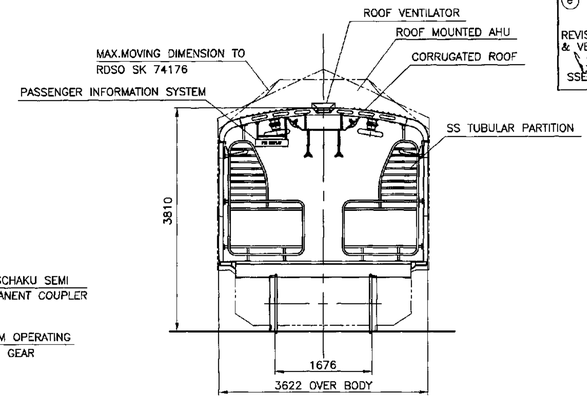
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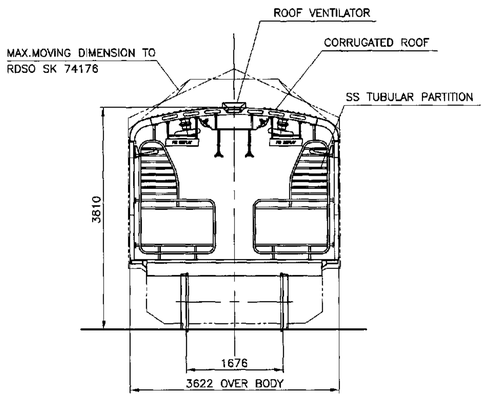


VIEW FROM–X

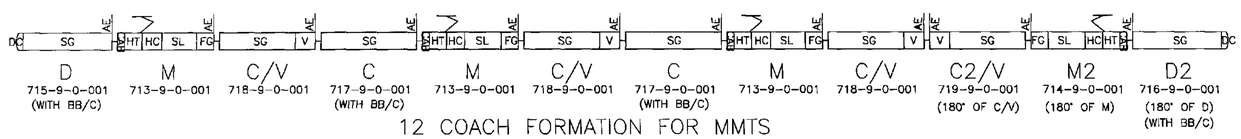




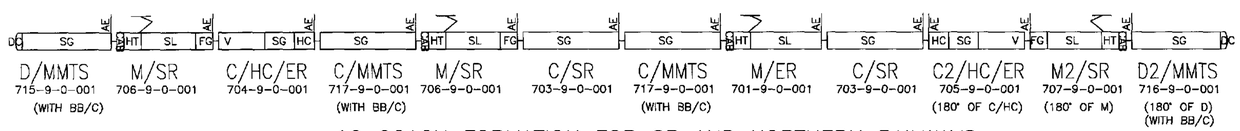
SECTION–AA



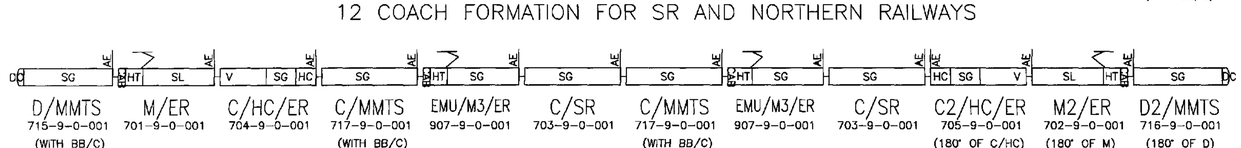
SECTION–BB



12 COACH FORMATION FOR MMTS



12 COACH FORMATION FOR SR AND NORTHERN RAILWAYS



12 COACH FORMATION FOR SER AND EASTERN RAILWAYS

NOTE:

1. BOGIE——————————AIR SPRING BOGIE
2. AXLE CAPACITY——————————20.32 TONNES
3. NO. OF PASSENGERS TO SEAT II CLASS GENERAL ———93
4. SEATED PASSENGER LOAD (93X60kg) ——————5.58 TONNES
5. ADDL, STANDING PASSENGER LOAD(SDCL–463x60kg)——27.78 TONNES

   TOTAL PAY LOAD ——————33.36 TONNES
6. TARE WEIGHT ——————— 39 TONNES (APPROX.)

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. CAB AC

FAN
ALARM PULL HANDLE
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
REMOVABLE EMERGENCY FOOT STEP
CAB LIGHT
ROOF VENTILATOR

ALTERATIONS		
a	05/2017	COACH FORMATION REVISED. Sd/– SSE/D, Sd/– SME/DSD
b	07/2017	COACH FORMATION REVISED. Sd/– SSE/D, Sd/– SME/DSD
c	09/2017	CAB AC INTRODUCED. SEATING CAPACITY REVISED. NOTE–10 ADDED. Sd/– SSE/D, Sd/– SME/DSD
d	05/2018	MMTS COACH FORMATION REVISED FROM 9CAR TO 12CAR. Sd/– SSE/D, Sd/– SME/D
e	03/2022	COACH FORMATION REVISED. RMVU REMOVED & VENTILATOR ADDED. SSE/D, AME/D

ASSEMBLY DRAWINGS		
21-03-2022	28-04-2017	AME/SME
DATE OF LATEST ALT	DATE OF FIRST ISSUE	
0 Num. Alt.		

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: EMU/D/MMTS-9-0-001,Alt:d/–	

LAYOUT OF 3 PHASE AC EMU DRIVING TRAILER 'D' COACH (FOR MMTS)

SCALE 1:50	SSE/D
	CHD
	ALTD N.Shanmugavel
	DRN SURESH KUMAR.S
Alpha Alt:– e	

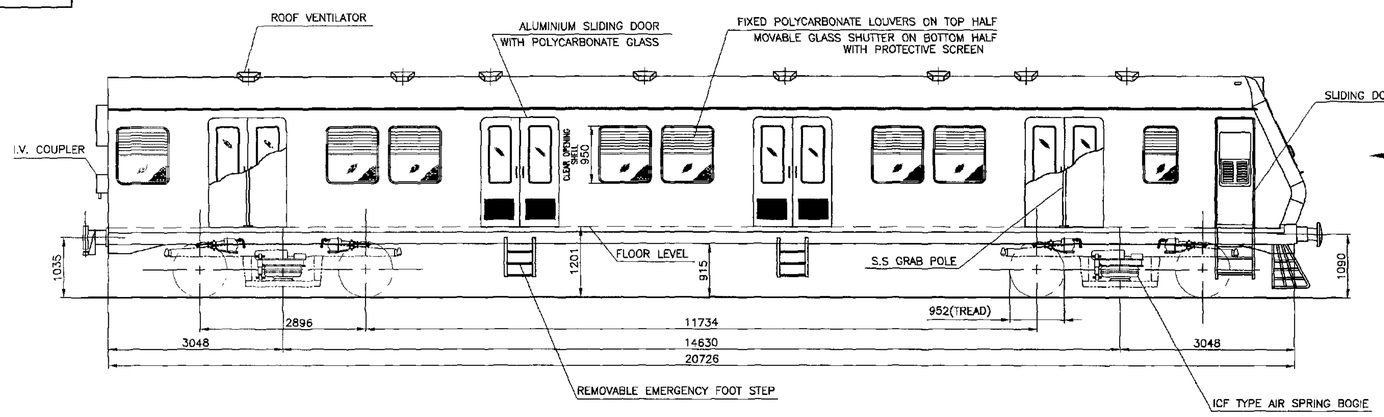
DATA CODE NO. 715 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1

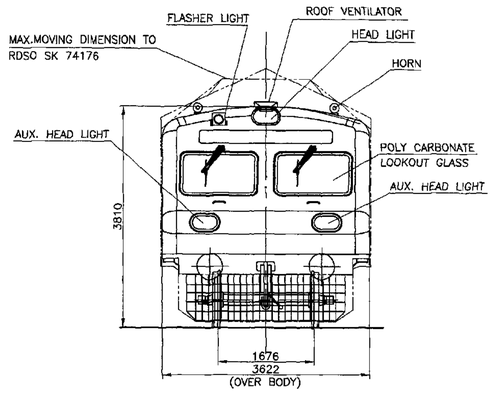
INTEGRAL COACH FACTORY CHENNAI–38

EMU/D/MMTS-9-0-001

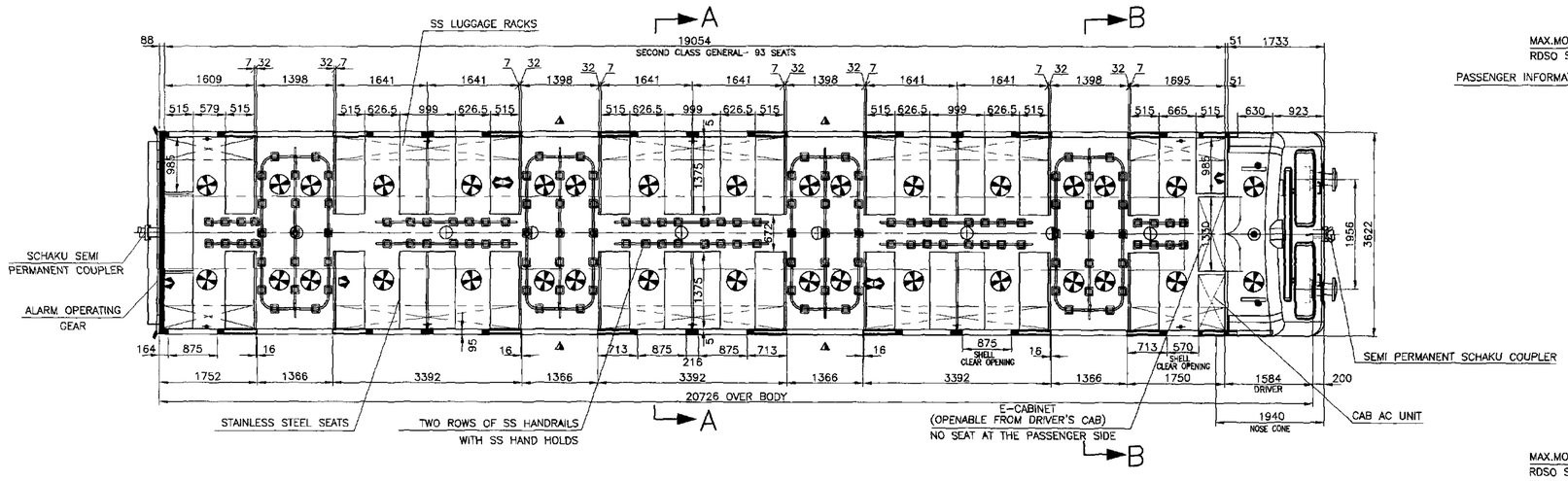
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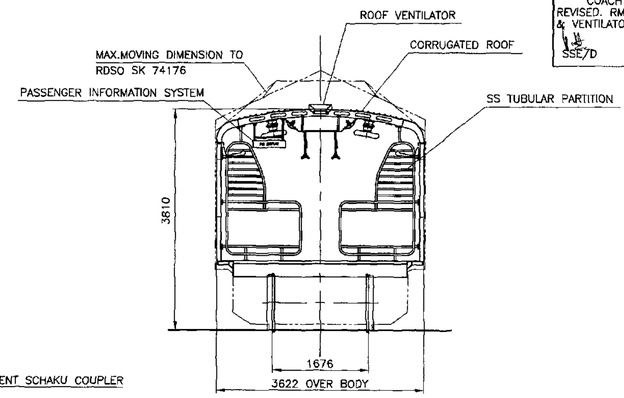
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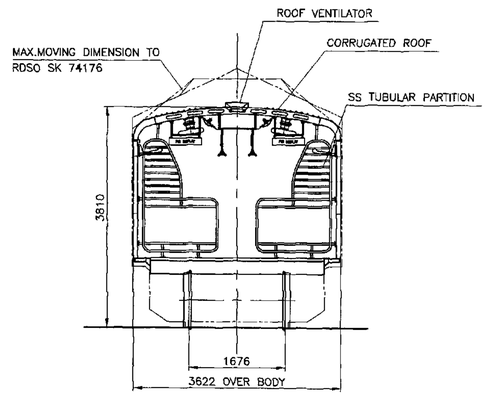


VIEW FROM-X

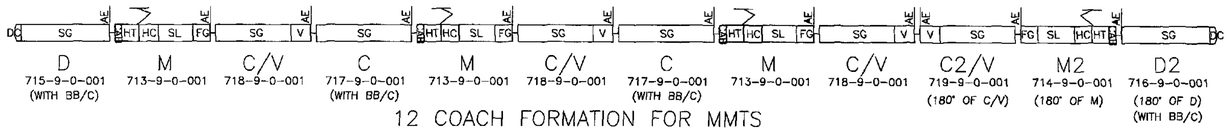




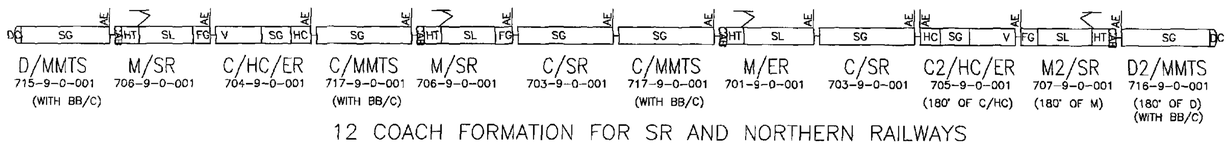
SECTION-AA



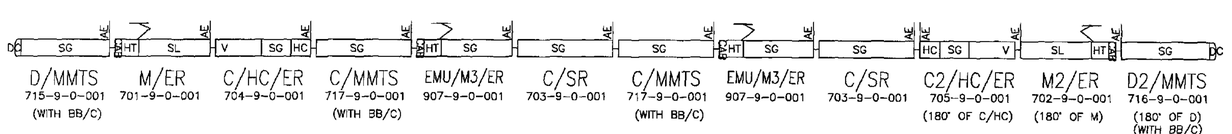
SECTION-BB



12 COACH FORMATION FOR MMTS



12 COACH FORMATION FOR SR AND NORTHERN RAILWAYS



12 COACH FORMATION FOR SER AND EASTERN RAILWAYS

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT II CLASS GENERAL -----93
4. SEATED PASSENGER LOAD (93X60kg) ----------5.58 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL-463x60kg)--27.78 TONNES
   TOTAL PAY LOAD -------33.36 TONNES
6. TARE WEIGHT _____ 39 TONNES (APPROX.)

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. CAB AC.

FAN
ALARM PULL HANDLE
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
REMOVABLE EMERGENCY FOOT STEP
CAB LIGHT
ROOF VENTILATOR

ALTERATIONS

a	05/2017	COACH FORMATION REVISED.	Sd/- SSE/D, Sd/- SME/DSD
b	07/2017	COACH FORMATION REVISED.	Sd/- SSE/D, Sd/- SME/DSD
c	09/2017	CAB AC INTRODUCED. SEATING CAPACITY REVISED. NOTE-10 ADDED.	Sd/- SSE/D, Sd/- SME/DSD
d	05/2018	MMTS COACH FORMATION REVISED FROM 9 CAR TO 12 CAR	Sd/- SSE/D, Sd/- SME/DSD
e	03/2022	COACH FORMATION REVISED. RMVU REMOVED & VENTILATOR ADDED.	SSE/D, AME/D

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
					SUPERSEDES: EMU/D2/MMTS-9-0-001,Alt:d/-	

LAYOUT OF 3 PHASE AC EMU DRIVING TRAILER 'D' COACH (FOR MMTS)

SCALE 1:50 | SSE/D | CHD | ALTD N.Shanmugavel | DRN SURESH KUMAR.S | Alpha Alt:- e

INTEGRAL COACH FACTORY CHENNAI-38

DATA CODE NO. 716 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1

EMU/D2/MMTS-9-0-001

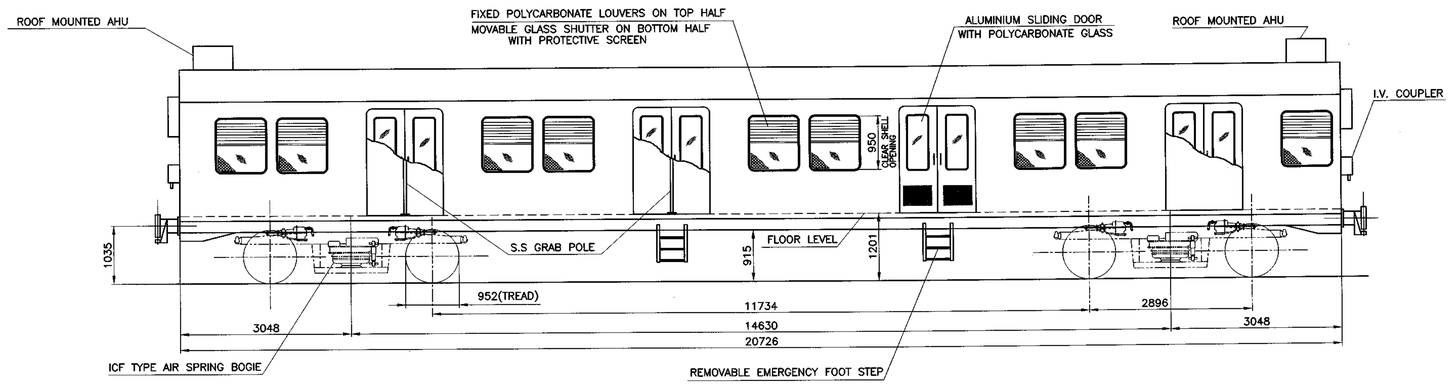
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	0	21-03-2022	28-04-2017	AME/SME

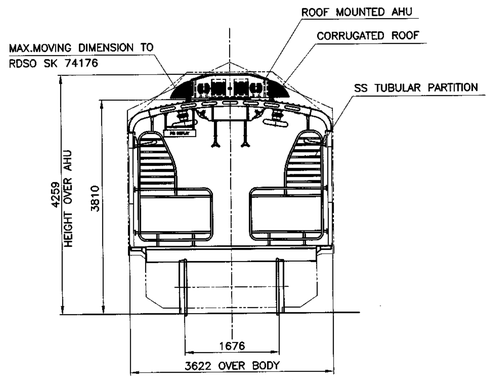
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PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

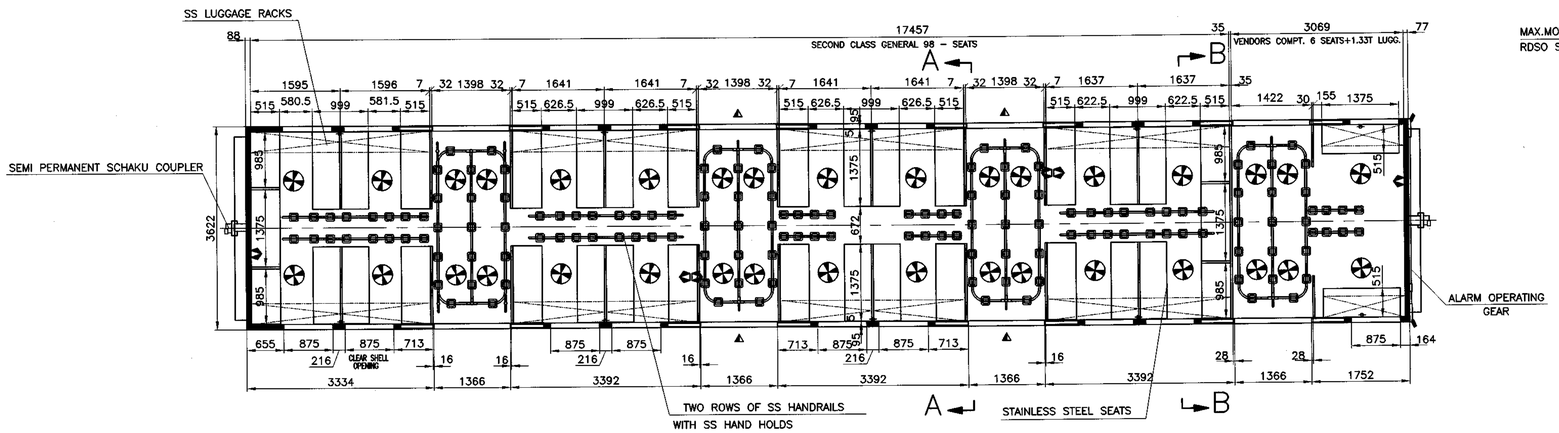
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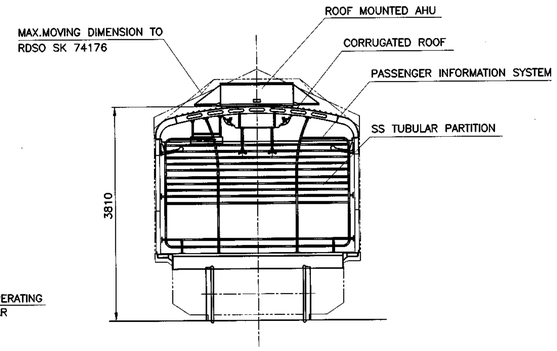
ALTERATIONS	
(a) 07/2017	
COACH DESCRIPTION REVISED FROM EMU/C/HC/MMTS TO EMU/C/V/MMTS. HANDICAPPED COMPT. DELETED. TITLE,LAYOUT & COACH FORMATION REVISED. ACCRDLY.	
Sd/- SSE/D	Sd/- SME/DSS
(b) 05/2018	
12 COACH FORMATION ADDED.	
SSE/D	SME/D



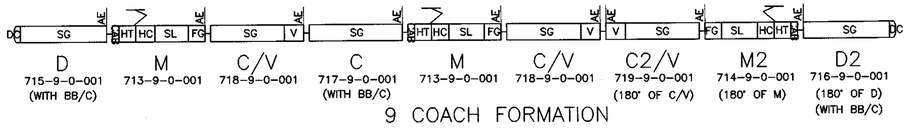


SECTION–AA

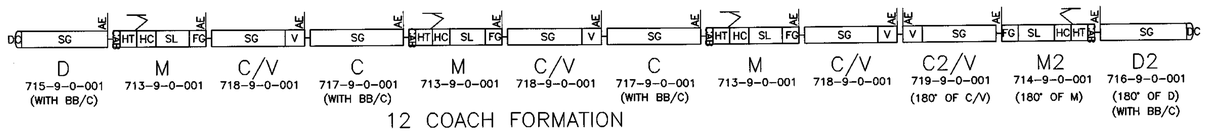




SECTION–BB



9 COACH FORMATION



12 COACH FORMATION

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS GENERAL--------	98
VENDORS COMPT.--------	6
TOTAL SEATING CAPACITY	-104

4. SEATED PASSENGER LOAD(104X60kg)----------6.24 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL, STANDING PASSENGER LOAD(SDCL-450x60kg)--27.00 TONNES

TOTAL PAY LOAD ------34.57 TONNES

7. TARE WEIGHT ---------- 38 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- REMOVABLE EMERGENCY FOOT STEP
- BUZZER
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: EMU/C/V/MMTS-9-0-001,Alt:c/-	

LAYOUT OF 3 PHASE AC EMU TRAILER COACH WITH VENDOR COMPT. (FOR MMTS)

SCALE 1:50	SSE/D		
	CHD		
	ALTD	SURESH KUMAR.S	
	DRN	SURESH KUMAR.S	

Alpha Alt:– b

INTEGRAL COACH FACTORY CHENNAI–38

ASSEMBLY DRAWINGS			
0 Num. Alt.	16–05–2018 DATE OF LATEST ALT	09–05–2017 DATE OF FIRST ISSUE	AME/SME

DATA CODE NO. 718 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1

EMU/C/V/MMTS-9-0-001

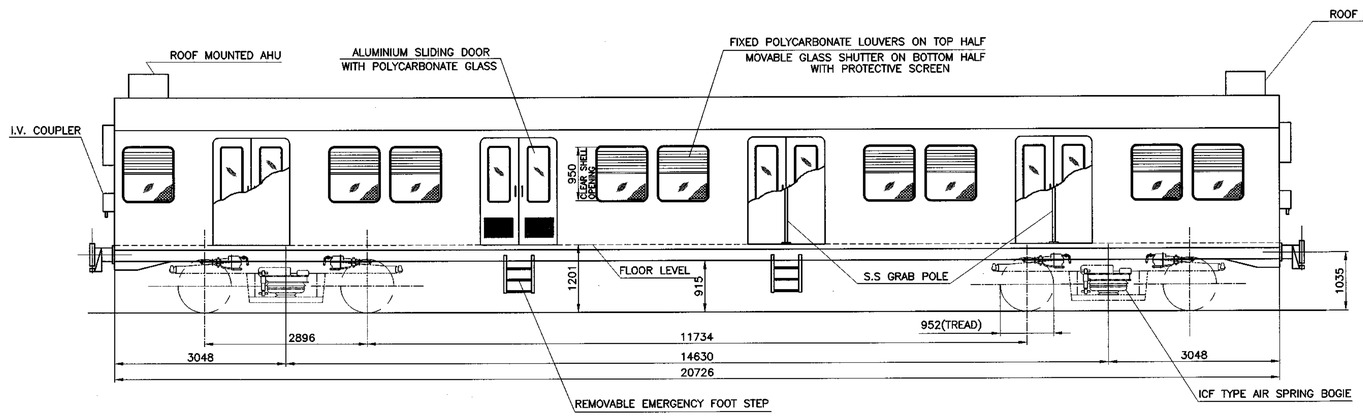
FORM:–IR.A1–840X600

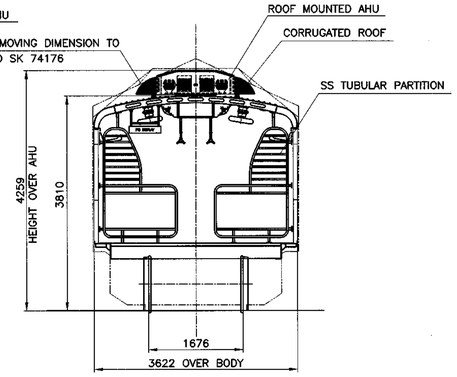
c.00

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

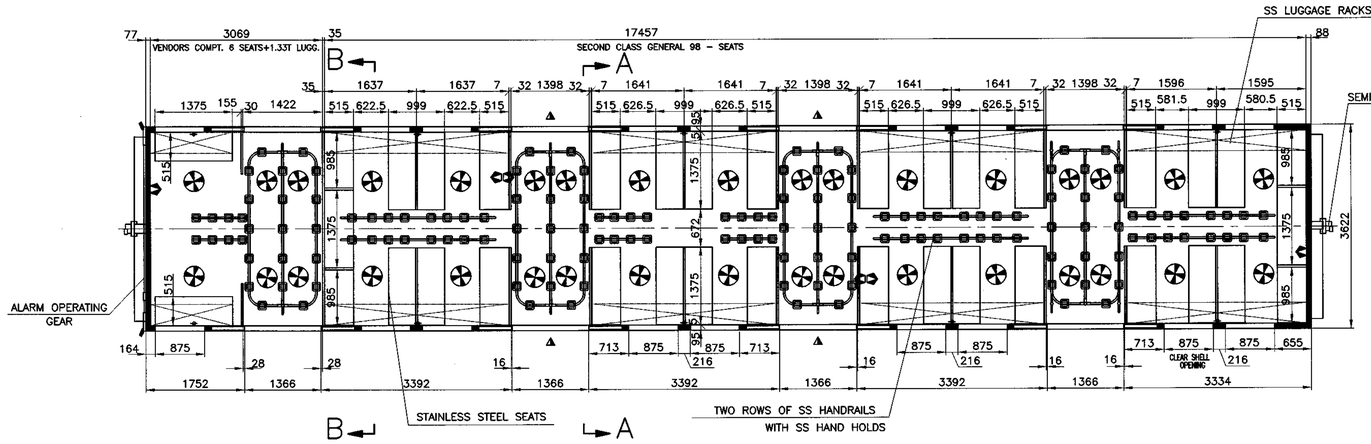
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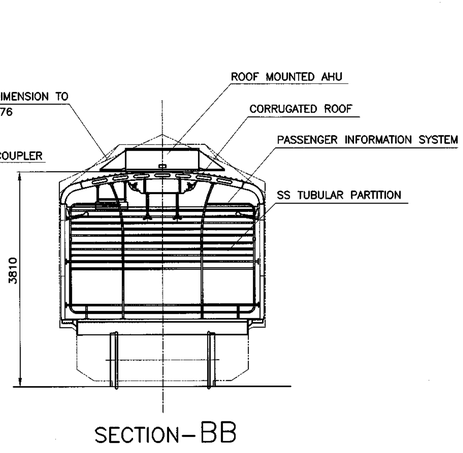
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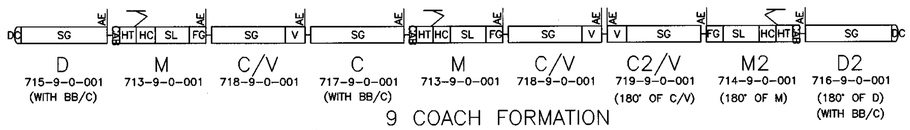


SECTION–AA

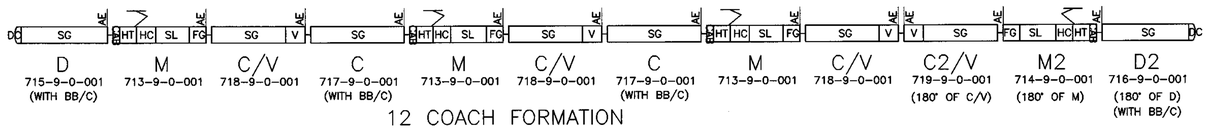




SECTION–BB



9 COACH FORMATION



12 COACH FORMATION

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS GENERAL--------	98
VENDORS COMPT.--------	6
TOTAL SEATING CAPACITY	-104

4. SEATED PASSENGER LOAD(104X60kg)----------6.24 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL. STANDING PASSENGER LOAD(SDCL-450x60kg)--27.00 TONNES

TOTAL PAY LOAD ------34.57 TONNES

7. TARE WEIGHT ---------- 38 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- REMOVABLE EMERGENCY FOOT STEP
- BUZZER
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

ALTERATIONS

(a) 07/2017
COACH DESCRIPTION REVISED FROM EMU/C2/HC/MMTS TO EMU/C2/V/MMTS. HANDICAPPED COMPT. DELETED. TITLE,LAYOUT & COACH FORMATION REVISED ACCRDLY.
Sd/- SSE/D Sd/- SME/DSS

(b) 05/2018
12 COACH FORMATION ADDED.
SSE/D SME/D

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
					SUPERSEDES: EMU/C2/V/MMTS-9-0-001 Alt:a/-	

LAYOUT OF 3 PHASE AC EMU TRAILER COACH WITH VENDOR COMPT. (FOR MMTS)

SCALE 1:50 | SSE/D | CHD | ALTD SURESH KUMAR.S | DRN SURESH KUMAR.S

Alpha Alt:- b

INTEGRAL COACH FACTORY CHENNAI-38

ASSEMBLY DRAWINGS					
0 Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME	DATA CODE NO. 719	INDIAN RAILWAY STANDARDS	SHEET 1 OF 1	EMU/C2/V/MMTS-9-0-001
	16-05-2018	09-05-2017					

FORM:-IR.A1-840X600

b.00

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

MEMU/TC6-9-0-001

▽ ROUGH MACHINED		(Q1) ROUGH CLEANING	
▽▽ FINISH MACHINED			
▽▽▽ FINE FINISH MACHINED			

ALTERATIONS

(a) 7/2017
NUMBER OF STANDEES REVISED.
-Sd- SSE/D -Sd- SME/DSS

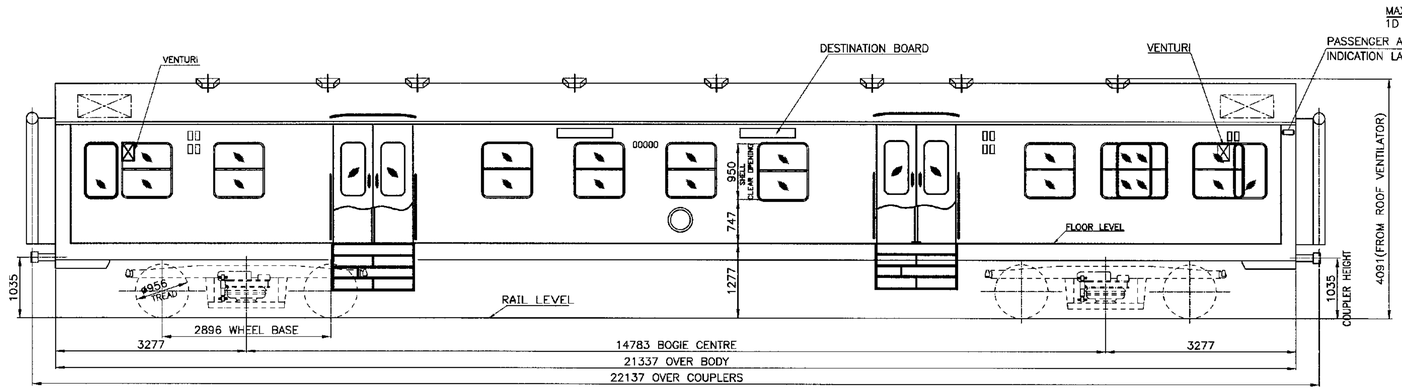
(b) 8/2017
NOTE-1 REVISED.
-Sd- SSE/D -Sd- SME/DSS

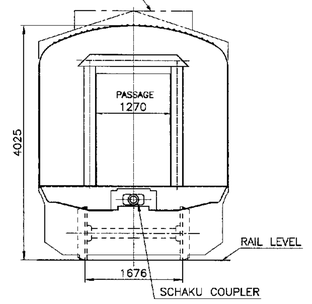
(c) 8/2017
END WALL ELECTRICAL CABINET INTRODUCED.
-Sd- SSE/D -Sd- SME/DSS

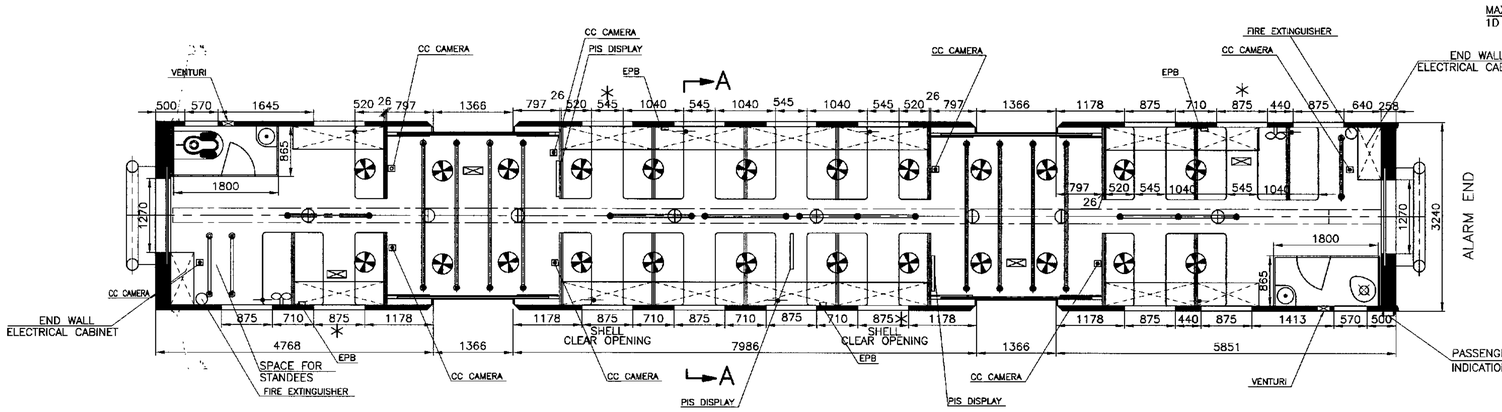
(d) 02/2020
TITLE REVISED.
-Sd- SSE/D -Sd- SME/DSS

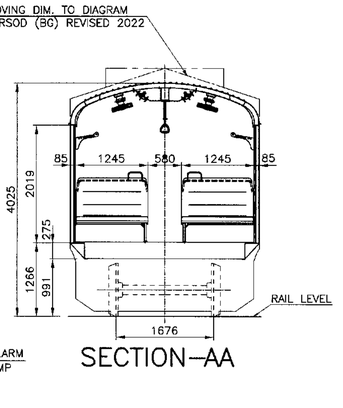
(e) 02/2021
ALARM END TOILET MODIFIED FROM INDIAN STYLE TO WESTERN STYLE.
-Sd- SSE/D -Sd- SME/DSS

(f) 05/2023
12 CAR FORMATION ADDED. MMD AND AMENETIES UPDATED
SSE/D AME/D

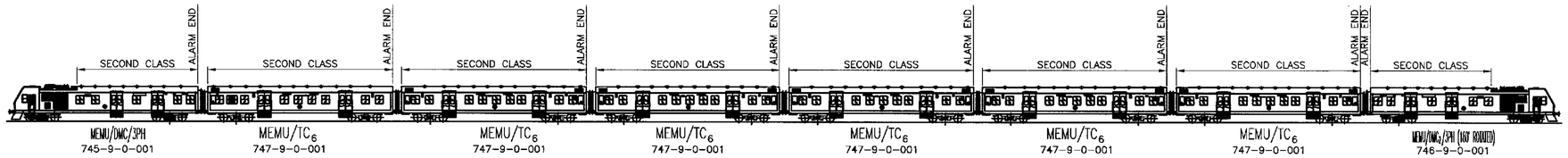




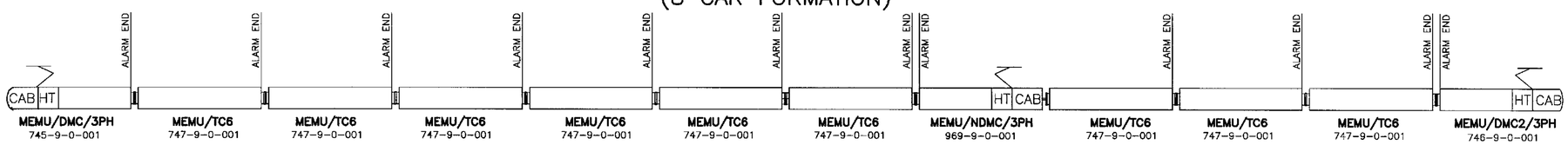




SECTION–AA



(8 CAR FORMATION)



(12 CAR FORMATION)

- RAILWAY CREST
- RAILWAY INITIALS
- 00000 COACH NUMBER
- FAN
- VENTILATORS
- ALARM PULL
- EMERGENCY WINDOW
- FAN
- EMERGENCY PUSH BUTTON (EPB)
- DISASTER ANAGEMENT LIGHT

PASSENGERS TO SEAT	84
NO. OF STANDING PASSENGERS	241
TOTAL NO. OF PASSENGERS	325
NO. OF DOORS ASIDE	2
PASSENGERS PER DOOR ASIDE	162
AXLE LOAD CAPACITY	20.3 Tonnes

NOTE:

1) THIS LAYOUT IS BASED ON MEMU/TC2-9-0-201 Alt 'b/-'.

ASSEMBLY DRAWINGS

		0	Num. Alt.	DATE OF LATEST ALT
06-03-2019	AME/SME			

DATE OF FIRST ISSUE

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
1	GROUP: 9				SUPERSEDED BY:	
					SUPERSEDES:	MEMU/TC6-9-0-001 Alt 'a/-'

LAYOUT OF MEMU/TC

SCALE 1:50	SSE/D	
	CHD	
	ALTD	M.SIVAKUMAR
	DRN	Jagadeeshwar

Alpha Alt:- F

DATA CODE NO.		SHEET
747	INDIAN RAILWAY STANDARDS	1 OF 1

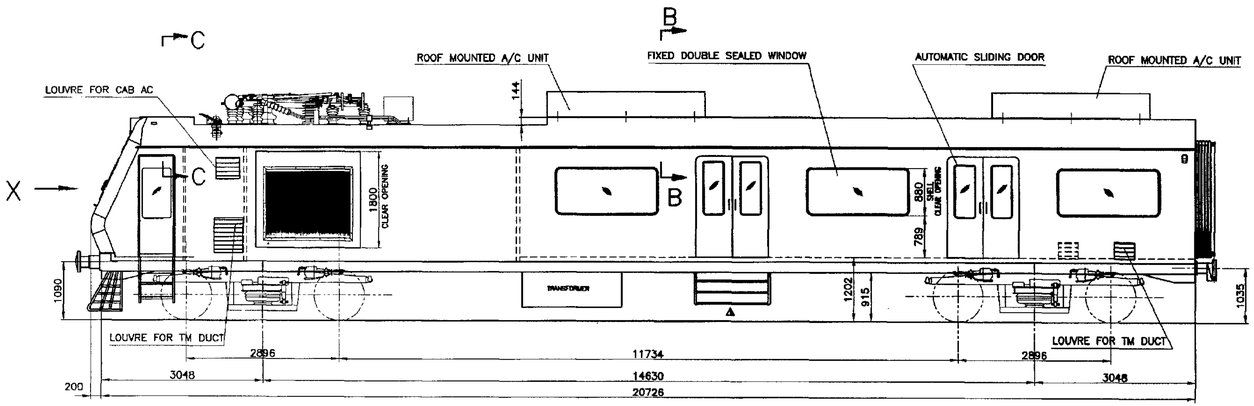
INTEGRAL COACH FACTORY CHENNAI-38

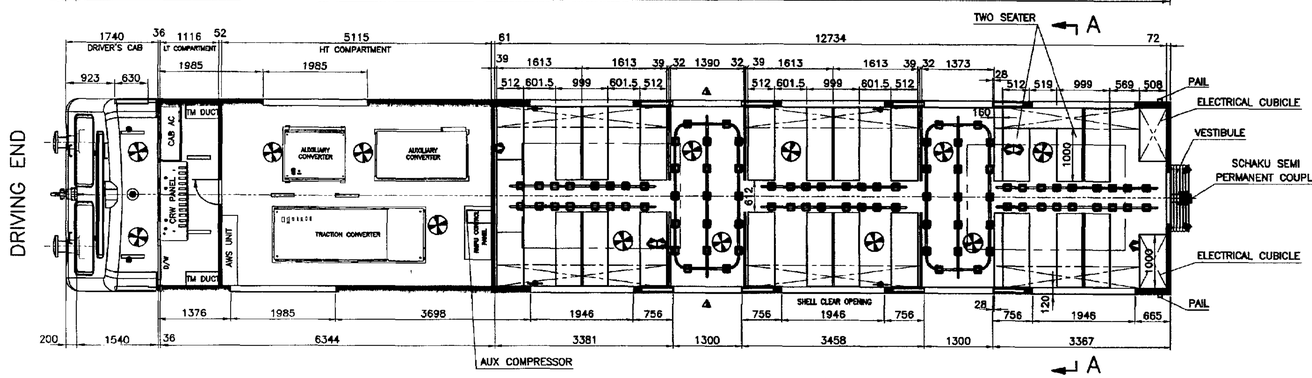
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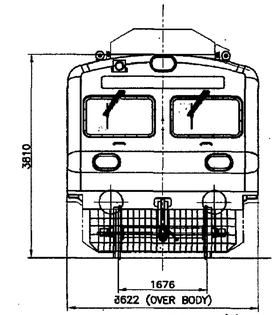
FORM:-IR.A1-840X600

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

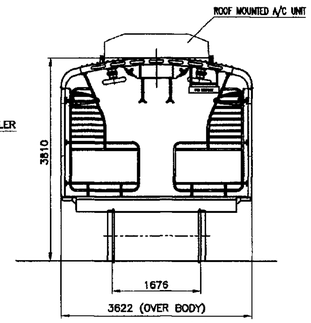
EMU2/DMC/AC-9-0-001



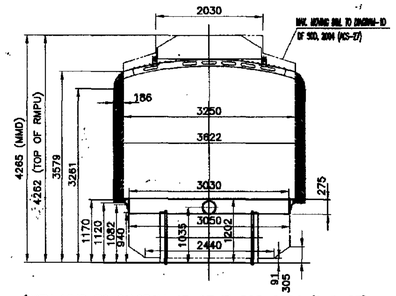




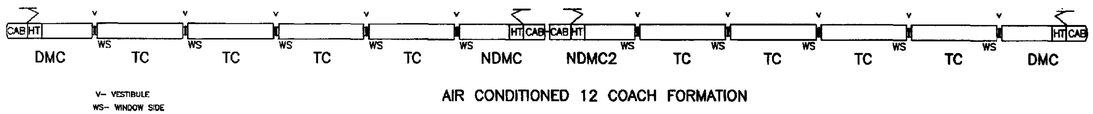
VIEW FROM–X



SECTION–AA

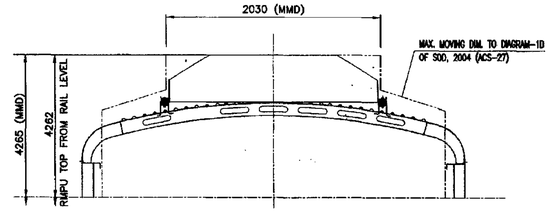


(WITH MMD TO DIAGRAM 1D OF IR SOD 2004 (ACS-27)

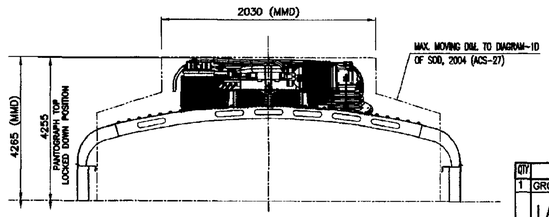


V– VESTIBULE
WS– WINDOW SIDE

AIR CONDITIONED 12 COACH FORMATION



SECTION–BB



SECTION–CC

FAN
ALARM PUSH BUTTON
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

NOTE:

1. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
2. FRP INTERIOR PANELS FOR SIDEWALL, ENDWALL & ROOF.
3. RUBBER FLOOR COVERING.
4. TUBULAR PARTITIONS, SEATS, HAND HOLDS AND GRAB POLES ARE OF STAINLESS STEEL.
5. ALUMINIUM EXTRUDED LUGGAGE RACK.
6. EXTERIOR PU PAINTING.
7. AIR SPRING BOGIE.
8. 20.32 TONNES AXLE CAPACITY.
9. No. OF PASSENGERS TO SEAT (II CLASS) – 65 + 1(MOTOR MAN)
10. STANDING PASSENGER - - - - - - - 258.

ALTERATIONS	
ⓐ 12/2018 LAYOUT REVISED.	sd/– SSE/D, sd/– SME/D
ⓑ 06/2019 WEIGHT DETAILS ADDED.	sd/– SSE/D, sd/– SME/D
ⓒ 10/2019 KEY DIAGRAM REVISED. MMD ACS–27 ADDED.	sd/– SSE/D, sd/– SME/D
ⓓ 11/2019 KEY DIAGRAM CORRECTED FOR HTC,DTC AND MC COACHES.	sd/– SSE/D, sd/– SME/D
ⓔ 10/2022 KEY DIAGRAM REVISED.	sd/– SSE/D, sd/– AME/D
ⓕ 04/2023 NOTE-9 REVISED. NOTE-10 ADDED.	SSE/D, AME/D

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
1	GROUP: 9				SUPERSEDED BY:	
					SUPERSEDES:	EMU2/DMC/AC-9-0-001 Alt. a/-

LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU DRIVING MOTOR COACH

SCALE	1:50, 1:20
SSE/D	
CHD	
ALTD	B.K.Thivakar Lakshman
DRN	A.V.V.Srinivas

Alpha Alt:– f

INTEGRAL COACH FACTORY CHENNAI–38

ASSEMBLY DRAWINGS					
0	Num. Alt.	04.04.2023 DATE OF LATEST ALT	21.11.2018 DATE OF FIRST ISSUE	AME/SME	

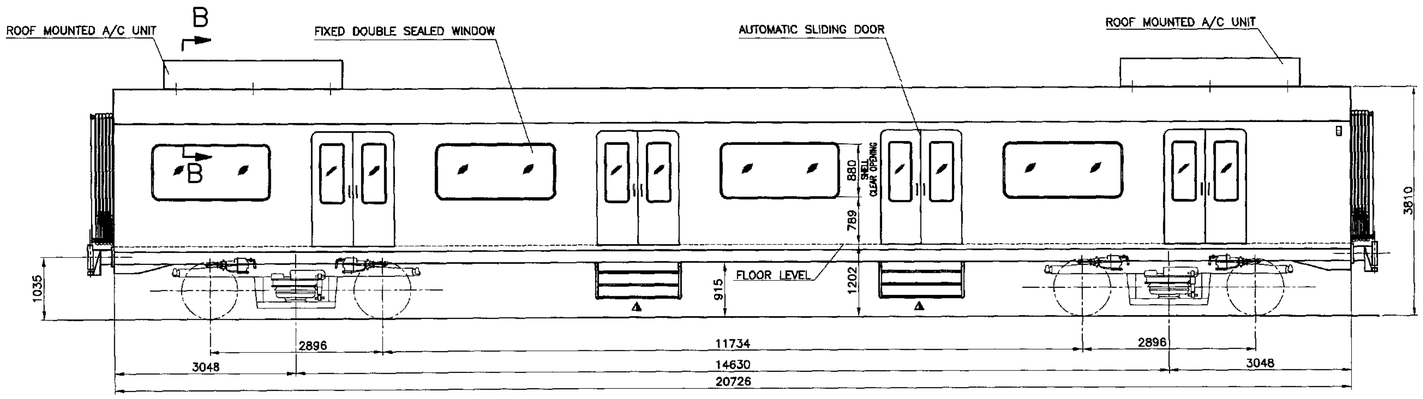
DATA CODE NO. 805 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1 | EMU2/DMC/AC-9-0-001

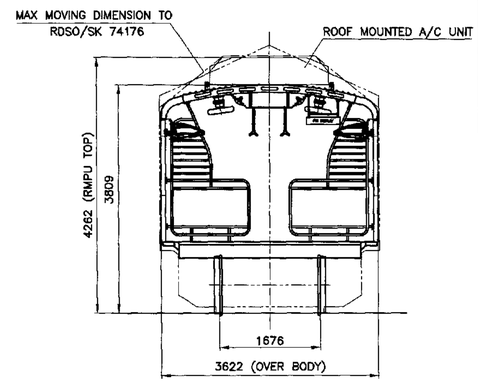
FORM:–IR.A1–840X600

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

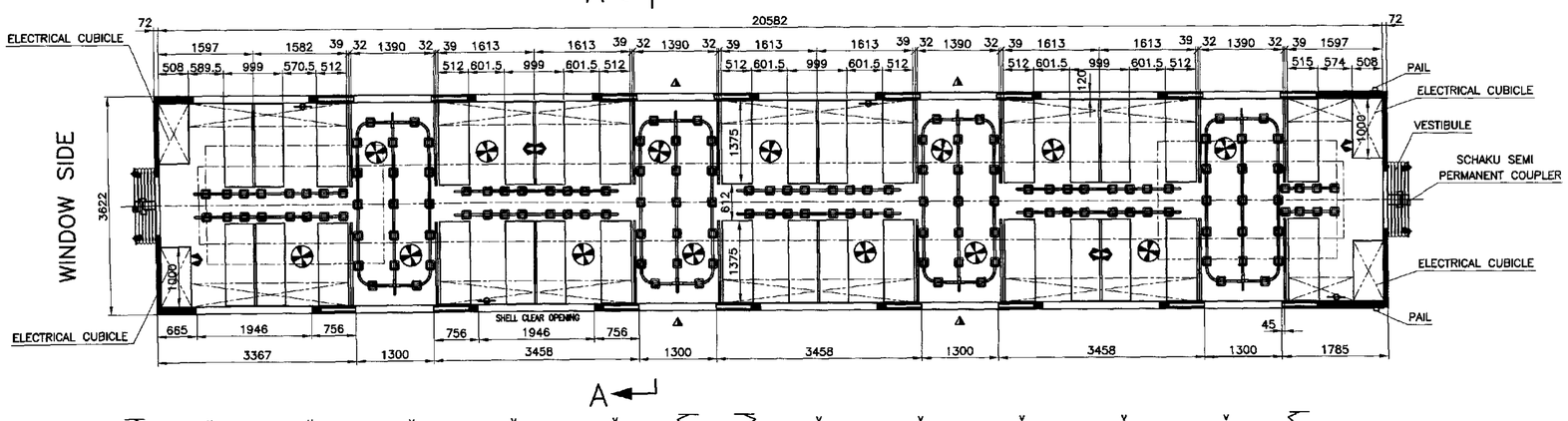
EMU2/TC2/AC-9-0-001

ALTERATIONS
ⓐ 12/2018
LAYOUT REVISED.
sd/– sd/–
SSE/D SME/D
ⓑ 10/2019
KEY DIAGRAM ADDED FOR PARTIAL AC COACHES. NOTE–10 DELETED.
SSE/D SME/D

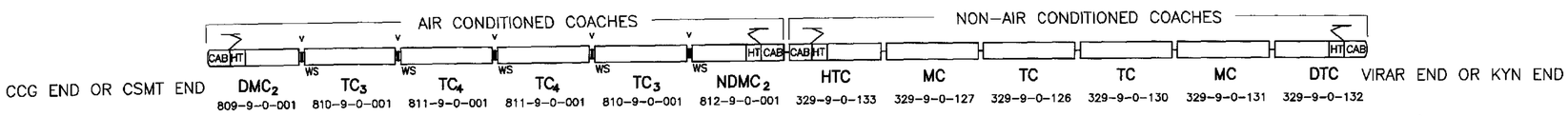




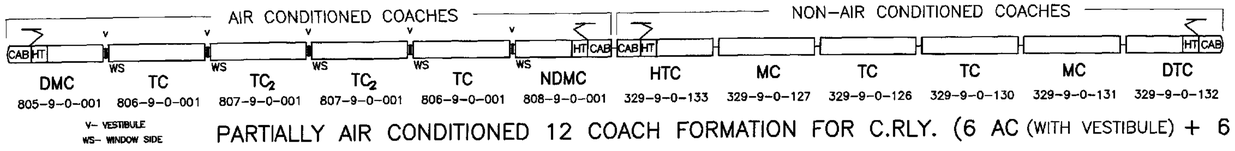
SECTION–AA



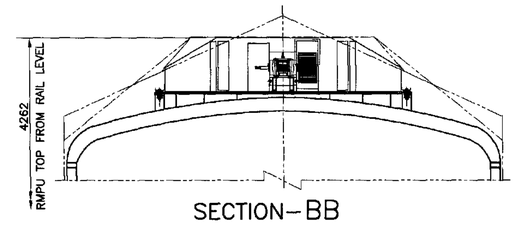
12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT (WITH VESTIBULE)



PARTIALLY AIR CONDITIONED 12 COACH FORMATION W.RLY (6 AC (WITH VESTIBULE) + 6 NON–AC)
(AS PER RLY. BOARD LETTER NO.2013/ELECT.(G)/181/1 PT.3 DATED 23.03.2018)



PARTIALLY AIR CONDITIONED 12 COACH FORMATION FOR C.RLY. (6 AC (WITH VESTIBULE) + 6 NON–AC)



SECTION–BB

NOTE:

1. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
2. FRP INTERIOR PANELS FOR SIDEWALL, ENDWALL & ROOF.
3. RUBBER FLOOR COVERING.
4. TUBULAR PARTITIONS, SEATS, HAND HOLDS AND GRAB POLES ARE OF STAINLESS STEEL.
5. ALUMINIUM EXTRUDED LUGGAGE RACK.
6. EXTERIOR PU PAINTING.
7. AIR SPRING BOGIE.
8. 20.32 TONNES AXLE CAPACITY.
9. NO OF PASSENGERS TO SEAT (II CLASS)–96.
10. ~~THIS FORMATION IS MEANT FOR PARTIAL AIR CONDITIONED RAKE.~~

FAN
ALARM PUSH BUTTON
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: EMU2/TC2/AC–9–0–001–Alt:a	

LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU C COACH (WITH MEDHA ELECTRICS)

SCALE	1:50 1:20	SSE/D	
		CHD	
		ALTD	Jagadeeshwar
		DRN	A.V.V.Srinivas

Alpha Alt:– b

ASSEMBLY DRAWINGS		
0 Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME
	10–2019	26–11–2018	

DATA CODE NO. 807 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1

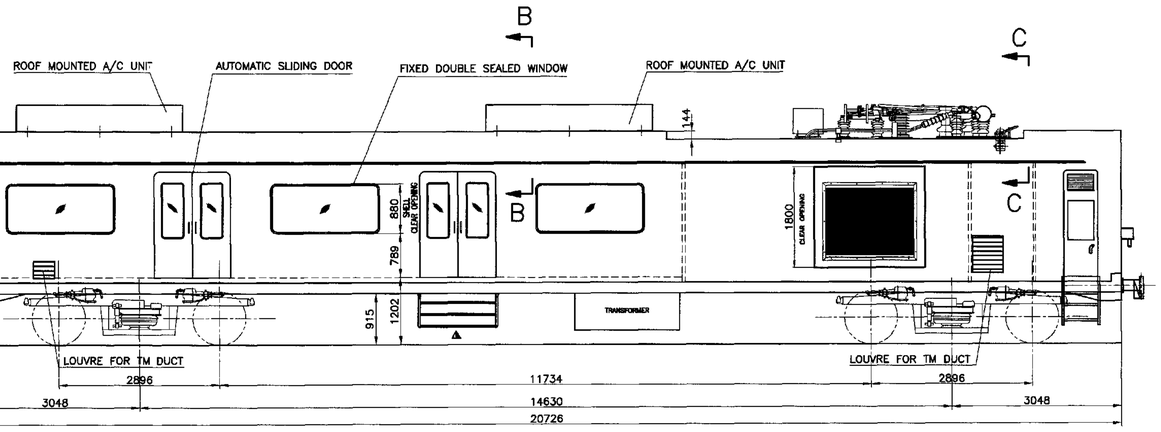
INTEGRAL COACH FACTORY CHENNAI–38

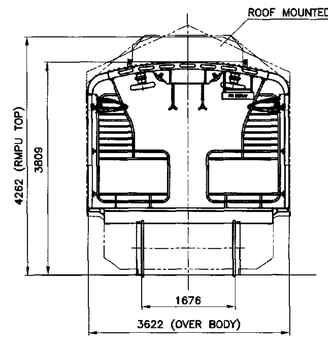
EMU2/TC2/AC–9–0–001

FORM:–IR.A1–840X600

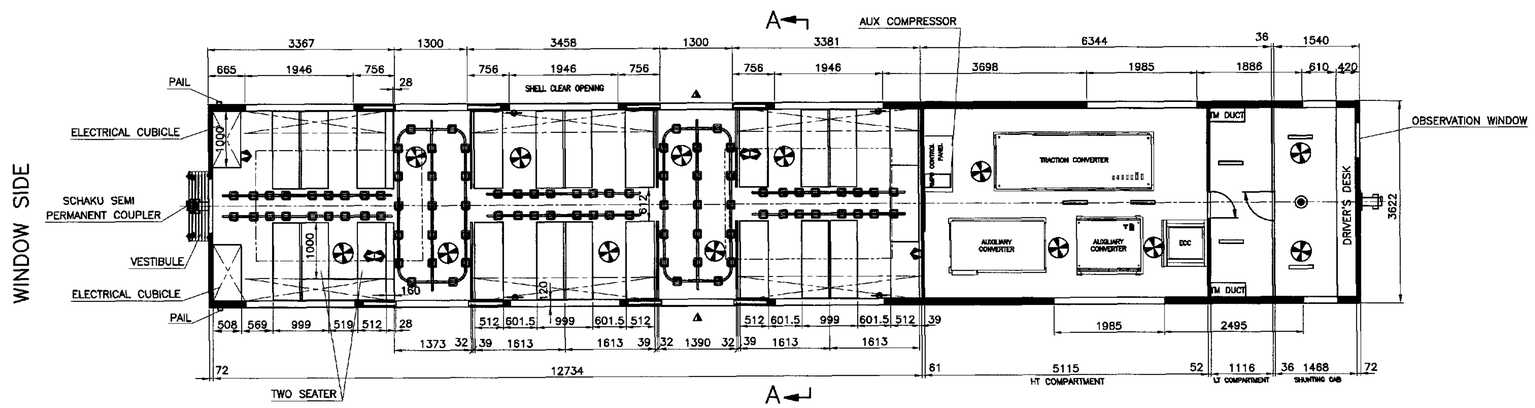
EMU2/NDMC/AC-9-0-001

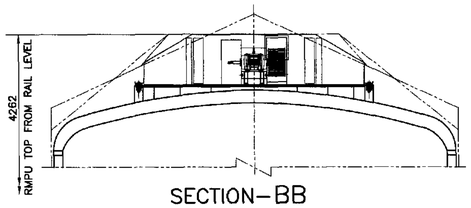
ALTERATIONS
ⓐ 12/2018
LAYOUT REVISED.
sd/- SSE/D sd/- SME/D
ⓑ 10/2019
KEY DIAGRAM ADDED FOR PARTIAL AC COACHES. NOTE-10 DELETED.
SSE/D SME/D



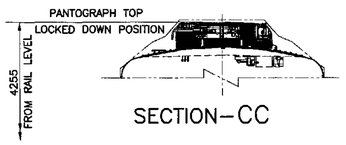


SECTION–AA





SECTION–BB



SECTION–CC

NOTE:

1. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
2. FRP INTERIOR PANELS FOR SIDEWALL, ENDWALL & ROOF.
3. RUBBER FLOOR COVERING.
4. TUBULAR PARTITIONS, SEATS, HAND HOLDS AND GRAB POLES ARE OF STAINLESS STEEL.
5. ALUMINIUM EXTRUDED LUGGAGE RACK.
6. EXTERIOR PU PAINTING.
7. AIR SPRING BOGIE.
8. 20.32 TONNES AXLE CAPACITY.
9. NO OF PASSENGERS TO SEAT (II CLASS)–65.
10. ~~THIS FORMATION IS MEANT FOR PARTIAL AIR CONDITIONED RAKE.~~

FAN
ALARM PUSH BUTTON
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

				ASSEMBLY DRAWINGS	
0	Num. Alt.	18-10-19 DATE OF LATEST ALT	22-11-2018 DATE OF FIRST ISSUE		AME/SME

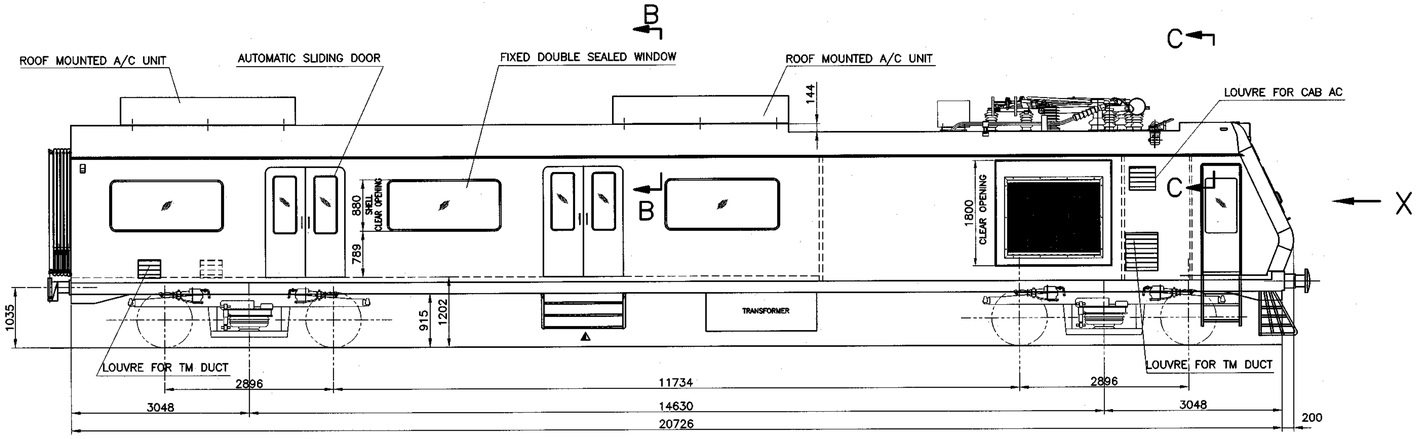
QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
	LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU NON DRIVING MOTOR COACH (WITH MEDHA ELECTRICS)				SUPERSEDES: EMU2/NDMC/AC-9-0-001 Alt: a	
					SCALE 1:50 1:20	SSE/D
						CHD
						ALTD Jagadeeshwar
						DRN A.V.V.Srinivas
					Alpha Alt:- b	
	DATA CODE NO. 808	INDIAN RAILWAY STANDARDS			SHEET 1 OF 1	INTEGRAL COACH FACTORY CHENNAI-38
						EMU2/NDMC/AC-9-0-001

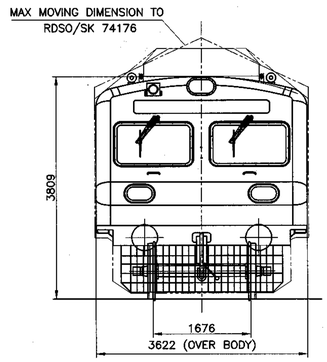
FORM:-IR.A1-840X600

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

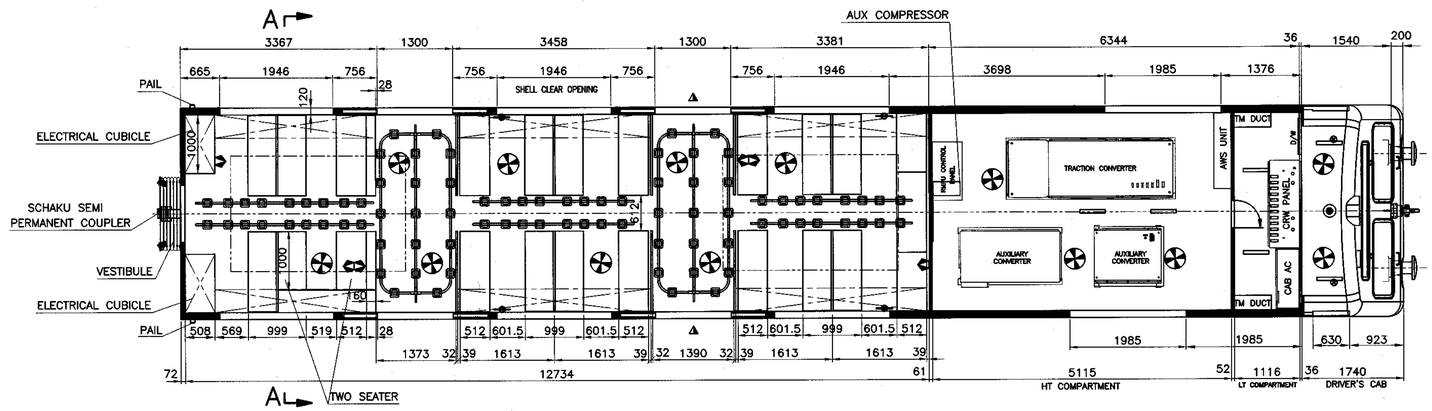
EMU2/DMC2/AC-9-0-001

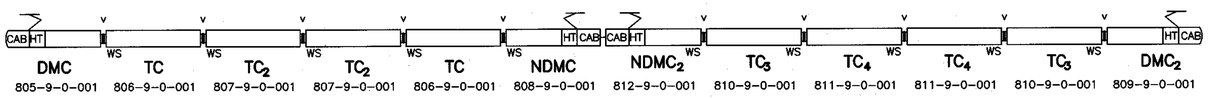
ALTERATIONS



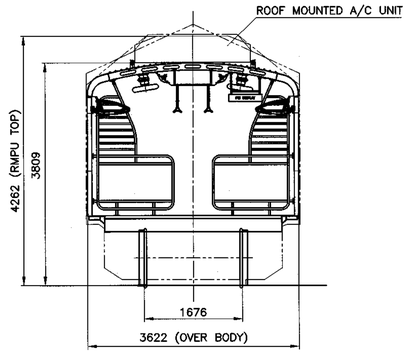


VIEW FROM–X

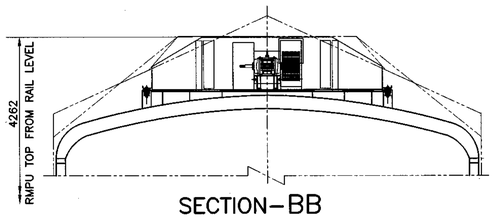




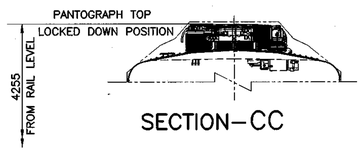
● 12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT (WITH VESTIBULE)



SECTION–AA



SECTION–BB



SECTION–CC

NOTE:

1. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
2. FRP INTERIOR PANELS FOR SIDEWALL, ENDWALL & ROOF.
3. RUBBER FLOOR COVERING.
4. TUBULAR PARTITIONS, SEATS, HAND HOLDS AND GRAB POLES ARE OF STAINLESS STEEL.
5. ALUMINIUM EXTRUDED LUGGAGE RACK.
6. EXTERIOR PU PAINTING.
7. AIR SPRING BOGIE.
8. 20.32 TONNES AXLE CAPACITY.
9. NO OF PASSENGERS TO SEAT (II CLASS)–65.
10. ● THIS FORMATION IS MEANT FOR PARTIAL AIR CONDITIONED RAKE.

FAN
ALARM PUSH BUTTON
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:	

LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU DRIVING MOTOR COACH (WITH MEDHA ELECTRICS)

SCALE	SSE/D	
1:50 1:20	CHD	
	ALTD	
	DRN	A.V.V.Srinivas

Alpha Alt:– –

INTEGRAL COACH FACTORY CHENNAI–38

0	Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	ASSEMBLY DRAWINGS AME/SME
			19–12–2018	

DATA CODE NO. 809 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1 — EMU2/DMC2/AC–9–0–001

FORM:–IR.A1–840X600

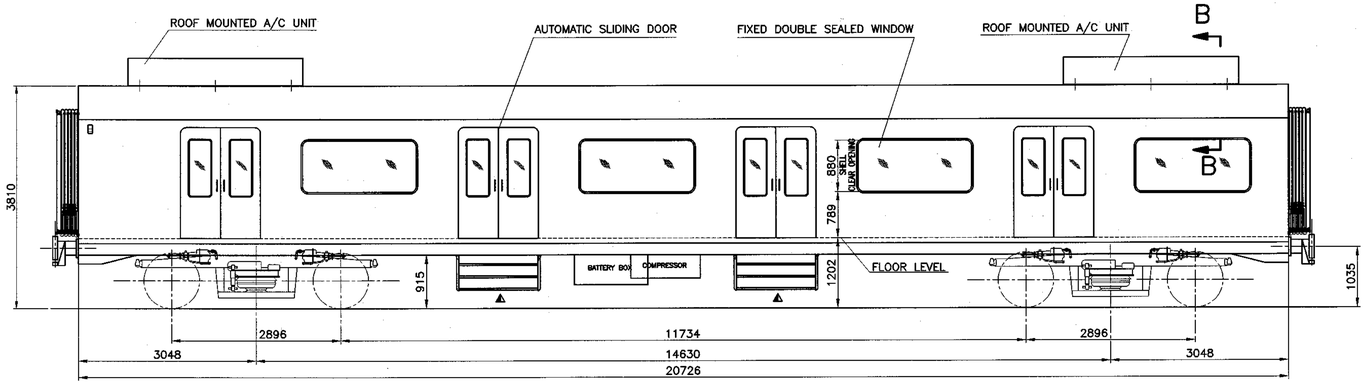
5059

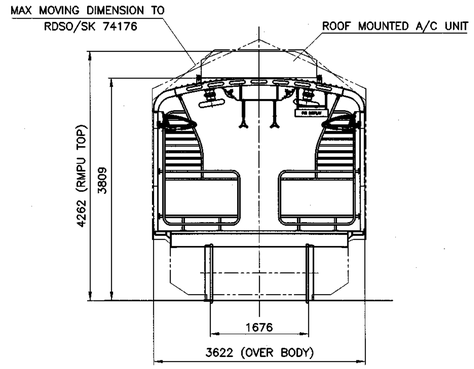
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

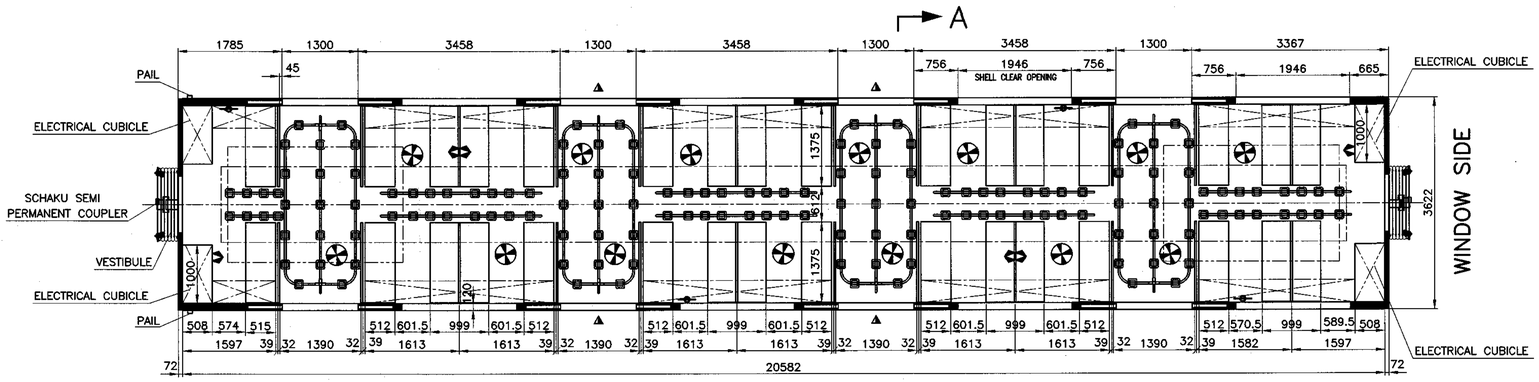
EMU2/TC3/AC-9-0-001

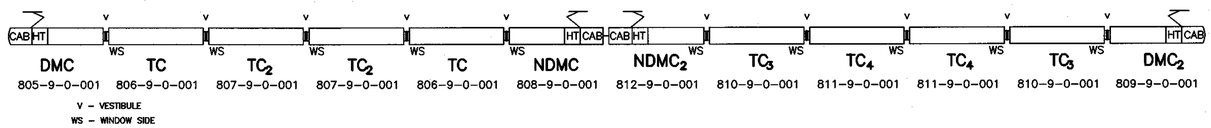
ALTERATIONS

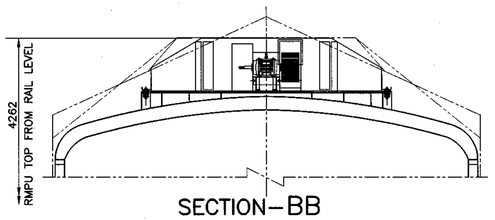




SECTION–AA







SECTION–BB

⓪ 12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT (WITH VESTIBULE)

NOTE:

1. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
2. FRP INTERIOR PANELS FOR SIDEWALL, ENDWALL & ROOF.
3. RUBBER FLOOR COVERING.
4. TUBULAR PARTITIONS, SEATS, HAND HOLDS AND GRAB POLES ARE OF STAINLESS STEEL.
5. ALUMINIUM EXTRUDED LUGGAGE RACK.
6. EXTERIOR PU PAINTING.
7. AIR SPRING BOGIE.
8. 20.32 TONNES AXLE CAPACITY.
9. NO OF PASSENGERS TO SEAT (II CLASS)–96.
10. ⓪ THIS FORMATION IS MEANT FOR PARTIAL AIR CONDITIONED RAKE.

FAN
ALARM PUSH BUTTON
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
	LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU C COACH (WITH MEDHA ELECTRICS)				SUPERSEDES:	

SCALE		
1:50 1:20	SSE/D	
	CHD	
	ALTD	
	DRN	A.V.V.Srinivas

Alpha Alt:--

INTEGRAL COACH FACTORY CHENNAI–38

ASSEMBLY DRAWINGS					
			19–12–2018		
0	Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME	

DATA CODE NO. 810 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1

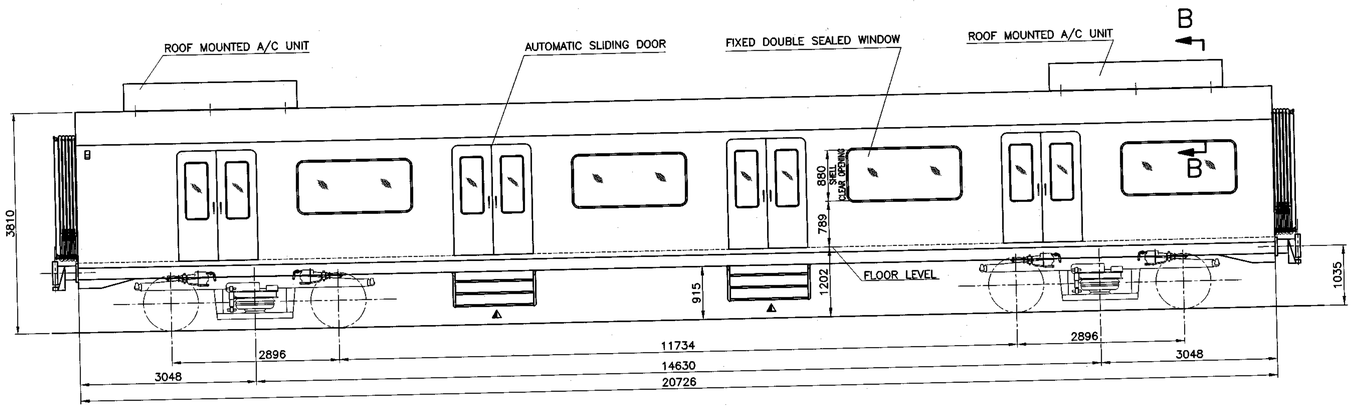
EMU2/TC3/AC-9-0-001

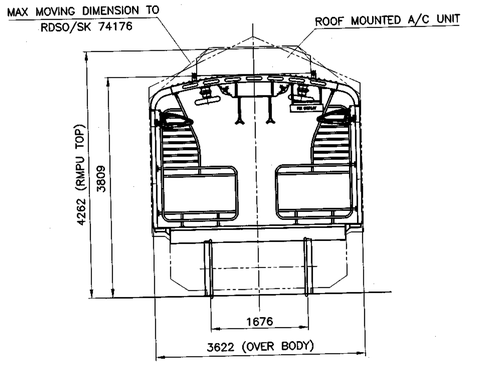
FORM:–IR.A1–840X600

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

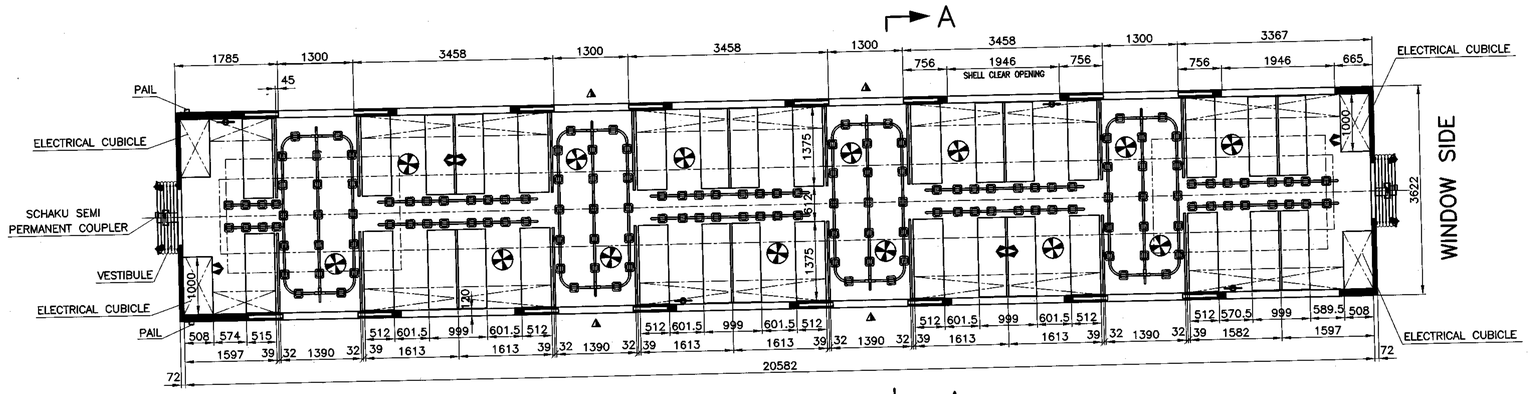
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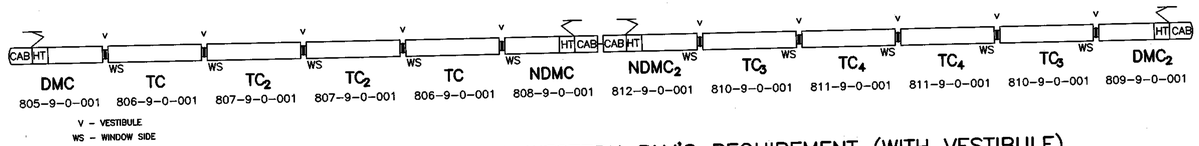
ALTERATIONS



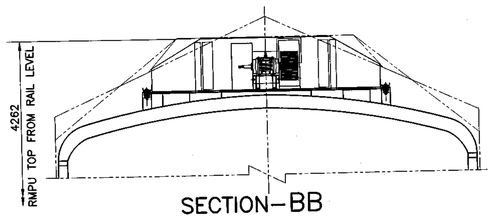


SECTION–AA





● 12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT (WITH VESTIBULE)



SECTION–BB

NOTE:

1. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
2. FRP INTERIOR PANELS FOR SIDEWALL, ENDWALL & ROOF.
3. RUBBER FLOOR COVERING.
4. TUBULAR PARTITIONS, SEATS, HAND HOLDS AND GRAB POLES ARE OF STAINLESS STEEL.
5. ALUMINIUM EXTRUDED LUGGAGE RACK.
6. EXTERIOR PU PAINTING.
7. AIR SPRING BOGIE.
8. 20.32 TONNES AXLE CAPACITY.
9. NO OF PASSENGERS TO SEAT (II CLASS)–96.
10. THIS FORMATION IS MEANT FOR PARTIAL AIR CONDITIONED RAKE.

FAN
ALARM PUSH BUTTON
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:	

LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU C COACH (WITH MEDHA ELECTRICS)

SCALE 1:50 1:20	SSE/D	
	CHD	
	ALTD	
	DRN	A.V.V.Srinivas

Alpha Alt:– –

INTEGRAL COACH FACTORY CHENNAI–38

		ASSEMBLY DRAWINGS		DATA CODE NO. 811	INDIAN RAILWAY STANDARDS
0	Num. Alt.	19–12–2018	N.K. 19/12/18		SHEET 1 OF 1
	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME		EMU2/TC4/AC-9-0-001

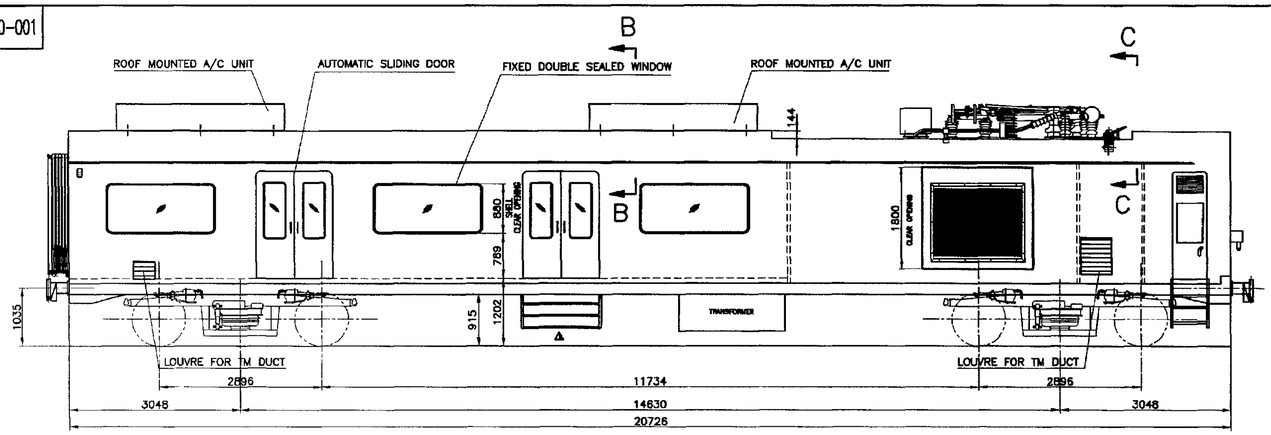
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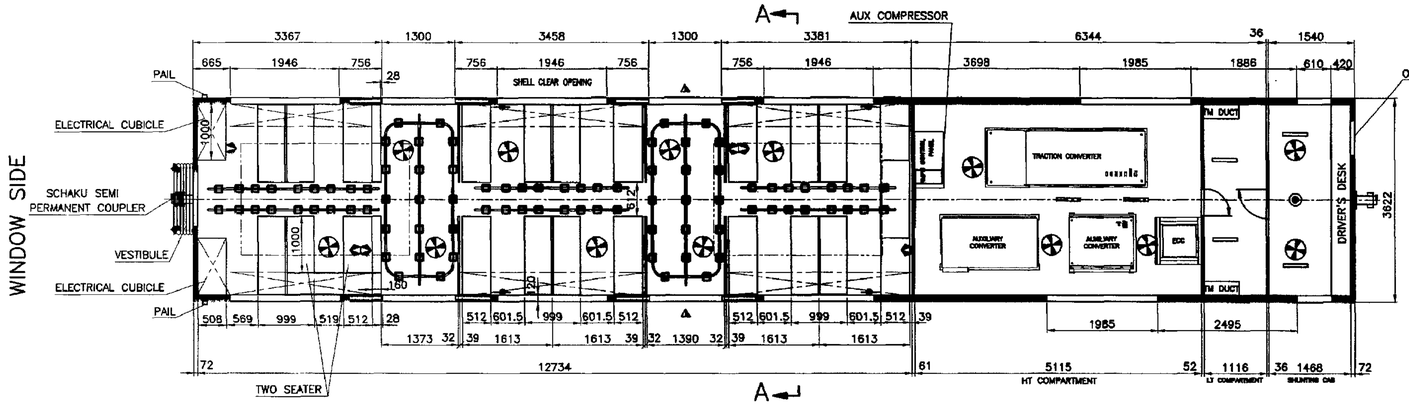
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

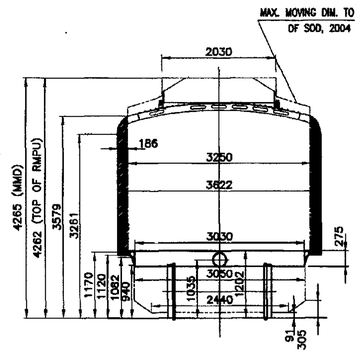
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EMU2/NDMC2/AC-9-0-001

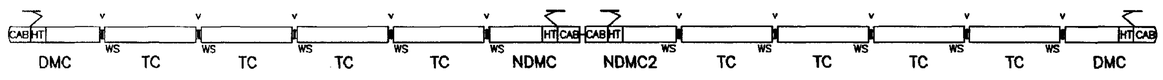




SECTION–AA

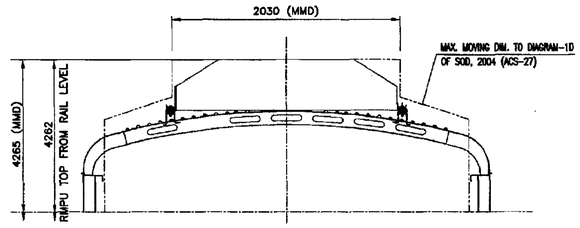


(WITH MMD TO DIAGRAM 1D OF IR SOD 2004 (ACS-27)

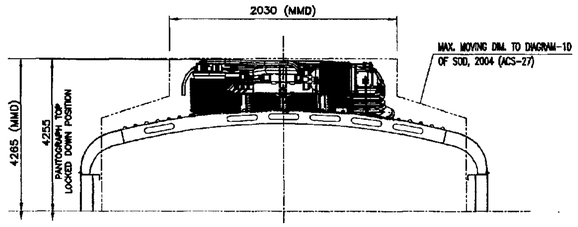


V– VESTIBULE
WS– WINDOW SIDE

AIR CONDITIONED 12 COACH FORMATION



SECTION–BB



SECTION–CC

NOTE:

1. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
2. FRP INTERIOR PANELS FOR SIDEWALL, ENDWALL & ROOF.
3. RUBBER FLOOR COVERING.
4. TUBULAR PARTITIONS, SEATS, HAND HOLDS AND GRAB POLES ARE OF STAINLESS STEEL.
5. ALUMINIUM EXTRUDED LUGGAGE RACK.
6. EXTERIOR PU PAINTING.
7. AIR SPRING BOGIE.
8. 20.32 TONNES AXLE CAPACITY.
9. NO OF PASSENGERS TO SEAT (II CLASS) – 65.+1(MOTOR MAN)
10. STANDING PASSENGER - - - - - - - 258.

FAN
ALARM PUSH BUTTON
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

ALTERATIONS		
ⓐ	06/2019 WEIGHT DETAILS ADDED.	sd/– SSE/D, sd/– SME/D
ⓑ	10/2019 KEY DIAGRAM REVISED. MMD ACS–27 ADDED.	sd/– SSE/D, sd/– SME/D
ⓒ	11/2019 LAYOUT REVISED. KEY DIAGRAM CORRECTED FOR HTC, DTC AND MC COACHES.	sd/– SSE/D, sd/– SME/D
ⓓ	10/2022 KEY DIAGRAM REVISED.	sd/– SSE/D, sd/– AME/D
ⓔ	04/2023 NOTE-9 REVISED. NOTE-10 ADDED.	SSE/D, AME/D

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
1	GROUP: 9				SUPERSEDED BY:	
					SUPERSEDES: EMU2/NDMC2/AC-9-0-001 Rd/-	

LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU NON DRIVING MOTOR COACH

SCALE	1:50 1:20
SSE/D	
CHD	
ALTD	B.K.Thivakar Lakshman
DRN	A.V.V.Srinivas
Alpha Alt:– ●	

INTEGRAL COACH FACTORY CHENNAI–38

ASSEMBLY DRAWINGS					
0	Num. Alt.	04.04.2023 DATE OF LATEST ALT	12–2018 DATE OF FIRST ISSUE	AME/SME	DATA CODE NO. 812

INDIAN RAILWAY STANDARDS

SHEET 1 OF 1

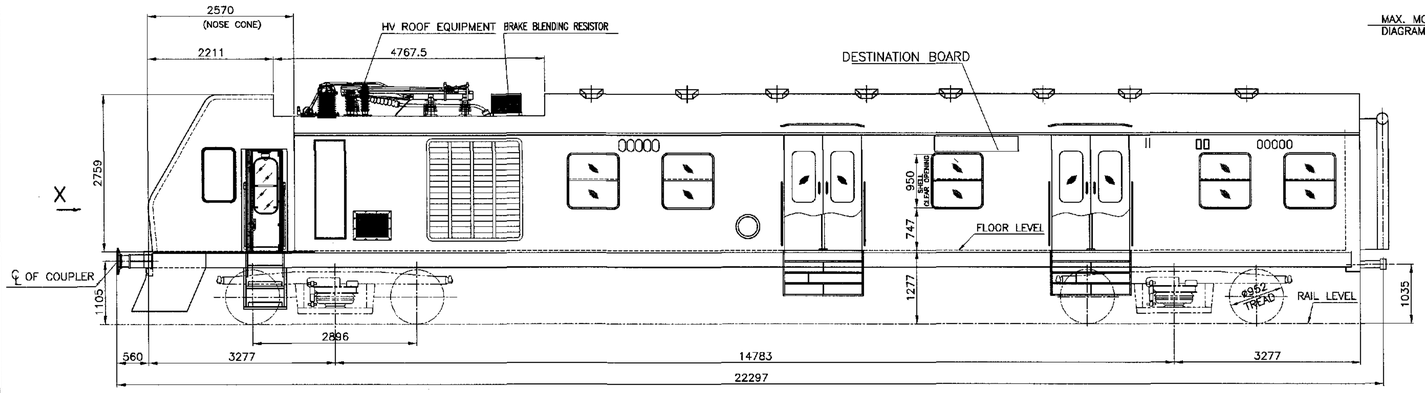
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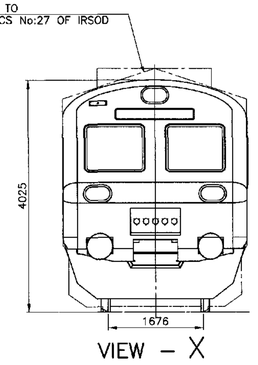
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PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

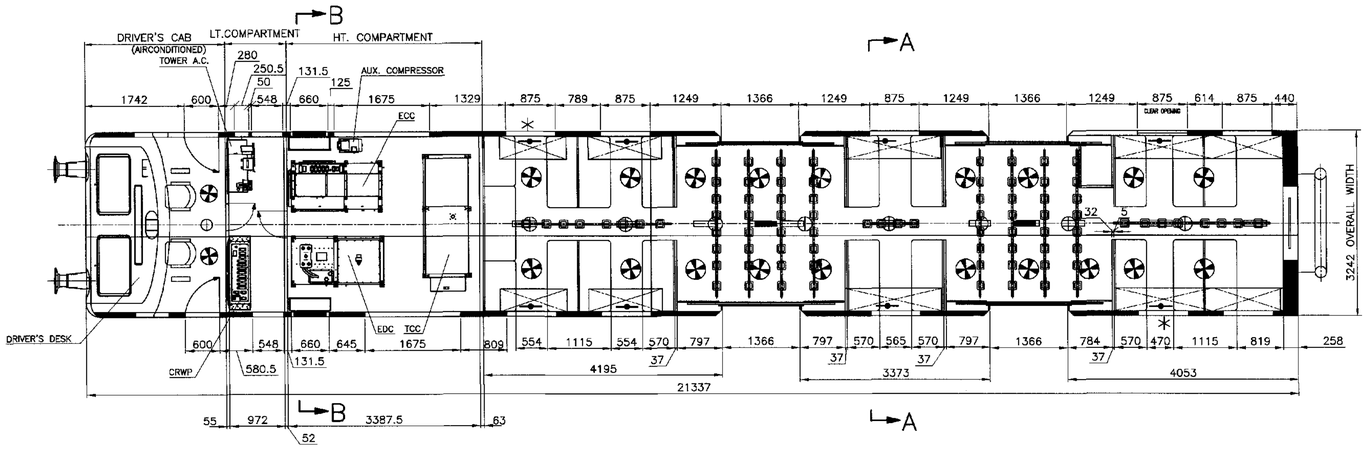
MEMU/DMC3/3PH-9-0-001

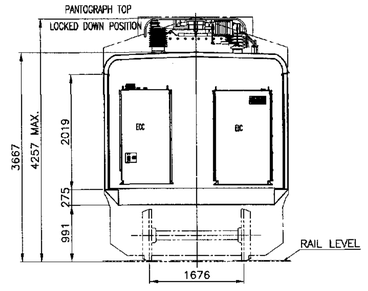
▽ ROUGH MACHINED	⓪1 ROUGH CLEANING	ALTERATIONS
▽▽ FINISH MACHINED		⓪ 12/2019
▽▽▽ FINE FINISH MACHINED		FORMATION REVISED.
		SSE/D AME/D



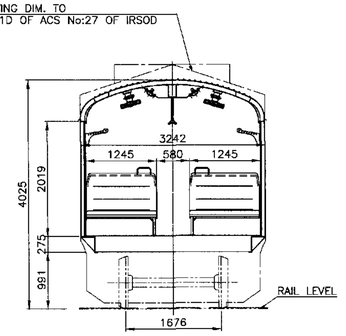


VIEW – X

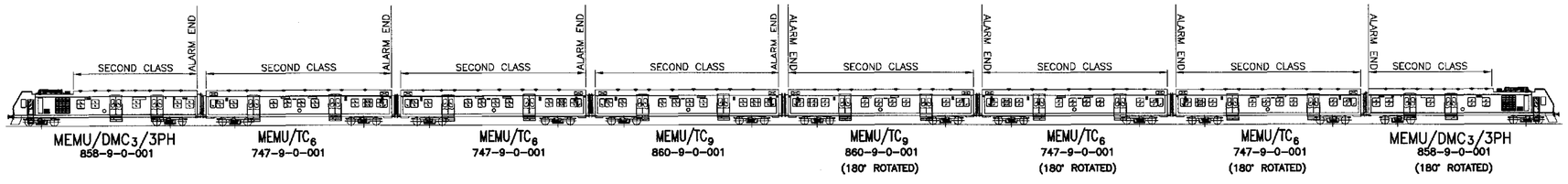




SECTION–BB



SECTION–AA



NOTE:

1) THIS LAYOUT IS BASED ON MEMU/DMC3-9-0-301 ALT 'c/-'.

* EMERGENCY WINDOW
RAILWAY CREST
RAILWAY INITIALS
00000 COACH NUMBER
FAN
LED LIGHT
EMERGENCY LIGHT
ALARM PULL
VENTILATORS

PASSENGERS TO SEAT ——— 55
NO.OF STANDING PASSENGERS — 171
NO.OF DOORS ASIDE ——— 2
PASSENGERS PER DOOR ASIDE — 113
AXLE LOAD CAPACITY ——— 20.32 tonnes

		ASSEMBLY DRAWINGS		
0 Num. Alt.	05-12-19 DATE OF LATEST ALT	03-09-2019 DATE OF FIRST ISSUE	AME/SME	

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC
1	GROUP: 9-0			

LAYOUT OF MEMU/DMC3 (3 PHASE) WITH BOMBARDIER TRANSPORT ELECTRICS

DATA CODE NO. 858

INDIAN RAILWAY STANDARDS

SHEET 1 OF 1

WEIGHT/UNIT	REMARKS
SUPERSEDED BY:	
SUPERSEDES:	MEMU/DMC3/3PH-9-0-001 ALT:-/-
SCALE 1:50	SSE/D HARIHARAN T
	CHD
	ALTD SURESH KUMAR.S
	DRN SARAVANAN B
Alpha Alt:- c	

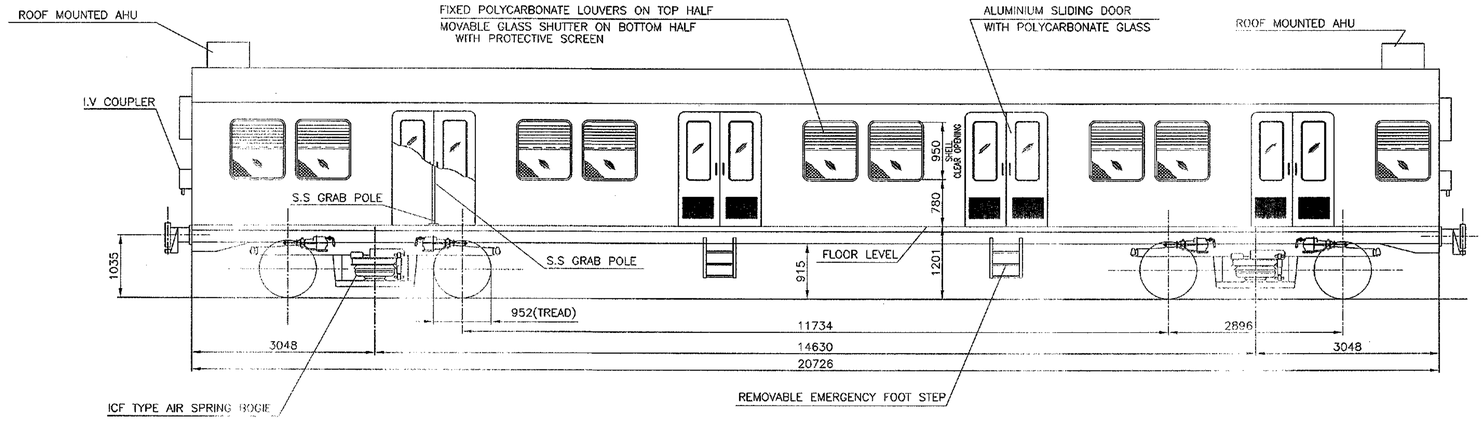
INTEGRAL COACH FACTORY CHENNAI-38

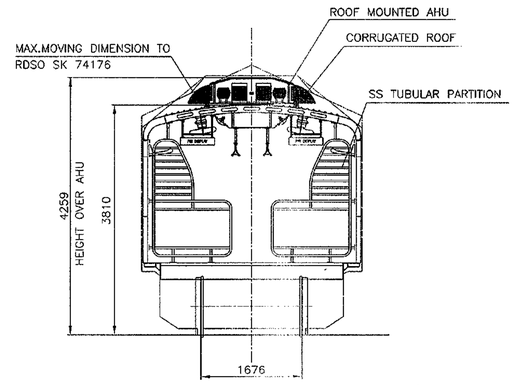
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FORM:-IR.A1-840X600

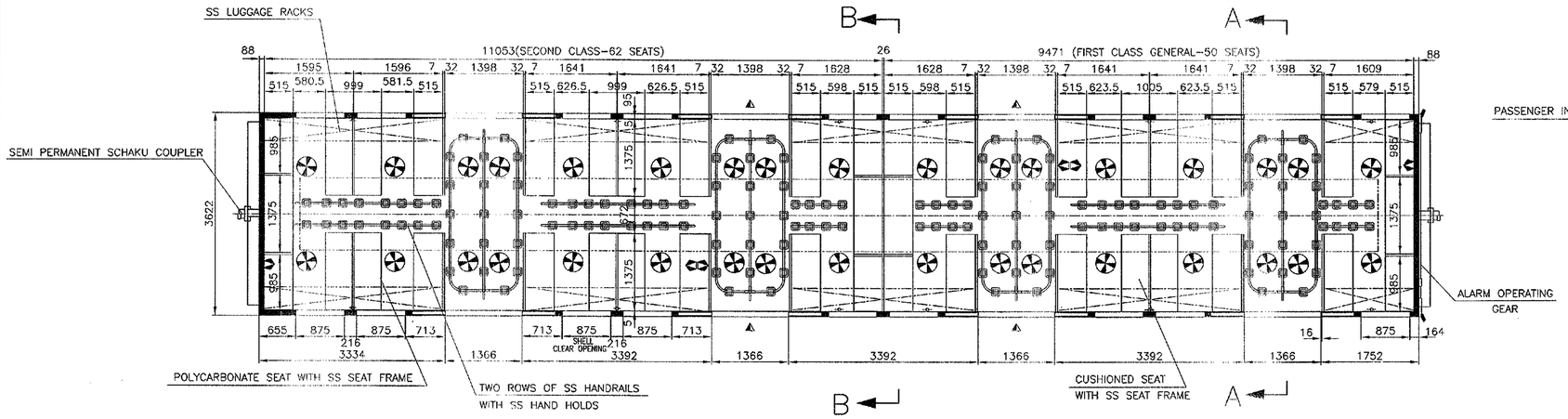
ICF/MRVC2/C-9-0-001

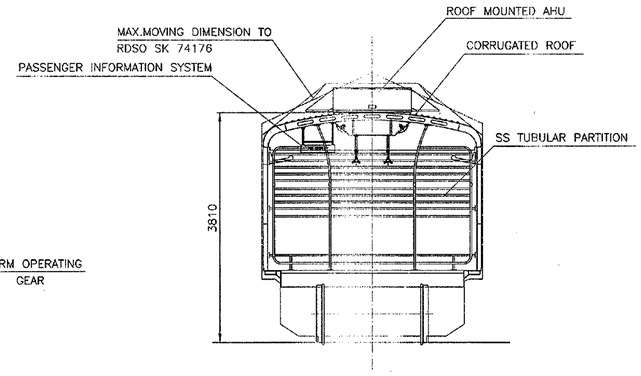
ALTERATIONS	
ⓐ 08/2012	LAYOUT REVISED. Sd/- SSE/D Sd/- SME/DSS
ⓑ 01/2013	TITLE REVISED. Sd/- SSE/D Sd/- SME/DSS
ⓒ 08/2013	SECTION-AA REVSD. NOTE-3 & 4 REVSD. HEIGHT OVER AHU ADDED. Sd/- SSE/D Sd/- SME/DSS
ⓓ 01/2014	SEAT WIDTH REVISED. NO. OF STANDING PASSENGERS REVSD. SSE/D SME/DSS



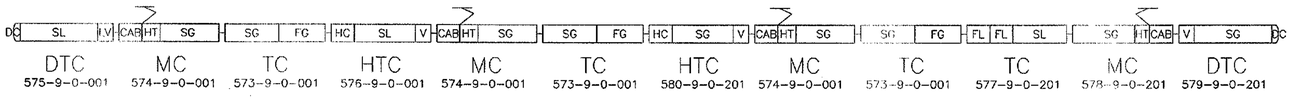


SECTION-AA





SECTION-BB



12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT

1. BOGIE ---------- AIR SPRING BOGIE
2. AXLE CAPACITY ---------- 20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

I CLASS GENERAL	50
II CLASS	62
TOTAL SEATING CAPACITY	112

4. SEATED PASSENGER LOAD (112X60kg) ---------- 6.72 TONNES
5. ADDL, STANDING PASSENGER LOAD(SDCL-451x60kg) ---- 27.06 TONNES

TOTAL PAY LOAD ---------- 33.78 TONNES

6. TARE WEIGHT ---------- 37 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. POLYCARBONATE SEATS.
6. SS CHEQUERED SHEET SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
					SUPERSEDES: ICF/MRVC2/C-9-0-001 ALT c/-	

LAYOUT OF 3 PHASE AC EMU TRAILER 'C' COACH (W.RLY.) FOR MRVC -- PHASE II

SCALE 1:50	
SSE/D	
CHD	
ALTD	N.Shanmugavel
DRN	N.Shanmugavel

Alpha Alt:- d

INTEGRAL COACH FACTORY CHENNAI-38

Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME
0	11.01.2014	14-07-2012	

ASSEMBLY DRAWINGS

DATA CODE NO. 573

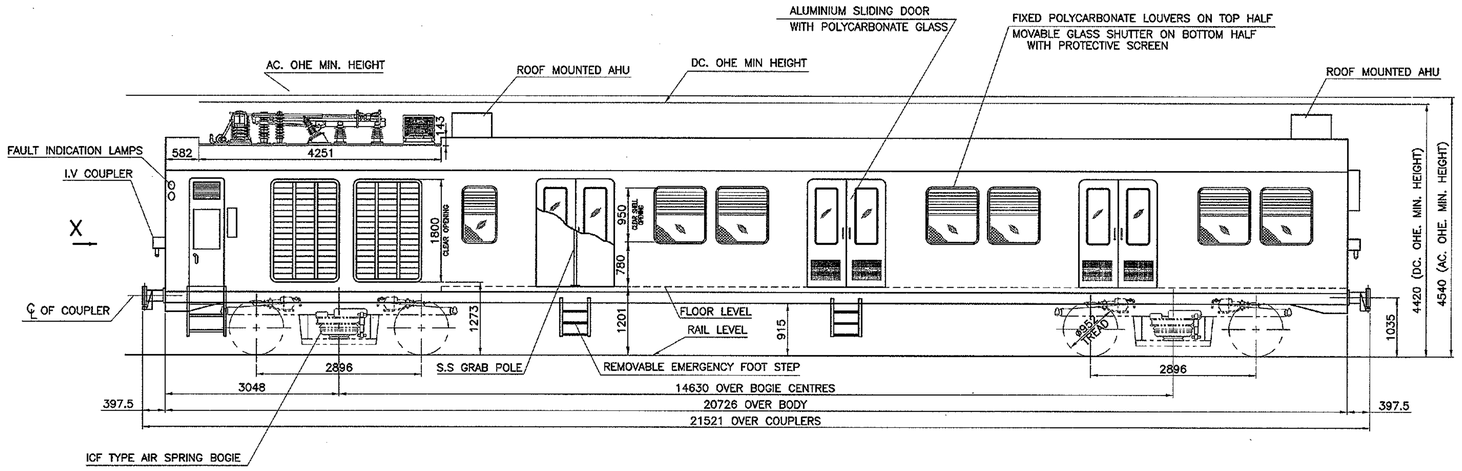
INDIAN RAILWAY STANDARDS

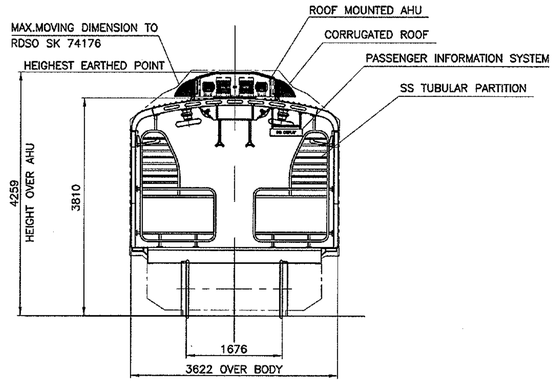
SHEET 1 OF 1

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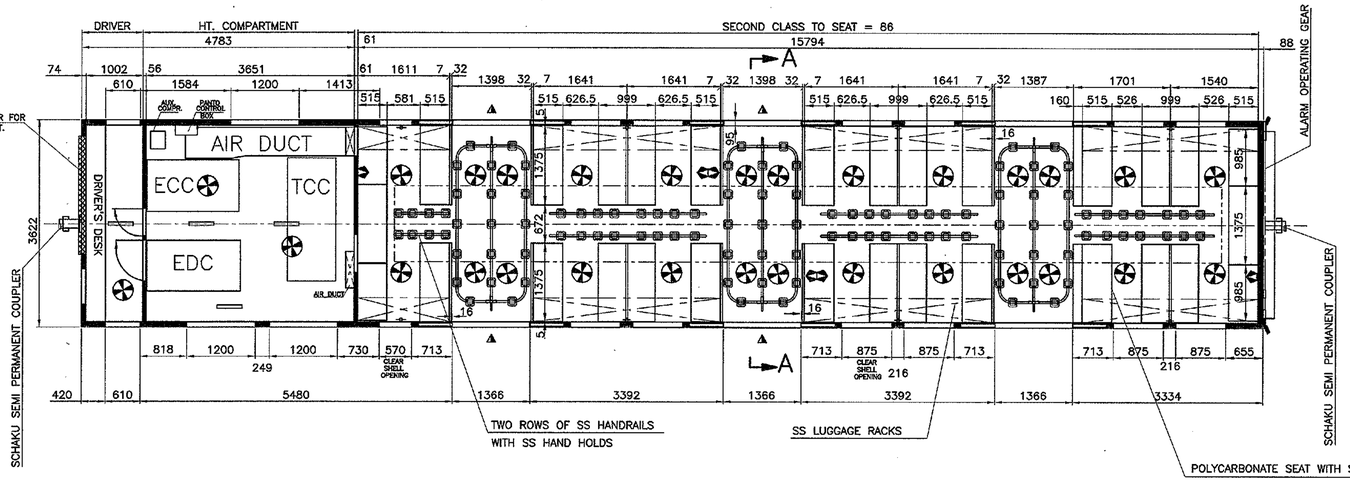
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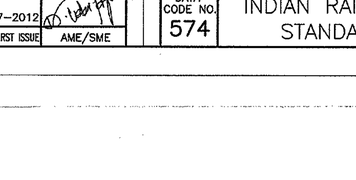
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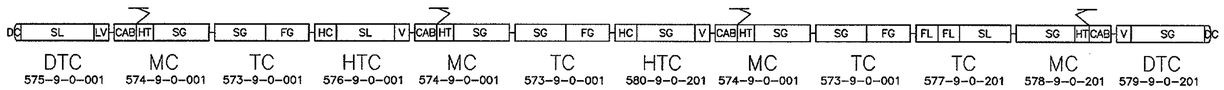


SECTION–AA





VIEW – X



12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT----------86
4. SEATED PASSENGER LOAD (86x60kg ----------5.16 TONNES
5. ADDL, STANDING PASSENGER LOAD(SDCL–352x60kg) –21.12 TONNES
   TOTAL PAY LOAD ------26.28 TONNES
6. TARE WEIGHT ---------- 53.5 TONNES (APPROX.)

- FAN
- EMERGENCY LIGHT
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- FLUORESCENT LIGHT

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. POLYCARBONATE SEATS.
6. SS CHEQUERED SHEET SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. EQUIVALENT DRAWING DESCRIPTION IS ICF/MRVC/M/BT.

ALTERATIONS

ⓐ 08/12
LAYOUT REVISED.
Sd/– SSE/D | Sd/– SME/DSS

ⓑ 01/2013
TITLE REVISED.
Sd/– SSE/D | Sd/– SME/DSS

ⓒ 08/2013
SECTION–AA REVSD.
NOTE–3 & 4 REVSD.
HEIGHT OVER AHU ADDED.
Sd/– SSE/D | Sd/– SME/DSS

ⓓ 01/2014
SEAT WIDTH REVISED. NO. OF STANDING PASSENGERS REVSD.
Sd/– SSE/D | Sd/– SME/DSS

ⓔ 08/2014
HEIGHT OF PANTOGRAPH LOCKED DOWN POSITION FROM RAIL LEVEL REVISED. DISHED ROOF HEIGHT REVSD. FROM 112MM TO 142MM.
Sd/– SSE/D | Sd/– SME/DSS

ⓕ 01/2015
AC OHE MIN HEIGHT REVSD FROM 4650MM TO 4540MM AS PER ACS NO.10 RSOD–2004 PARA–2, NOTE(b) OF CHAPTER –V(A). HIGHEST EARTHED POINT SHOWN IN SECTION–AA.
Sd/– SSE/D | Sd/– SME/DSS

ⓖ 08/2017
9 COACH FORMATION AND NOTE–10 ADDED.
SSE/D | SME/DSS

0	Num. Alt.	ASSEMBLY DRAWINGS		
		03–08–2017	24–07–2012	AME/SME
		DATE OF LATEST ALT	DATE OF FIRST ISSUE	

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: ICF/MRVC2/M-9-0-001, Alt/–	

LAYOUT OF 3 PHASE AC EMU
MOTOR COACH
FOR MRVC – PHASE II

SCALE 1:50	SSE/D	
	CHD	
	ALTD	SURESH KUMAR.S
	DRN	N.Shanmugavel

Alpha Alt:– g

DATA CODE NO. 574 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1

INTEGRAL COACH FACTORY CHENNAI–38

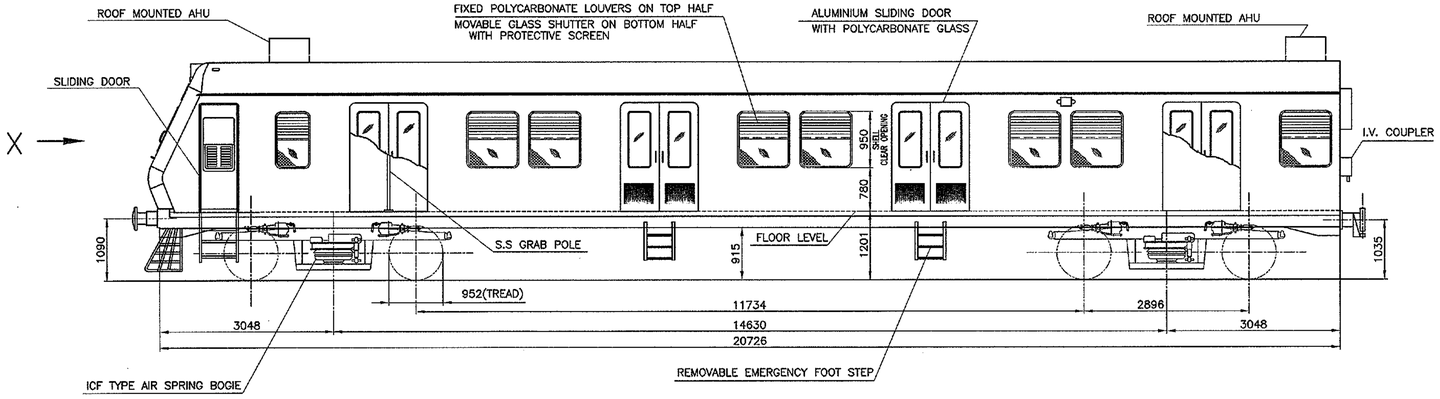
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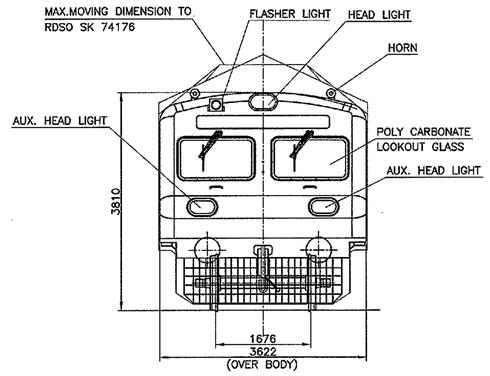
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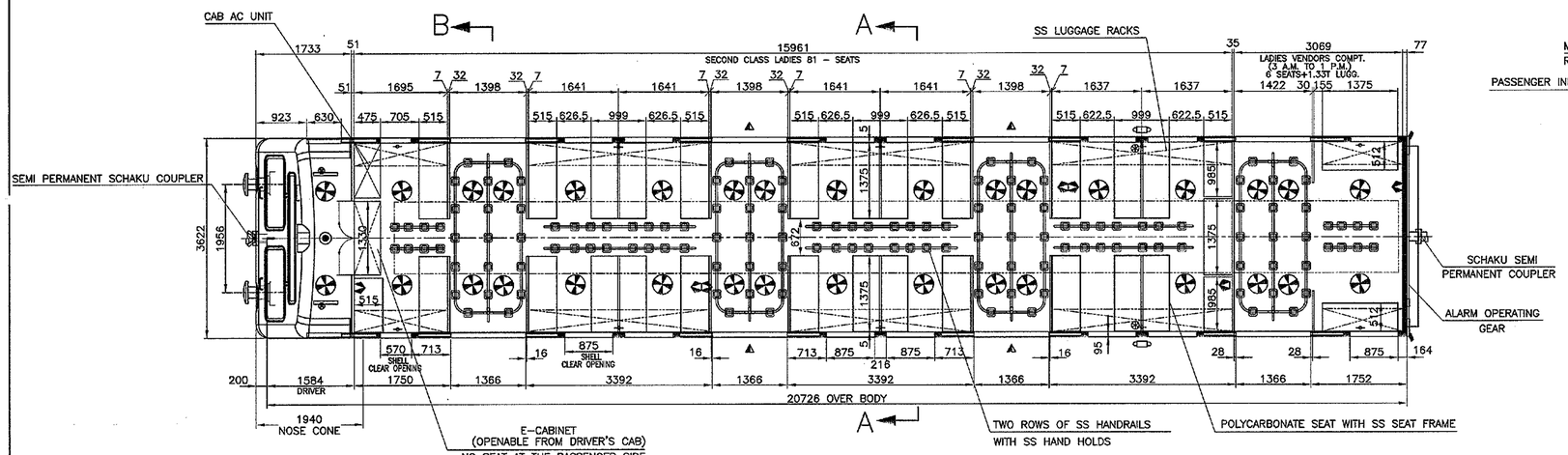
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PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

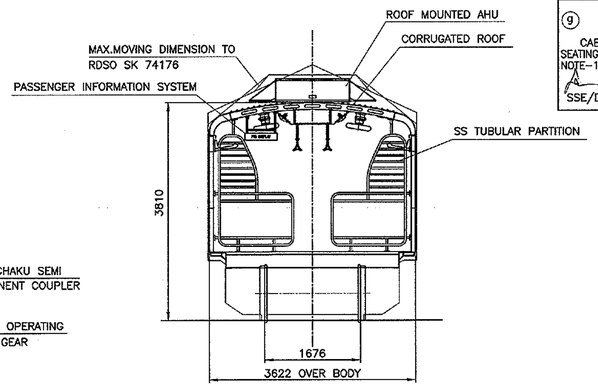
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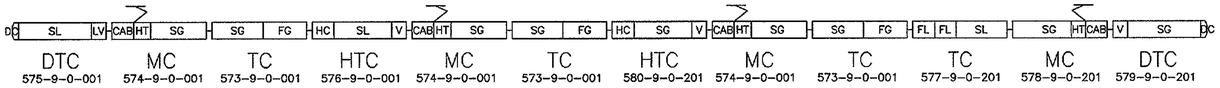


VIEW FROM–X

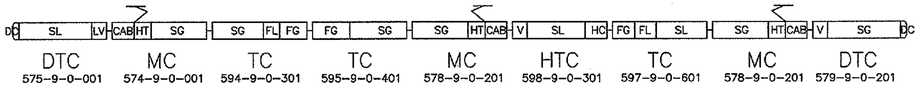




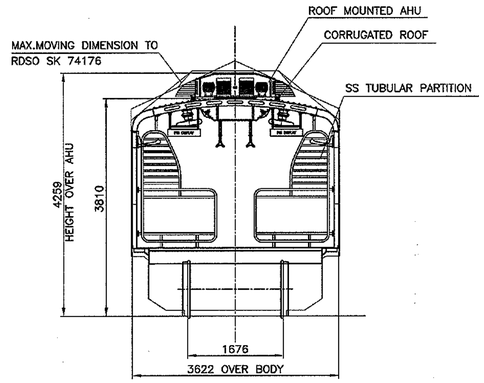
SECTION–AA



12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



SECTION–BB

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT
   - II CLASS LADIES------ 81
   - LADIES VENDORS COMPT.(3 A.M. TO 1 P.M.)------ 6
   - TOTAL SEATING CAPACITY ---- 87
4. SEATED PASSENGER LOAD (87X60kg) ----------5.22 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL. STANDING PASSENGER LOAD(SDCL-443x60kg)--26.58 TONNES
   - TOTAL PAY LOAD -------33.13 TONNES
7. TARE WEIGHT ---------- 39 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- REMOVABLE EMERGENCY FOOT STEP
- BUZZER
- CAB LIGHT
- PASSENGER ALARM INDICATION LIGHT

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. POLYCARBONATE SEATS.
6. SS CHEQUERED SHEET SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. EQUIVALENT DRAWING DESCRIPTION IS ICF/MRVC/D/BT.
11. CAB AC

ALTERATIONS

ⓐ 08/2012
LAYOUT REVISED.
Sd/- SSE/D Sd/- SME/DSS

ⓑ 09/2012
SEATING CAPACITY REDUCED FROM 91 TO 89.
Sd/- SSE/D Sd/- SME/DSS

ⓒ 01/2013
TITLE REVISED.
Sd/- SSE/D Sd/- SME/DSS

ⓓ 08/2013
SECTION-BB ADDED. NOTE-3 & 4 REVSD. HEIGHT OVER AHU ADDED.
Sd/- SSE/D Sd/- SME/DSS

ⓔ 01/2014
SEAT WIDTH REVISED. NO. OF STANDING PASSENGERS REVSD.
Sd/- SSE/D Sd/- SME/DSS

ⓕ 08/2017
9 COACH FORMATION AND NOTE-10 ADDED.
Sd/- SSE/D Sd/- SME/DSS

ⓖ 09/2017
CAB AC INTRODUCED. SEATING CAPACITY REVISED. NOTE-11 ADDED.
SSE/D SME/DSD

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
					SUPERSEDES:ICF/MRVC/D/BT-9-0-001, Alt/-	

LAYOUT OF 3 PHASE AC EMU DRIVING TRAILER 'D' COACH FOR MRVC–PHASE II

	ASSEMBLY DRAWINGS		
0 Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME
	12-09-2017	18-07-2012	

DATA CODE NO. 575 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1

SCALE 1:50 | SSE/D | CHD | ALTD SURESH KUMAR.S | DRN N.Shanmugavel

Alpha Alt:- g

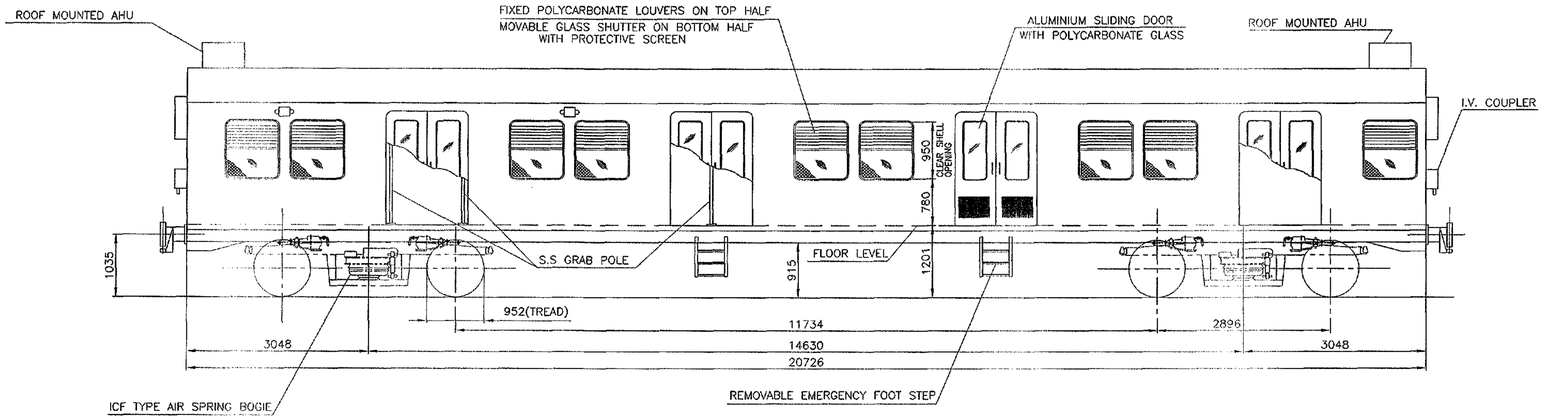
INTEGRAL COACH FACTORY CHENNAI–38

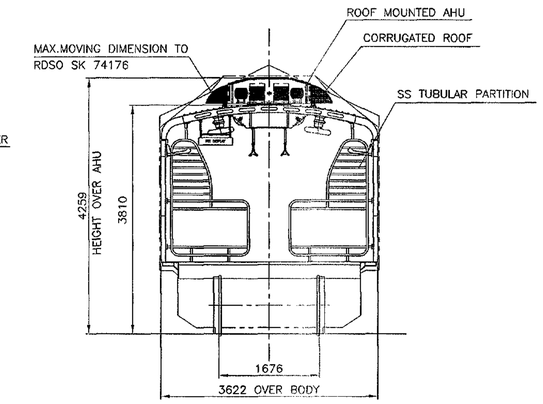
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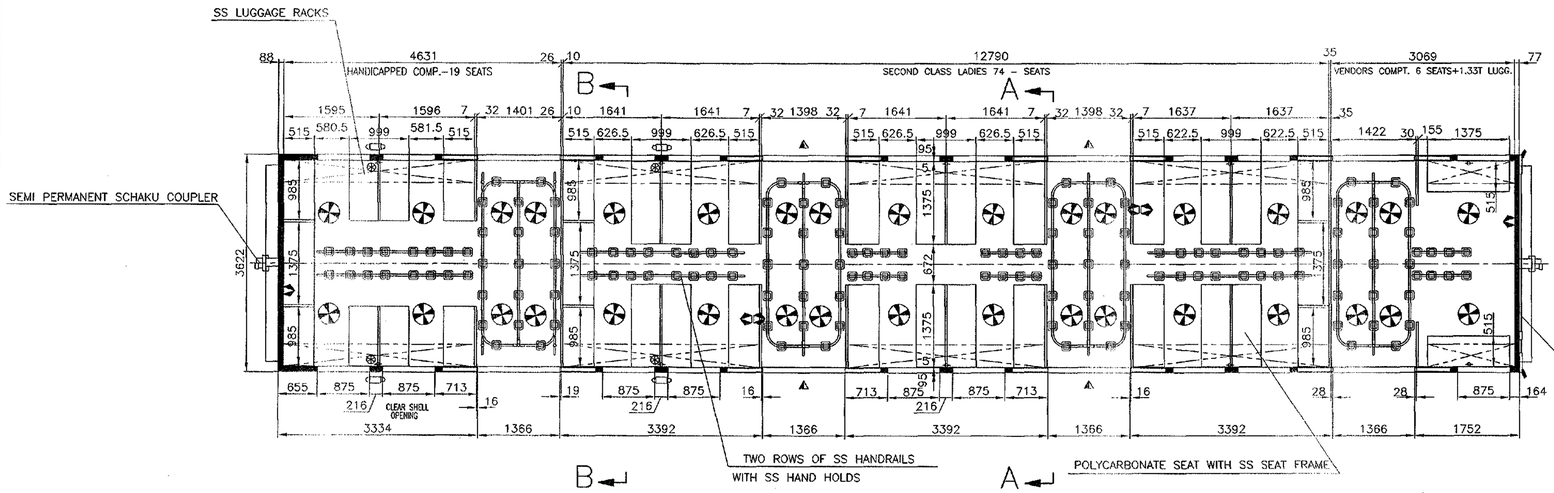
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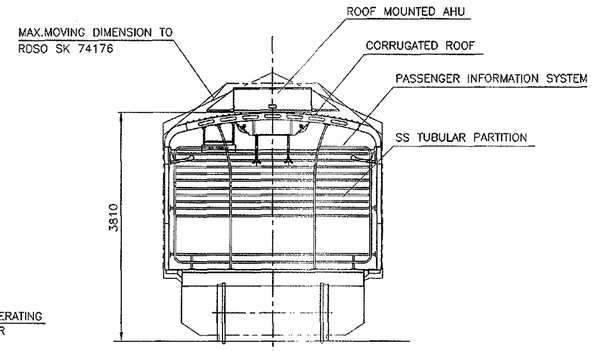
ALTERATIONS
ⓐ 08/2012
LAYOUT REVISED.
Sd/- SSE/D Sd/- SME/DSS
ⓑ 01/2013
TITLE REVISED.
Sd/- SSE/D Sd/- SME/DSS
ⓒ 08/2013
SECTION-AA REVSD. NOTE-3 & 4 REVSD. HEIGHT OVER AHU ADDED.
SSE/D SME/DSS
ⓓ 01/2014
SEAT WIDTH REVISED. NO. OF STANDING PASSENGERS REVSD.
SSE/D SME/DSS



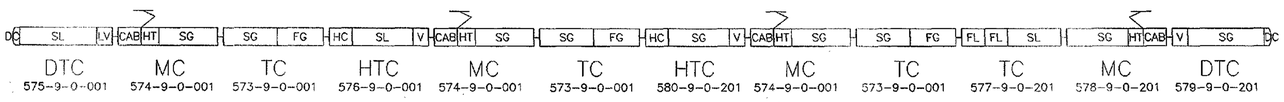


SECTION-AA





SECTION-BB



12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT

FAN
ALARM PULL HANDLE
PASSENGER ALARM INDICATION LIGHT
REMOVABLE EMERGENCY FOOT STEP
BUZZER
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS LADIES--------	74
VENDORS COMPT.--------	6
HANDICAPPED COMPT.----	19
TOTAL SEATING CAPACITY	- 99

4. SEATED PASSENGER LOAD(99X60kg)----------5.94 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL. STANDING PASSENGER LOAD(SDCL-403x60kg)--24.18 TONNES

TOTAL PAY LOAD ------31.45 TONNES

7. TARE WEIGHT ---------- 38 TONNES (APPROX.)

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. POLYCARBONATE SEATS.
6. SS CHEQUERED SHEET SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
					SUPERSEDES: ICF/MRVC2/D/HC-9-0-001 ALT c/-	

LAYOUT OF 3 PHASE AC EMU TRAILER 'D' COACH WITH HANDICAPPED COMPT.(W.RLY.) FOR MRVC-PHASE II

SCALE 1:50	SSE/D	
	CHD	
	ALTD	N.Shanmugavel
	DRN	SURESH 07/12

Alpha Alt:- d

INTEGRAL COACH FACTORY CHENNAI-38

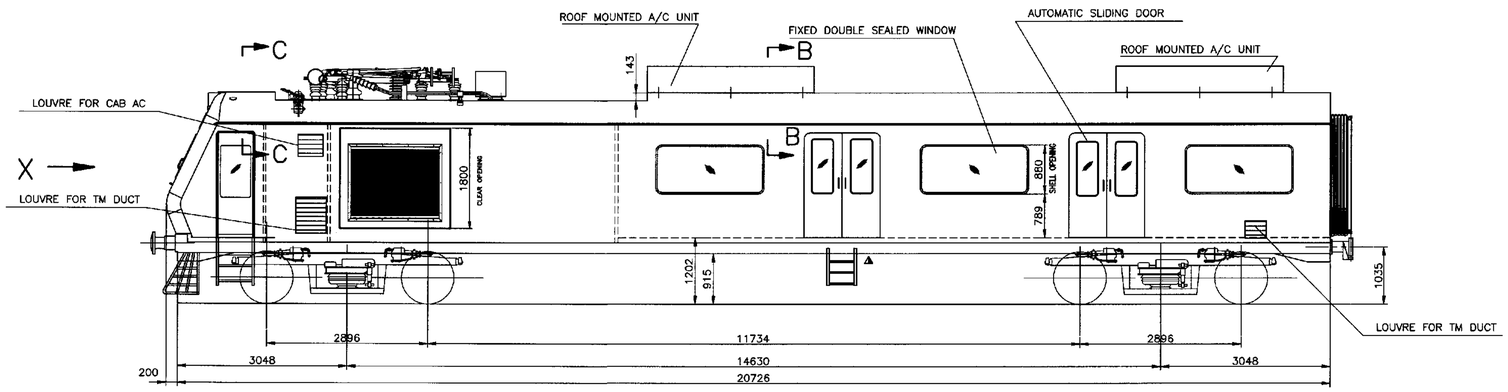
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11.01.2014	14-07-2012	AME/SME	576		1 OF 1
DATE OF LATEST ALT	DATE OF FIRST ISSUE				ICF/MRVC2/D/HC/-9-0-001

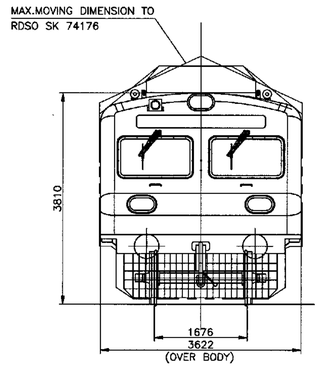
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A1

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

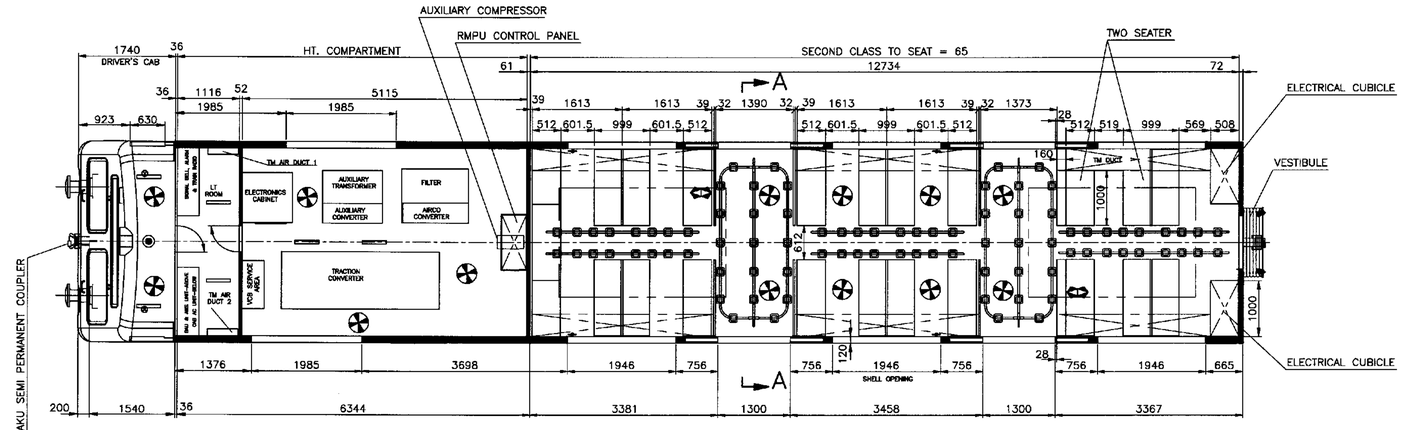
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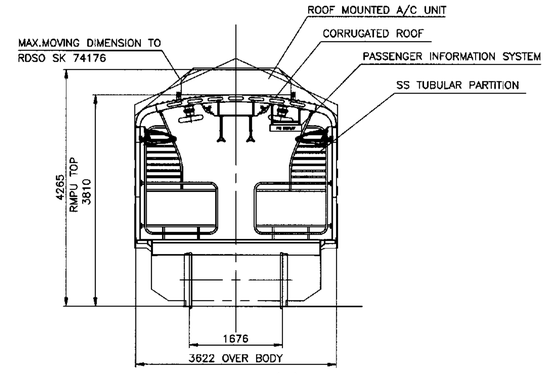




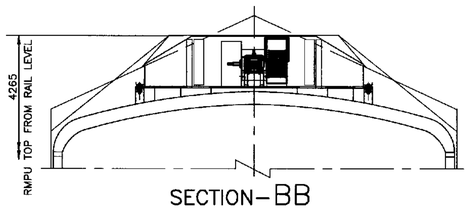
VIEW FROM–X

ALTERATIONS
ⓐ 03/2014 NOTE–10 ADDED. Sd/– SSE/D Sd/– SME/DSS
ⓑ 8/2014 HEIGHT OF PANTOGAPH LOCKED DOWN POSITION FROM RAIL LEVEL REVISED. DISHED ROOF HEIGHT & SECTION–CC ADDED. Sd/– SSE/D Sd/– SME/DSS
ⓒ 9/2014 FLOOR HEIGHT REVISED FROM 1210 TO 1202. Sd/– SSE/D Sd/– SME/DSS
ⓓ 05/2019 WEIGHT PARTICULARS UPDATED. SSE/D DY.CME/DSS

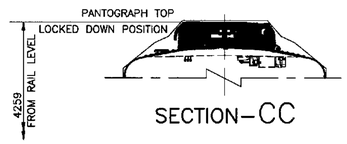




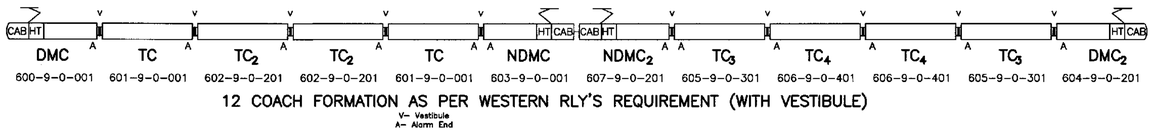
SECTION–AA



SECTION–BB



SECTION–CC



12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT (WITH VESTIBULE)

V– Vestibule
A– Alarm End

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT (II CLASS)---------- 65
4. SEATED PASSENGER LOAD (65X60kg) + DRIVER------ 3.96 TONNES
5. ADDL. STANDING PASSENGER LOAD (175x60kg)-------10.50 TONNES
   TOTAL PAY LOAD -------14.46 TONNES
6. TARE WEIGHT ---------- 58.88 TONNES (APPROX.)
7. GROSS WEIGHT (12 PASSENGERS / SQ. M.) ------- 73.34 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES AND GRAB POLES ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. POLYCARBONATE INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. POLYCARBONATE HAND HOLDS.
5. POLYCARBONATE SEATS.
6. SS CHEQUERED SHEET SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. THIS DRG. IS BASED ON ICF/SK3–9–0–115,Alt.'f', APPROVED VIDE RAILWAY BOARD LR. NO. 2007/M(C)137/3VOL(II) DT:24–02–2014.

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: EMU/DMC/AC-9-0-001. Alt: c/–	

LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU DRIVING MOTOR COACH

SCALE		
1:50 1:20	SSE/D	
	CHD	
	ALTD	B.K.Thivakar Lakshma
	DRN	N.Shanmugavel

Alpha Alt:– d

INTEGRAL COACH FACTORY CHENNAI–38

ASSEMBLY DRAWINGS				
0	Num. Alt.	03.05.2019 DATE OF LATEST ALT	31.01.2014 DATE OF FIRST ISSUE	DY.CME/DSS

DATA CODE NO. 600 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1 | EMU/DMC/AC-9-0-001

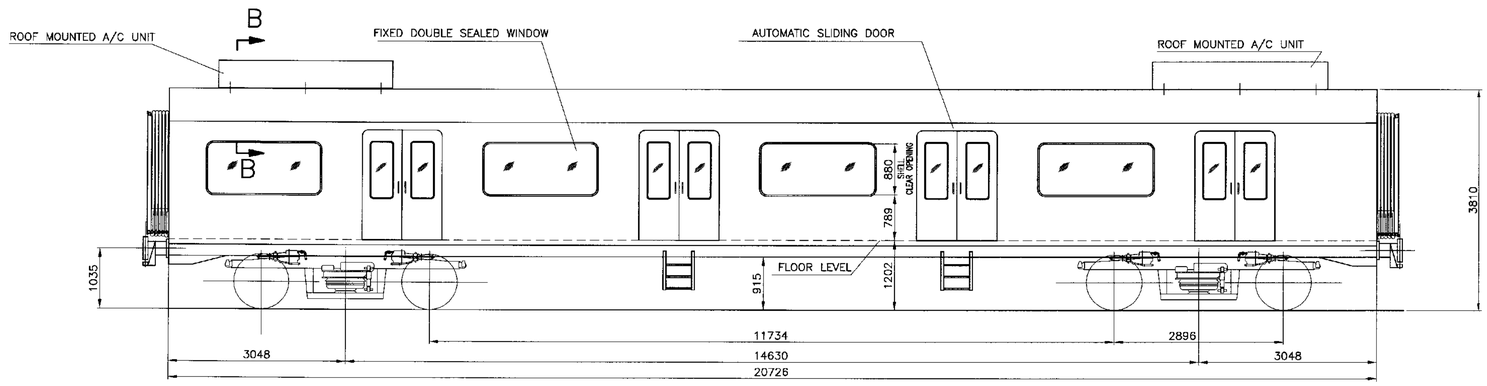
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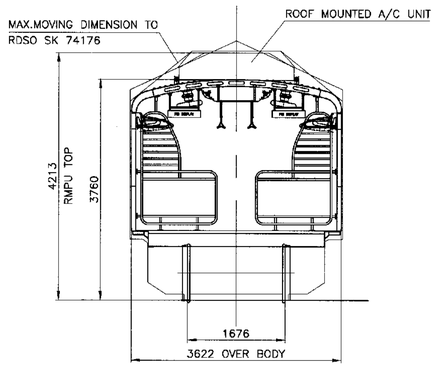
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PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

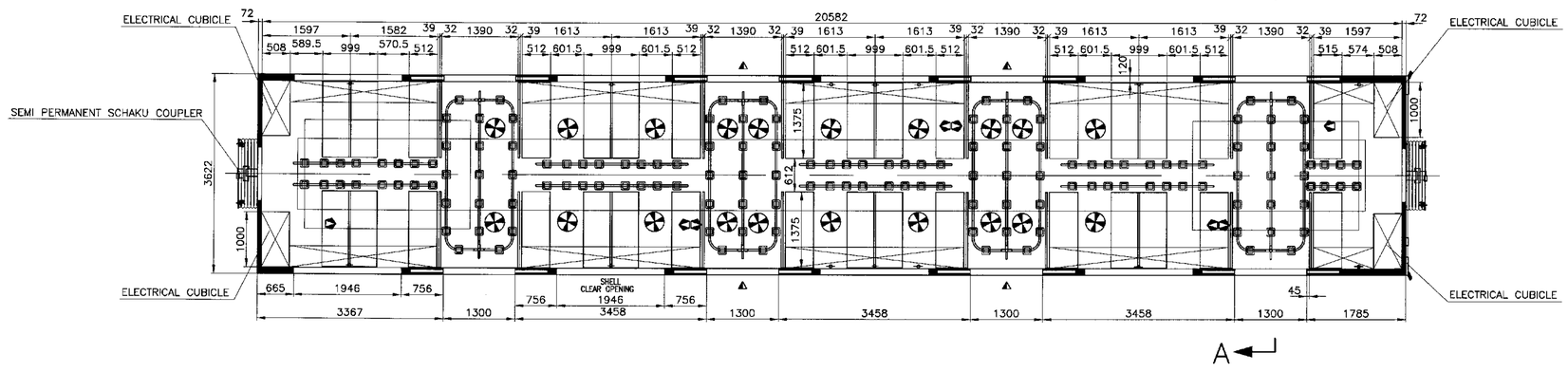
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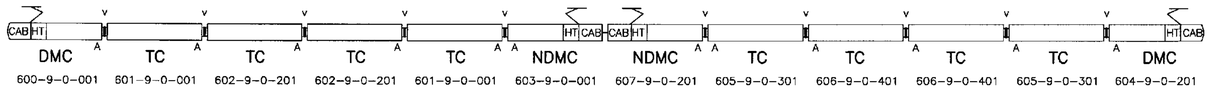
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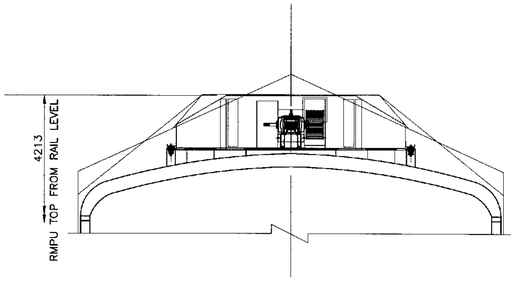
SECTION–AA





12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT (WITH VESTIBULE)

V– Vestibule
A– Alarm End



SECTION–BB

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT (II CLASS)---------- 96
4. SEATED PASSENGER LOAD (96X60kg) ----------5.76 TONNES
5. ADDL. STANDING PASSENGER LOAD (327x60kg)-------19.62 TONNES
   TOTAL PAY LOAD ------25.38 TONNES
6. TARE WEIGHT----------41.127 TONNES (APPROX.)
7. GROSS WEIGHT(12 PASSENGERS / SQ. M.)----------66.507 TONNES (APPROX.)

FAN
ALARM PULL HANDLE
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES AND GRAB POLES ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. POLYCARBONATE INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. POLYCARBONATE HAND HOLDS.
5. POLYCARBONATE SEATS.
6. SS CHEQUERED SHEET SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. BATTERY BOX & COMPRESSOR ARE TO BE PROVIDED.
11. THIS DRG. IS BASED ON ICF/SK3-9-0-116,Alt.'c', APPROVED VIDE RAILWAY BOARD LR. NO. 2007/M(C)137/3VOL(II) DT:24-02-2014.

ALTERATIONS
ⓐ 03/2014 NOTE–11 ADDED. Sd/– SSE/D Sd/– SME/DSS
ⓑ 9/2014 FLOOR HEIGHT REVISED FROM 1210 TO 1202. Sd/– SSE/D Sd/– SME/DSS
ⓒ 7/2015 HEIGHT OF RMPU FROM RAIL LEVEL REVISED. SECTION–AA & BB REVSD. ACCDLY. Sd/– SSE/D Sd/– SME/DSS
ⓓ 5/2019 WEIGHT PARTICULARS UPDATED. SSE/D SME/D
ⓔ 08/2019 COACH HEIGHT REDUCED BY 50mm SSE/D SME/D

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: EMU/C/AC-9-0-001. Alt: d/–	

LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU C COACH

SCALE 1:50 1:20	SSE/D		
	CHD		
	ALTD	S MUTHUKUMARAN	
	DRN	G.SURESH BABU	

Alpha Alt:– e

INTEGRAL COACH FACTORY CHENNAI–38

ASSEMBLY DRAWINGS					
0	Num. Alt.	DATE OF LATEST ALT –08–2019	DATE OF FIRST ISSUE .01.2014	AME/SME	

DATA CODE NO. 601 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1 | EMU/C/AC-9-0-001

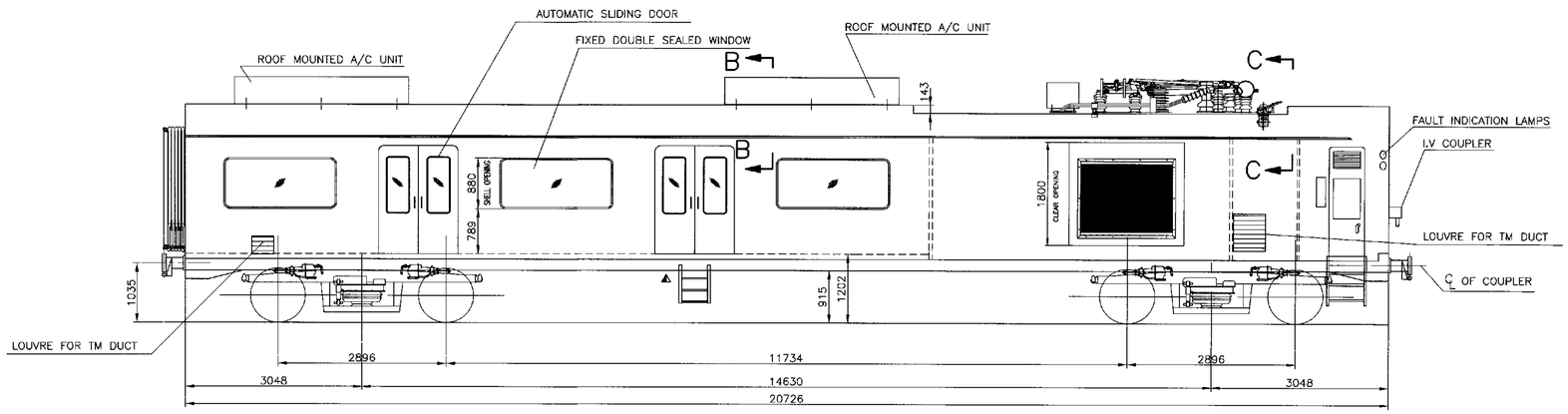
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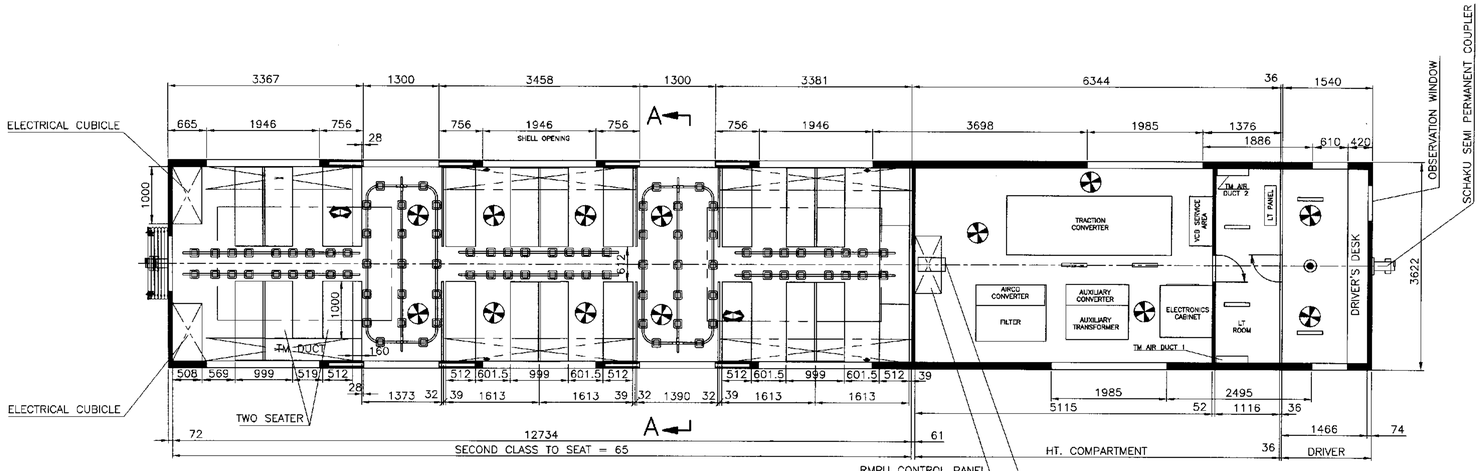
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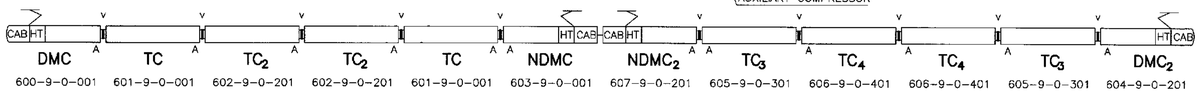
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

EMU/NDMC/AC-9-0-001

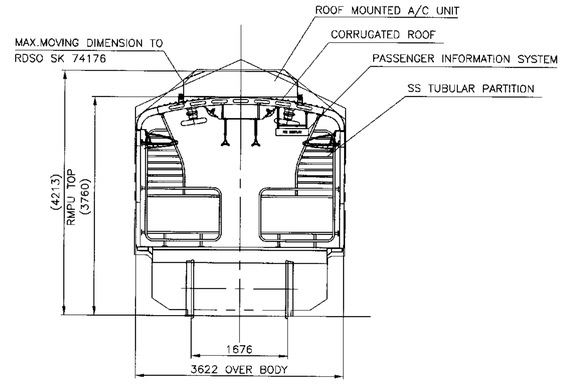




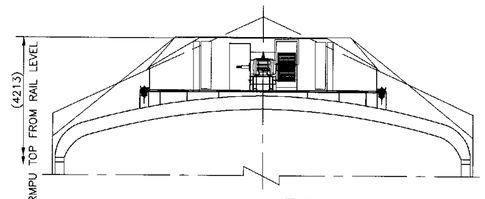


12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT (WITH VESTIBULE)

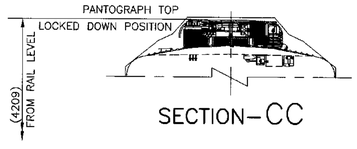
V- Vestibule
A- Alarm End



SECTION-AA



SECTION-BB



SECTION-CC

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT (II CLASS)---------- 65
4. SEATED PASSENGER LOAD (65X60kg) + DRIVER------- 3.96 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL-258x60kg)---15.48 TONNES

   TOTAL PAY LOAD -------19.44 TONNES

6. TARE WEIGHT ---------- 56.71 TONNES (APPROX.)

AIR CONDITIONING UNIT (0.75X2)	1.5 TONNES
INCREASE IN ELECTRICS AND MISC. ITEMS LIKE VESTIBULE, BOGIE COMPARED TO MRVC PHASE-I	1.01 TONNES
MRVC PHASE-I MOTOR COACH WEIGHT	54.20 TONNES

7. GROSS WEIGHT UNDER SDCL 76.15 TONNES (APPROX.)
   (16 PASSENGERS / SQ. M.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES AND GRAB POLES ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. POLYCARBONATE INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. POLYCARBONATE HAND HOLDS.
5. POLYCARBONATE SEATS.
6. SS CHEQUERED SHEET SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. THIS DRG. IS BASED ON ICF/SK3-9-0-119,Alt.'d', APPROVED VIDE RAILWAY BOARD LR. NO. 2007/M(C)137/3VOL(II) DT:24-02-2014.

ALTERATIONS

ⓐ 03/2014
NOTE-10 ADDED.
Sd/- SSE/D Sd/- SME/DSS

ⓑ 8/2014
HEIGHT OF PANTOGAPH LOCKED DOWN POSITION FROM RAIL LEVEL REVISED. DISHED ROOF HEIGHT & SECTION-CC ADDED.
Sd/- SSE/D Sd/- SME/DSS

ⓒ 9/2014
FLOOR HEIGHT REVISED FROM 1210 TO 1202.
Sd/- SSE/D Sd/- SME/DSS

ⓓ 8/2019
COACH HEIGHT REDUCED BY 50 mm.
SSE/D AME/DSS

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
					SUPERSEDES: EMU/NDMC/AC-9-0-001,Alt.c/-	

LAYOUT OF 3 PHASE AIR CONDITIONED AC/EMU NON DRIVING MOTOR COACH

SCALE 1:50 1:20 | SSE/D | CHD | ALTD A.SURESH | DRN N.Shanmugavel

Alpha Alt:- d

INTEGRAL COACH FACTORY CHENNAI-38

0	Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	ASSEMBLY DRAWINGS
		-08-2019	31-01-2014	AME/SME

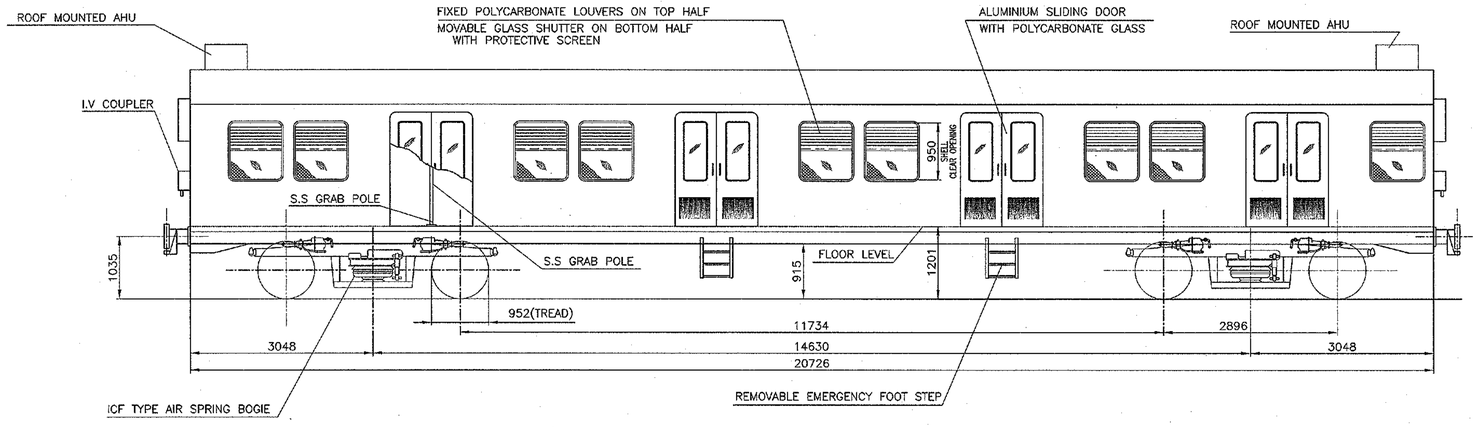
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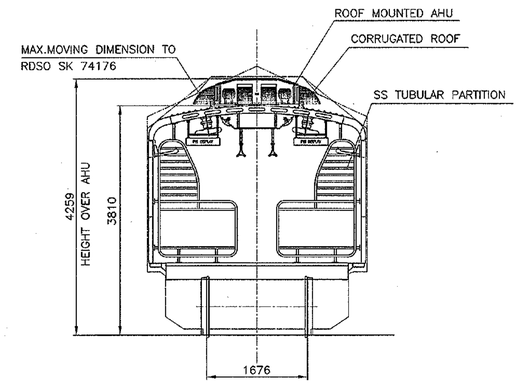
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9079

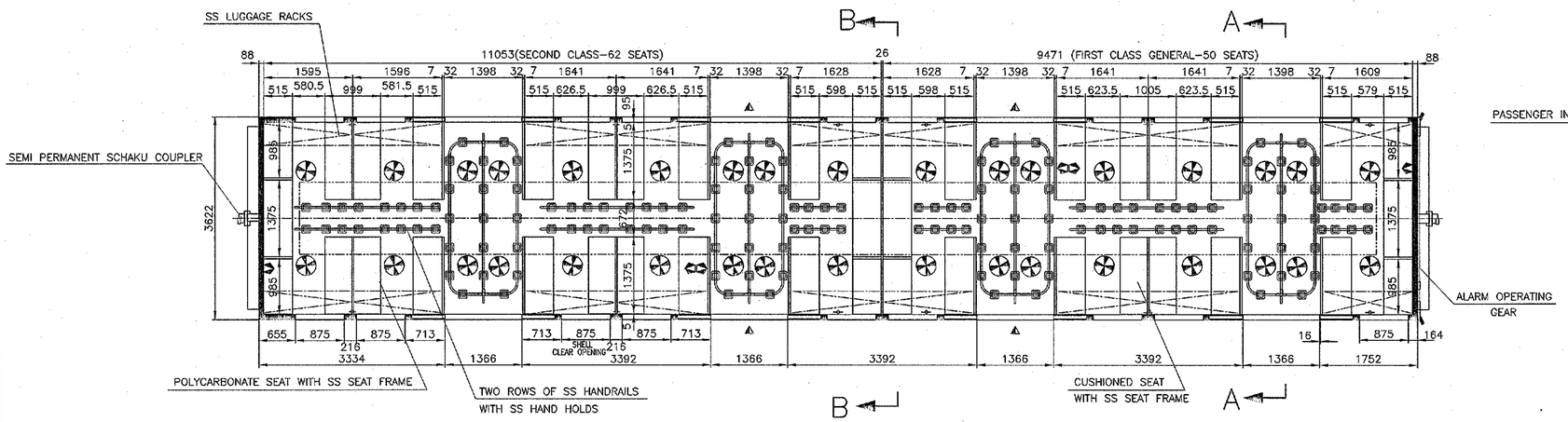
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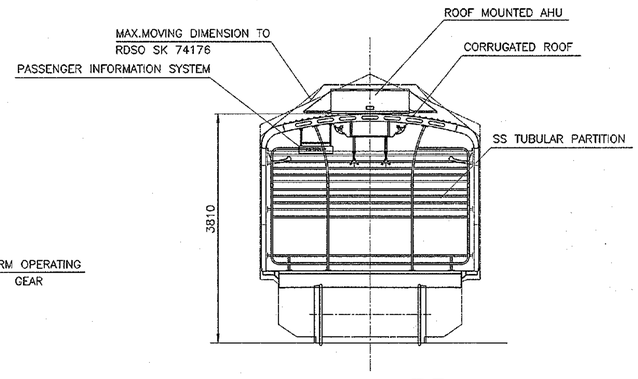
ALTERATIONS	
⓪	08/2015
	NOTE-10 ADDED.
SSE/D	SME/DSS





SECTION–AA





SECTION–BB



12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

I CLASS GENERAL	–50
II CLASS----------	–62
TOTAL SEATING CAPACITY	– 112

4. SEATED PASSENGER LOAD (112X60kg) ----------6.72 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL–451x60kg)----27.06 TONNES

TOTAL PAY LOAD -------33.78 TONNES

6. TARE WEIGHT ---------- 37 TONNES (APPROX.)

FAN
ALARM PULL HANDLE
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. POLYCARBONATE SEATS.
6. SS CHEQUERED SHEET SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. THIS DRG. IS BASED ON ICF/SK3-9-0-126,Alt.'a', APPROVED VIDE RAILWAY BOARD LR. NO. 87/M(C)/202/10/VOL.III(Pt.III) DT:23-07-2014.

Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME
0	12-08-2015	28-01-2014	D.Udayan

ASSEMBLY DRAWINGS

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: EMU/C/3PH-9-0-001 alt-/--	

LAYOUT OF 3 PHASE AC EMU TRAILER 'C' COACH (W.RLY.)

SCALE 1:50	SSE/D
	CHD
	ALTD N.Shanmugavel
	DRN N.Shanmugavel

Alpha Alt:– a

INTEGRAL COACH FACTORY CHENNAI–38

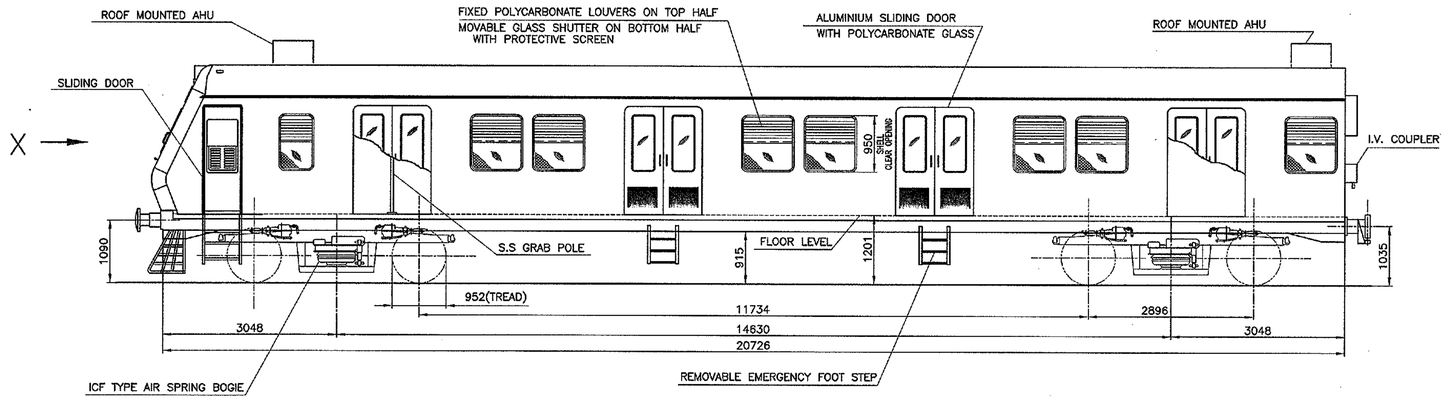
DATA CODE NO.		SHEET
616	INDIAN RAILWAY STANDARDS	1 OF 1

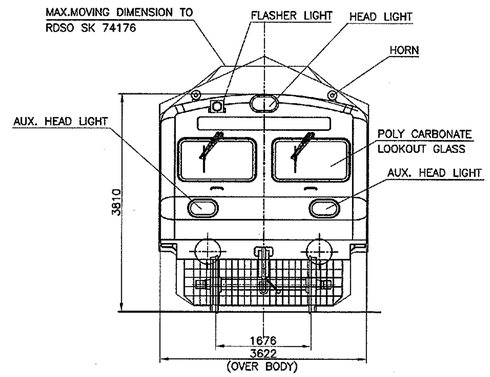
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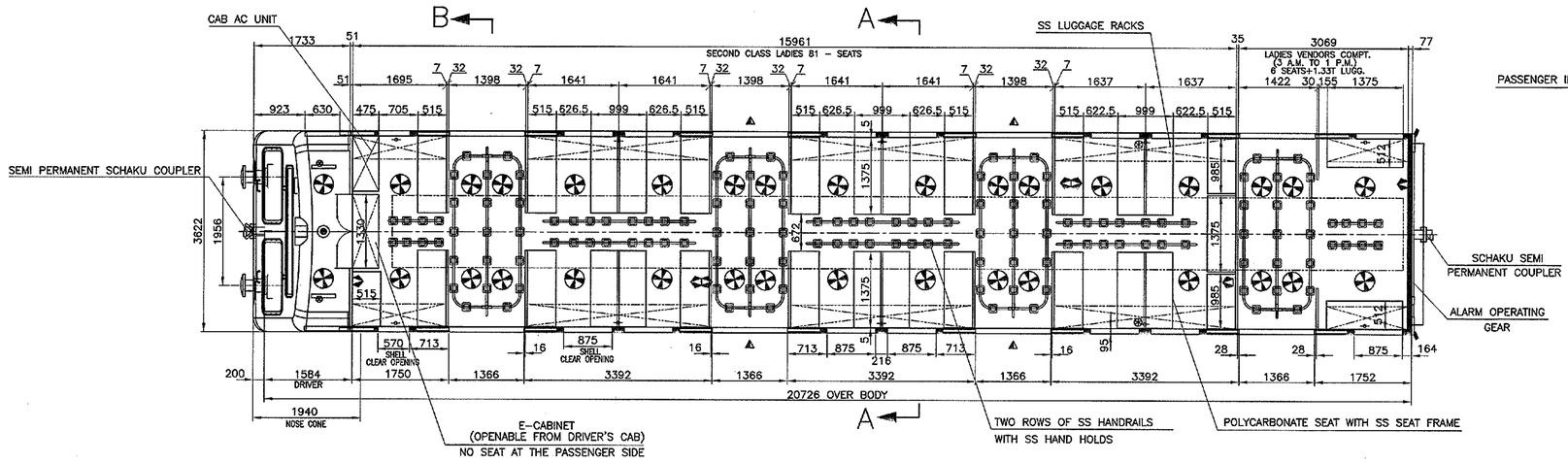
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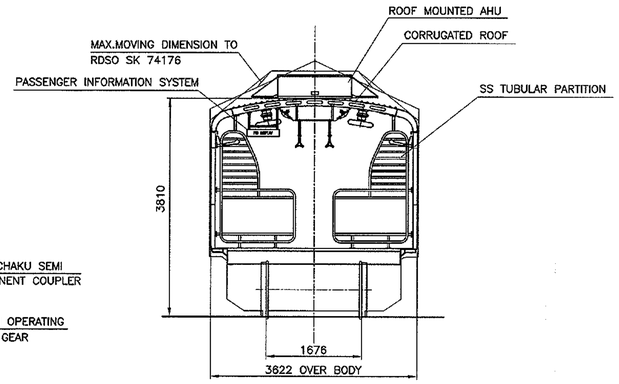
ALTERATIONS
ⓐ 08/2015
NOTE-10 ADDED.
Sd/- SSE/D Sd/- SME/DSS
ⓑ 09/2017
CAB AC INTRODUCED. SEATING CAPACITY REVISED. NOTE-11 ADDED.
Sd/- SSE/D Sd/- SME/DSD



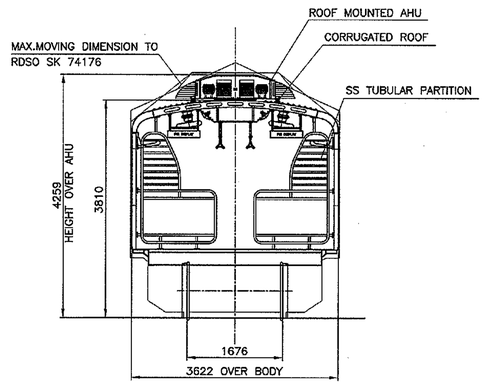


VIEW FROM-X

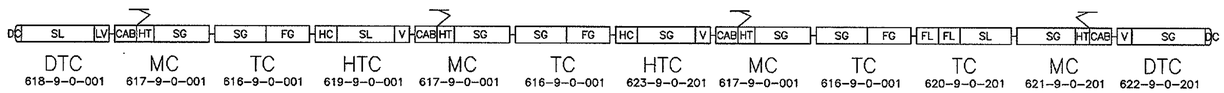




SECTION-AA



SECTION-BB



12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS LADIES------	81
LADIES VENDORS COMPT.(3 A.M. TO 1 P.M.)-------	6
TOTAL SEATING CAPACITY ----	87

4. SEATED PASSENGER LOAD (87X60kg) ----------5.22 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL, STANDING PASSENGER LOAD(SDCL-443x60kg)--26.58 TONNES

TOTAL PAY LOAD --------33.13 TONNES

7. TARE WEIGHT _____ 39 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- REMOVABLE EMERGENCY FOOT STEP
- BUZZER
- CAB LIGHT

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. POLYCARBONATE SEATS.
6. SS CHEQUERED SHEET SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. THIS DRG. IS BASED ON ICF/SK3-9-0-128,Alt.'a', APPROVED VIDE RAILWAY BOARD LR. NO. 87/M(C)/202/10/VOL.III(Pt.II) DT:23-07-2014.
11. CAB AC

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC
	GROUP: 9-0			

LAYOUT OF 3 PHASE AC EMU DRIVING TRAILER 'D' COACH

WEIGHT/UNIT	REMARKS
SUPERSEDED BY:	
SUPERSEDES: EMU/D/3PH-9-0-001 alt: a/-	

SCALE 1:50	SSE/D	
	CHD	
	ALTD	SURESH KUMAR.S
	DRN	A.SURESH

Alpha Alt:- b

INTEGRAL COACH FACTORY CHENNAI-38

ASSEMBLY DRAWINGS		
12-09-2017	28-01-2014	
0 Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME

DATA CODE NO. 618 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1

EMU/D/3PH-9-0-001

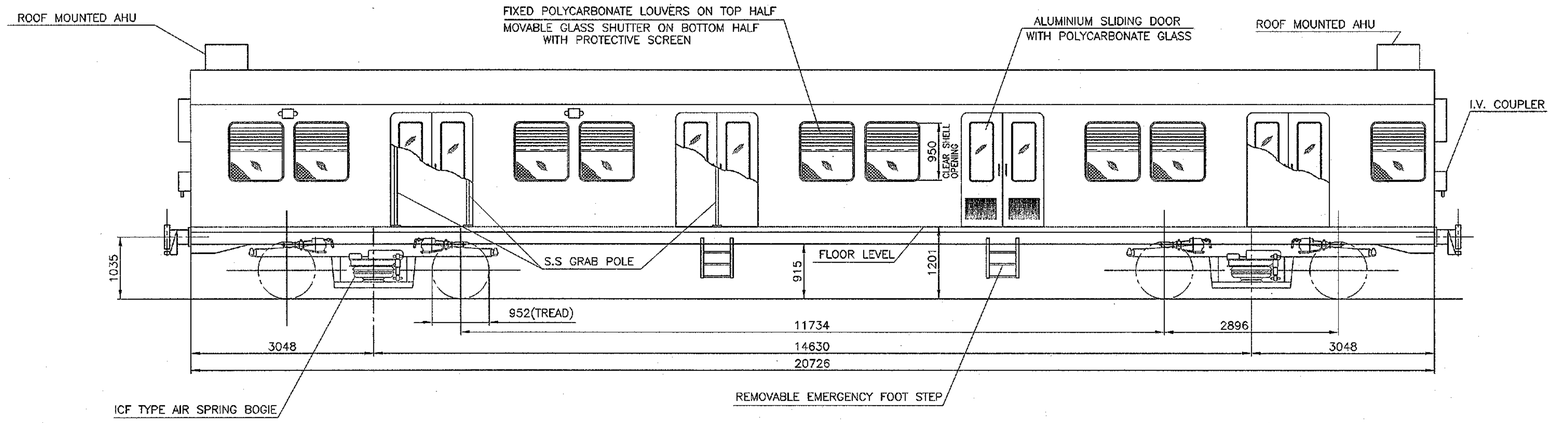
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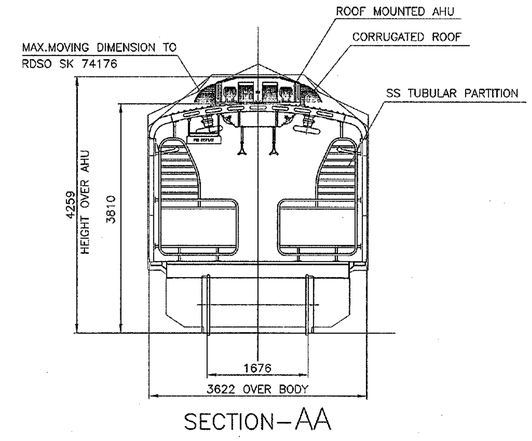
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PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

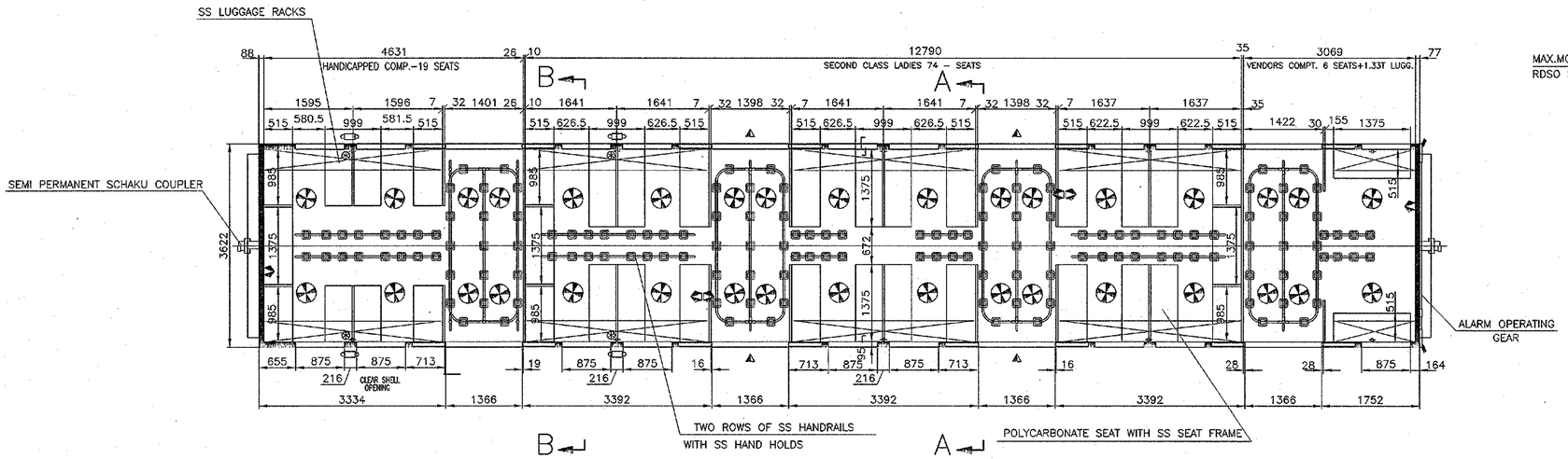
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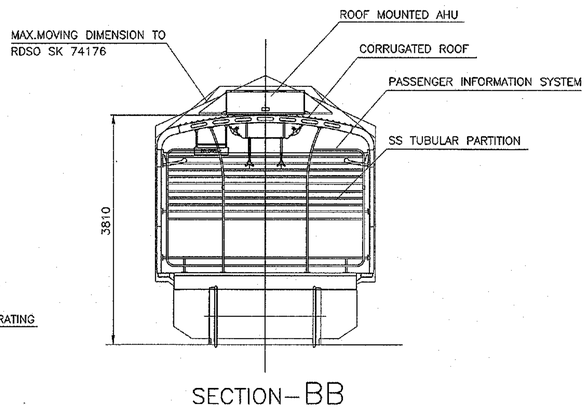
ALTERATIONS	
©	08/2015
	NOTE-10 ADDED.
SSE/D	SME/DaS



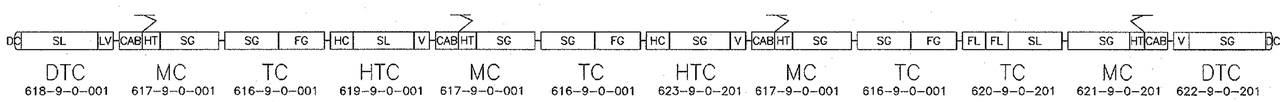


SECTION–AA





SECTION–BB



12 COACH FORMATION AS PER WESTERN RLY'S REQUIREMENT

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS LADIES--------	74
VENDORS COMPT.---------	6
HANDICAPPED COMPT.-----	19
TOTAL SEATING CAPACITY	– 99

4. SEATED PASSENGER LOAD(99X60kg)----------5.94 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL. STANDING PASSENGER LOAD(SDCL–403x60kg)---24.18 TONNES

TOTAL PAY LOAD ------31.45 TONNES

7. TARE WEIGHT ---------- 38 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- REMOVABLE EMERGENCY FOOT STEP
- BUZZER
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)

NOTE:

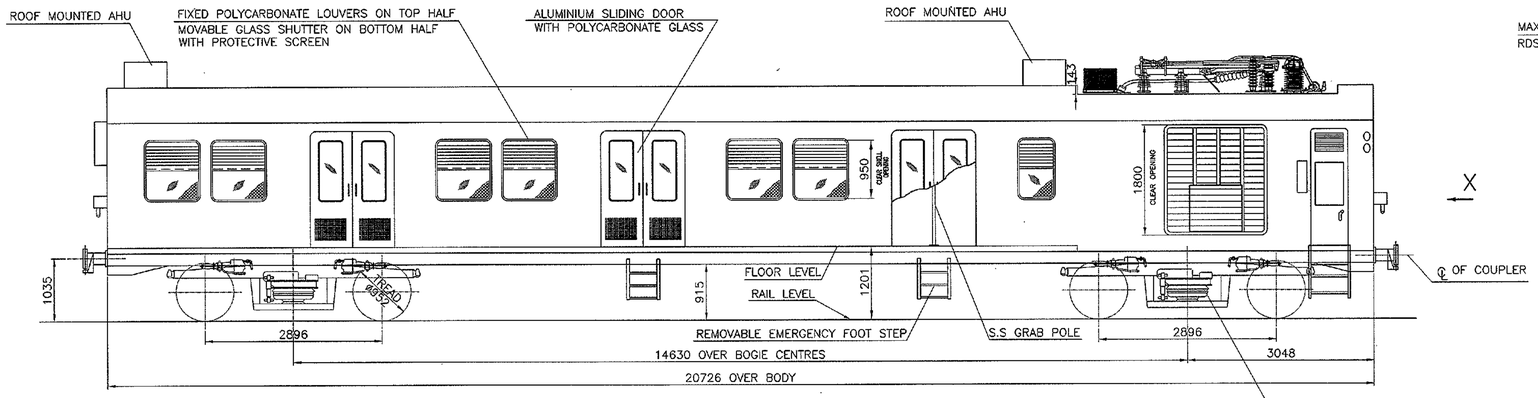
1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. POLYCARBONATE SEATS.
6. SS CHEQUERED SHEET SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. THIS DRG. IS BASED ON ICF/SK3-9-0-129,Alt.'a', APPROVED VIDE RAILWAY BOARD LR. NO. 87/M(C)/202/10/VOL.III(Pt.III) DT:23-07-2014.

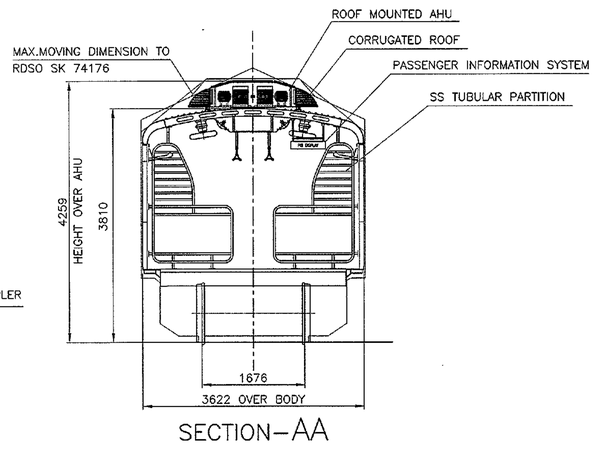
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							GROUP: 9–0				SUPERSEDED BY:	
											SUPERSEDES: EMU/D/HC/3PH-9-0-001 alt-/-	
							LAYOUT OF 3 PHASE AC EMU TRAILER 'D' COACH WITH HANDICAPPED COMPT.(W.RLY.)				SCALE 1:50	SSE/D
												CHD
												ALTD N.Shanmugavel
												DRN N.Shanmugavel
											Alpha Alt:– a	
			ASSEMBLY DRAWINGS								INTEGRAL COACH FACTORY CHENNAI–38	
		0	Num. Alt.	12–08–2015 DATE OF LATEST ALT	28–01–2014 DATE OF FIRST ISSUE	AME/SME	DATA CODE NO. 619	INDIAN RAILWAY STANDARDS	SHEET 1 OF 1	EMU/D/HC/3PH-9-0-001		

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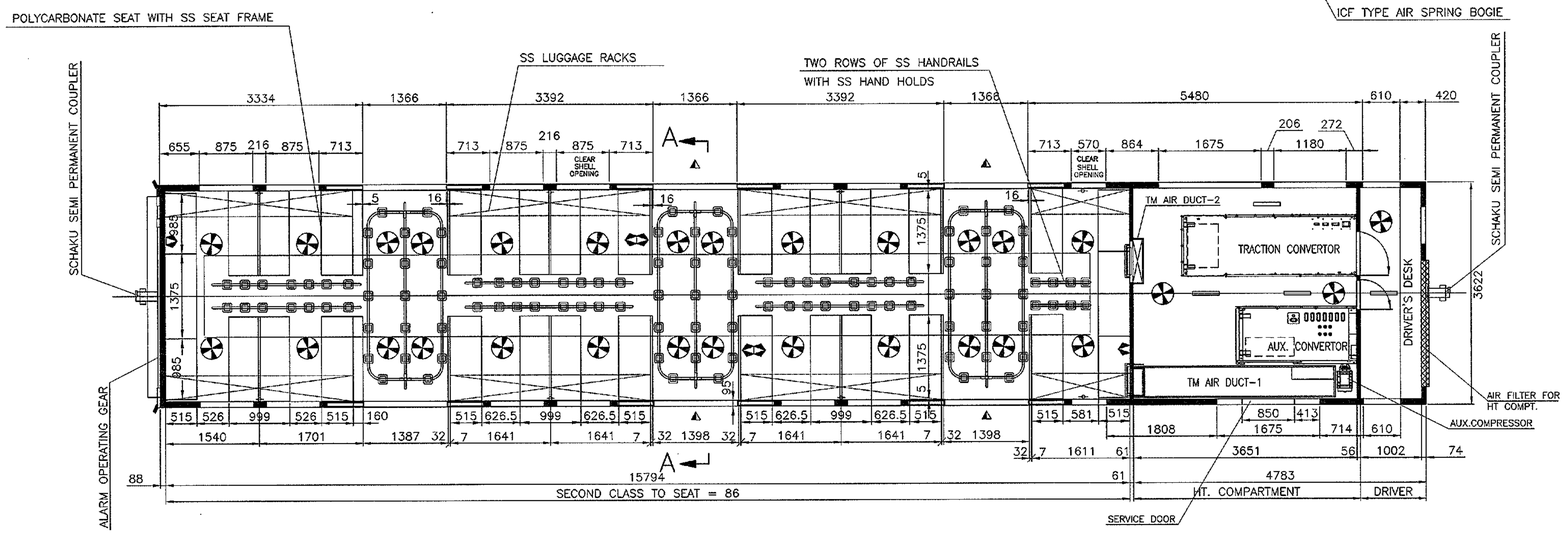
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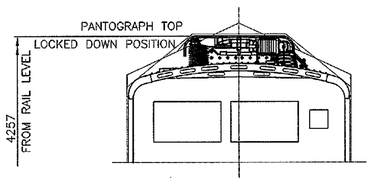
ALTERATIONS



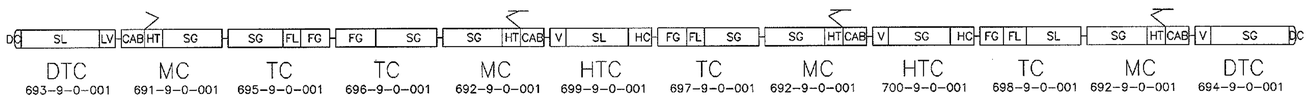


SECTION–AA

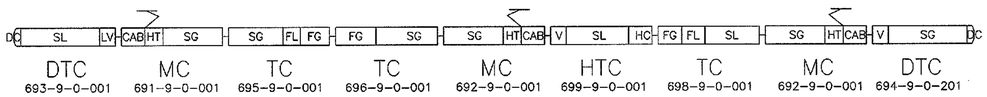




VIEW – X



12 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT----------86
4. SEATED PASSENGER LOAD (86x60kg ----------5.16 TONNES
5. ADDL, STANDING PASSENGER LOAD(SDCL–352x60kg) –21.12 TONNES

   TOTAL PAY LOAD ------26.28 TONNES
6. TARE WEIGHT ---------- 54 TONNES (APPROX.)

FAN
ALARM PULL HANDLE
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP
FLUORESCENT LIGHT

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:	

LAYOUT OF 3 PHASE AC EMU MOTOR COACH FOR HARBOUR LINE & CIDCO

					SCALE 1:50	SSE/D
						CHD
						ALTD
						DRN N.Shanmugavel

Alpha Alt:–

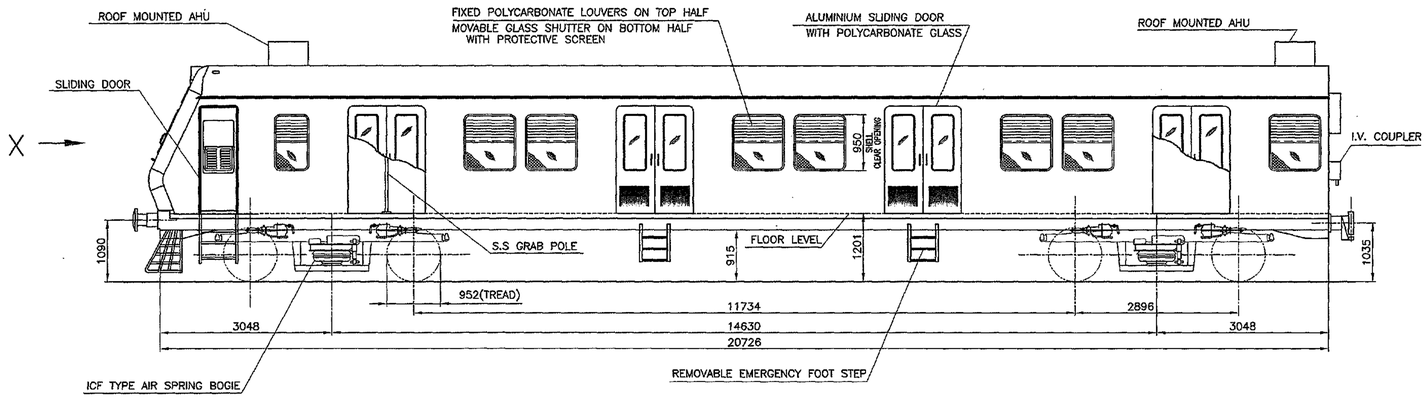
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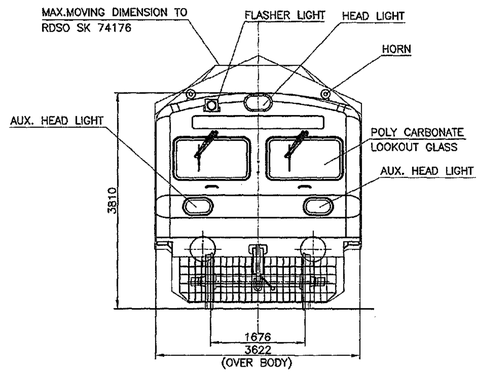
DATA CODE NO.		SHEET	INTEGRAL COACH FACTORY CHENNAI–38
692	INDIAN RAILWAY STANDARDS	1 OF 1	EMU/M2/3PH/HL-9-0-001

FORM:–IR.A1–840X600

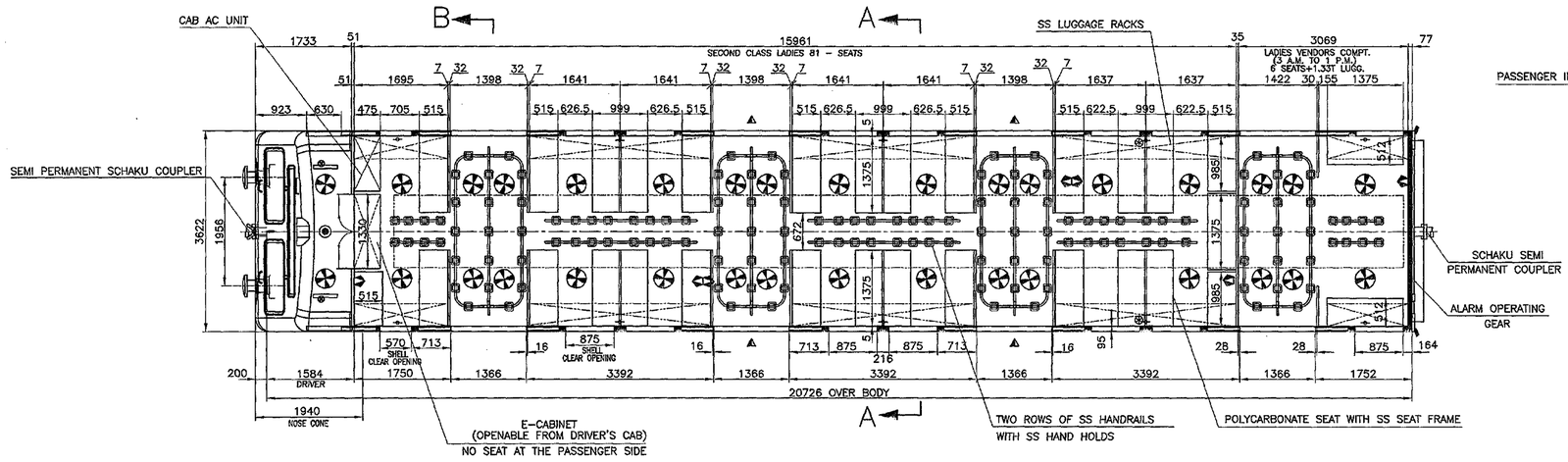
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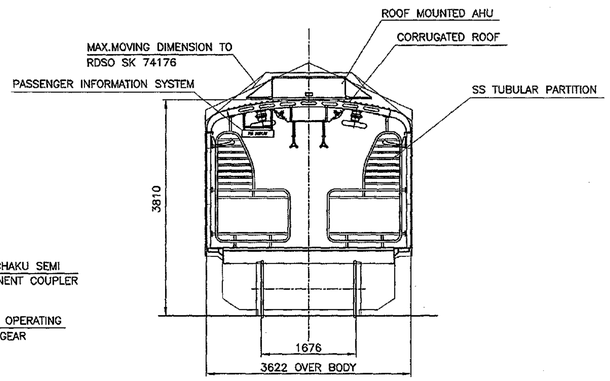
ALTERATIONS	
a	09/2017
	CAB AC INTRODUCED. SEATING CAPACITY REVISED. NOTE-11 ADDED.
	SSE/D SME/DSD



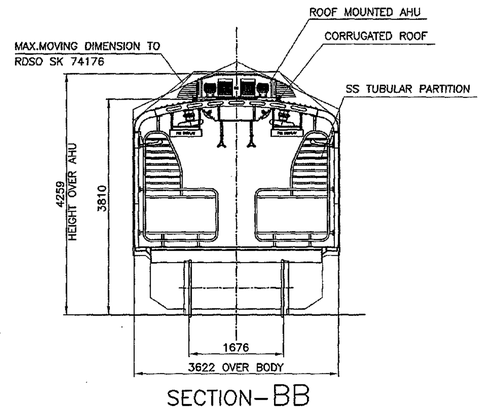


VIEW FROM–X

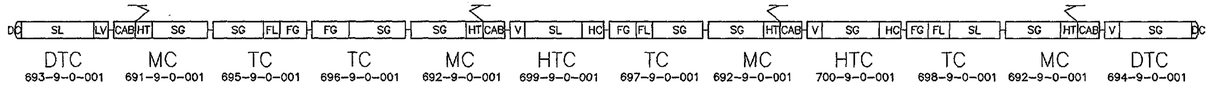




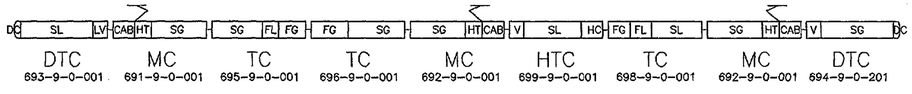
SECTION–AA



SECTION–BB



12 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. THIS DRG. IS BASED ON ICF/SK3–9–0–128,Alt.'a', APPROVED VIDE RAILWAY BOARD LR. NO. 87/M(C)/202/10/VOL.III(Pt.III) DT:23–07–2014.
11. CAB AC

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS LADIES------ 81
LADIES VENDORS COMPT.(3 A.M. TO 1 P.M.)------ 6
TOTAL SEATING CAPACITY ---- 87

4. SEATED PASSENGER LOAD (87X60kg) ----------5.22 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL. STANDING PASSENGER LOAD(SDCL–443x60kg)--26.58 TONNES

TOTAL PAY LOAD ------33.13 TONNES

7. TARE WEIGHT ---------- 39 TONNES (APPROX.)

FAN
ALARM PULL HANDLE
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
REMOVABLE EMERGENCY FOOT STEP
BUZZER
CAB LIGHT

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:EMU/D/3PH/HL-9-0-001,Alt:–/–	

LAYOUT OF 3PHASE AC EMU DRIVING TRAILER 'D' COACH FOR HARBOUR LINE & CIDCO

SCALE 1:50	SSE/D	
	CHD	
	ALTD	SURESH KUMAR.S
	DRN	N.SHANMUGAVEL

Alpha Alt:– a

INTEGRAL COACH FACTORY CHENNAI–38

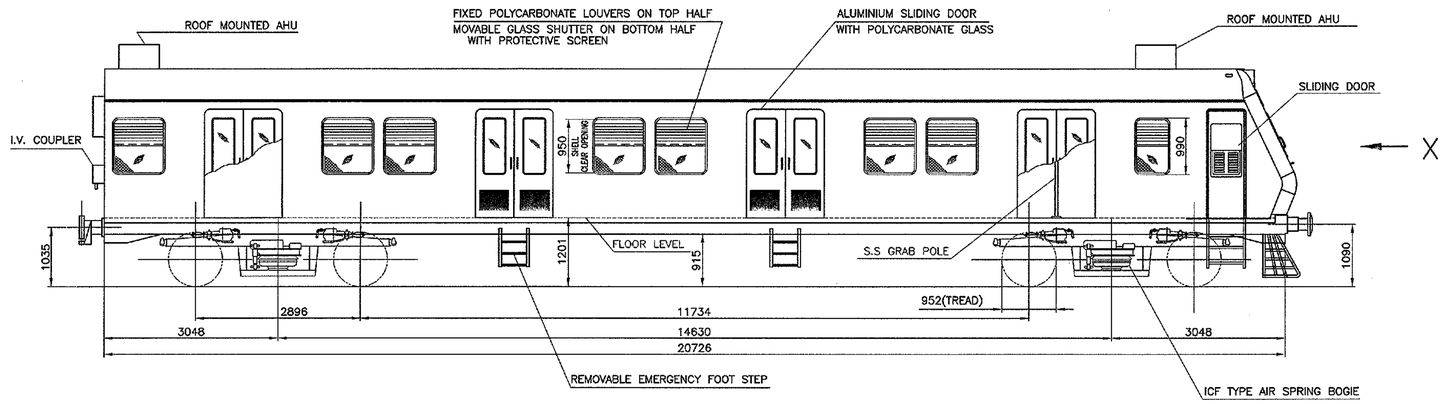
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	ASSEMBLY DRAWINGS	12–09–2017	30–03–2017	

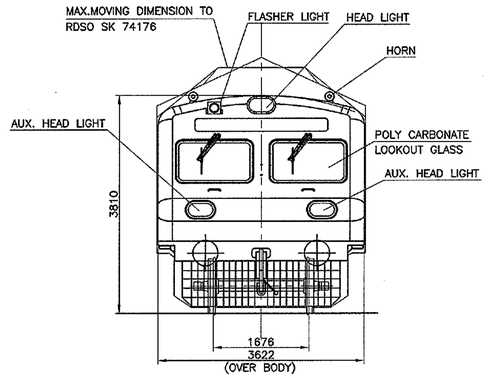
DATA CODE NO. 693 | INDIAN RAILWAY STANDARDS | SHEET 1 OF 1 | EMU/D/3PH/HL–9–0–001

FORM:–IR.A1–840X600

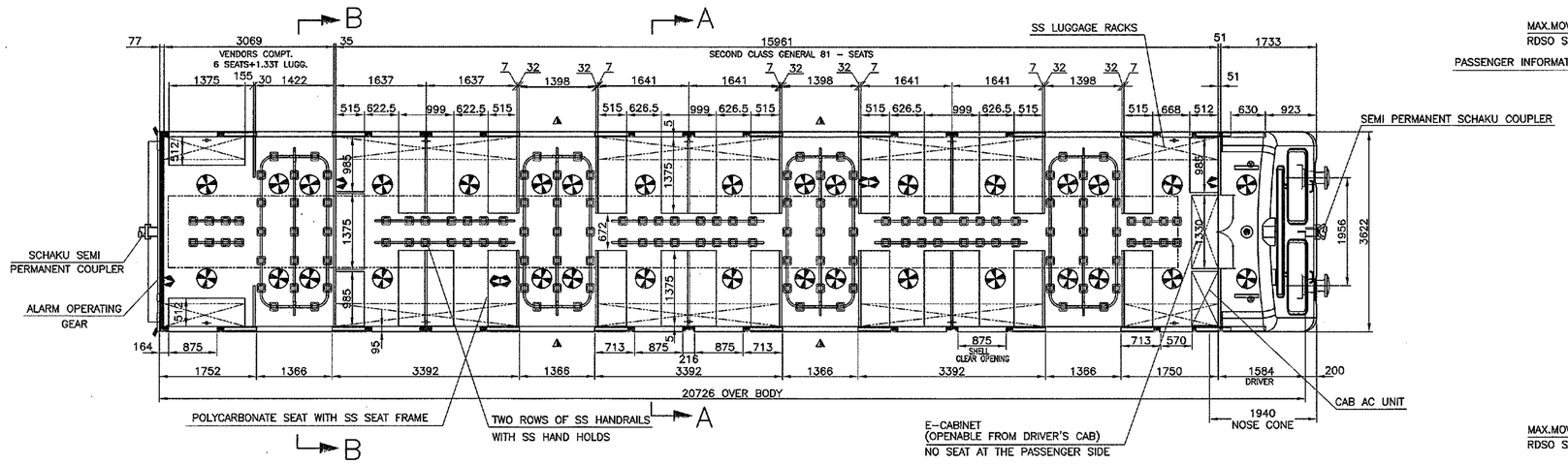
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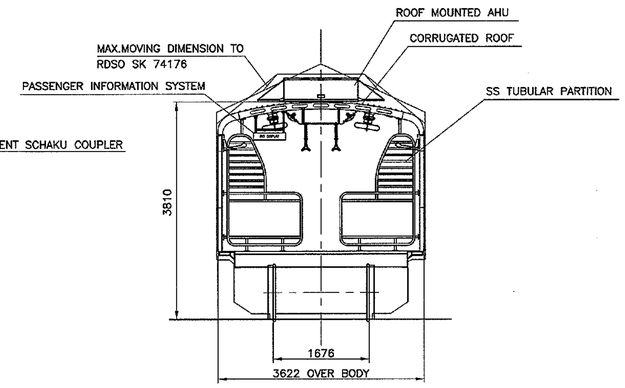
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(a)	09/2017
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	SSE/D SME/DSD



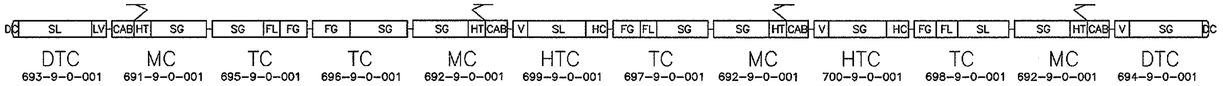


VIEW FROM-X





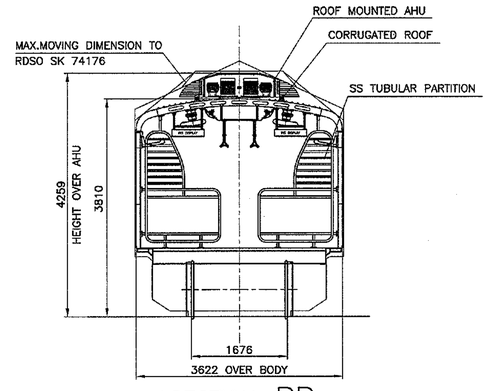
SECTION-AA



12 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



SECTION-BB

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS GENERAL-----	81
VENDORS COMPT.-----	6
TOTAL SEATING CAPACITY ----	87

4. SEATED PASSENGER LOAD(87x60kg)----- --------5.22 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL. STANDING PASSENGER LOAD(SDCL-443x60kg)---26.58 TONNES

TOTAL PAY LOAD ------33.13 TONNES

7. TARE WEIGHT ---------- 39 TONNES (APPROX.)

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING
10. CAB AC

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- REMOVABLE EMERGENCY FOOT STEP
- CAB LIGHT

		ASSEMBLY DRAWINGS	
0	Num. Alt.	12-09-2017	30-03-2017
		DATE OF LATEST ALT	DATE OF FIRST ISSUE
			AME/SME

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9-0				SUPERSEDED BY:	
					SUPERSEDES:EMU/D2/3PH/HL-9-0-001,Alt:-/-	

LAYOUT OF 3PHASE AC EMU DRIVING TRAILER 'D' COACH FOR HARBOUR LINE & CIDCO

SCALE 1:50	SSE/D		
	CHD		
	ALTD	SURESH KUMAR.S	
	DRN	N.SHANMUGAVEL	

Alpha Alt:- a

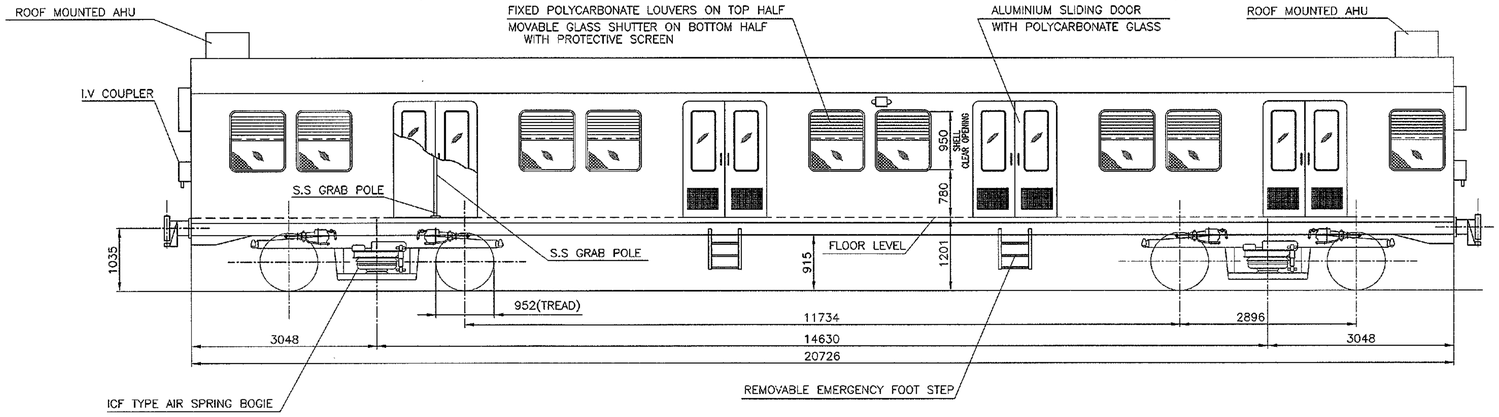
INTEGRAL COACH FACTORY CHENNAI-38

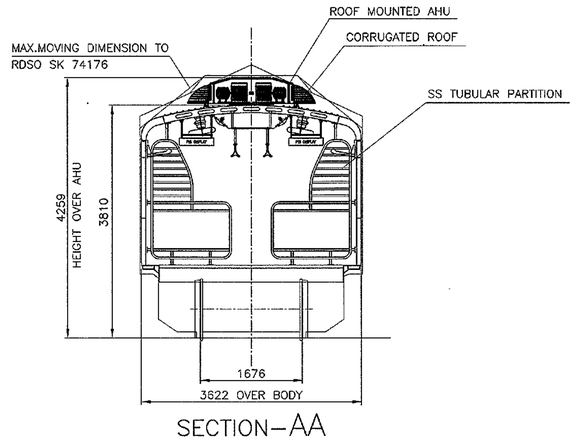
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694		1 OF 1	

FORM:-IR.A1-840X600

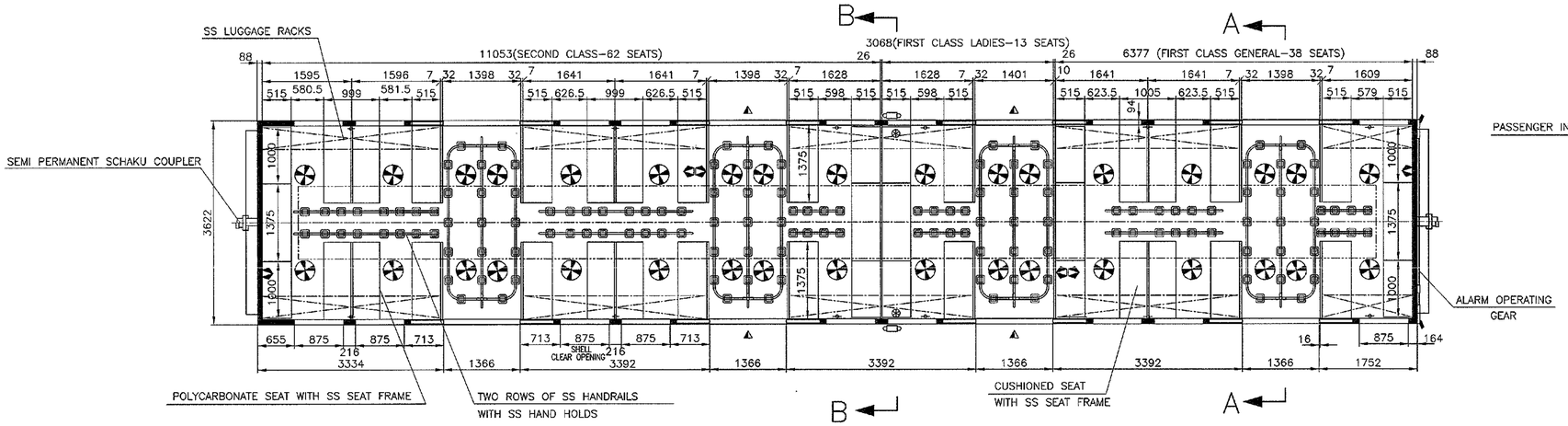
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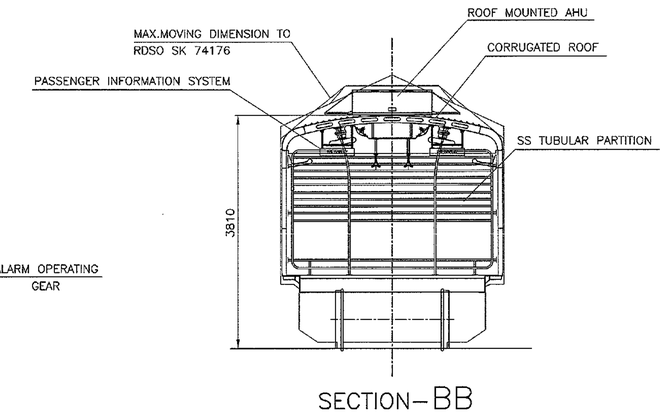
ALTERATIONS



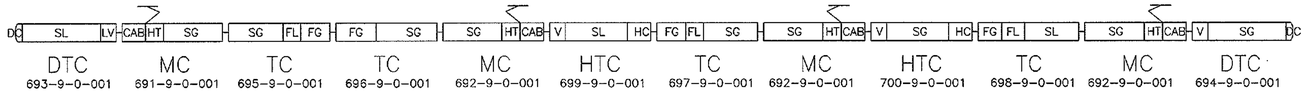


SECTION–AA

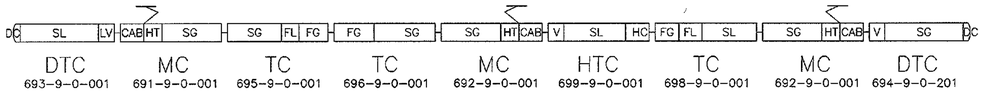




SECTION–BB



12 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

I CLASS GENERAL	–38
I CLASS LADIES	–13
II CLASS--------	–62
TOTAL SEATING CAPACITY	–113

4. SEATED PASSENGER LOAD (113X60kg) ----------6.78 TONNES
5. ADDL, STANDING PASSENGER LOAD(SDCL–442x60kg)----26.52 TONNES

TOTAL PAY LOAD --------33.30 TONNES

6. TARE WEIGHT ---------- 37 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- PASSENGER ALARM INDICATION LIGHT
- BUZZER

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:	

LAYOUT OF 3 PHASE AC EMU TRAILER 'C' COACH (C.RLY.) FOR HARBOUR LINE & CIDCO

SCALE 1:50	SSE/D
	CHD
	ALTD
	DRN N.Shanmugavel

Alpha Alt:–

INTEGRAL COACH FACTORY CHENNAI–38

			ASSEMBLY DRAWINGS		
0	Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE 30-03-2017	AME/SME	

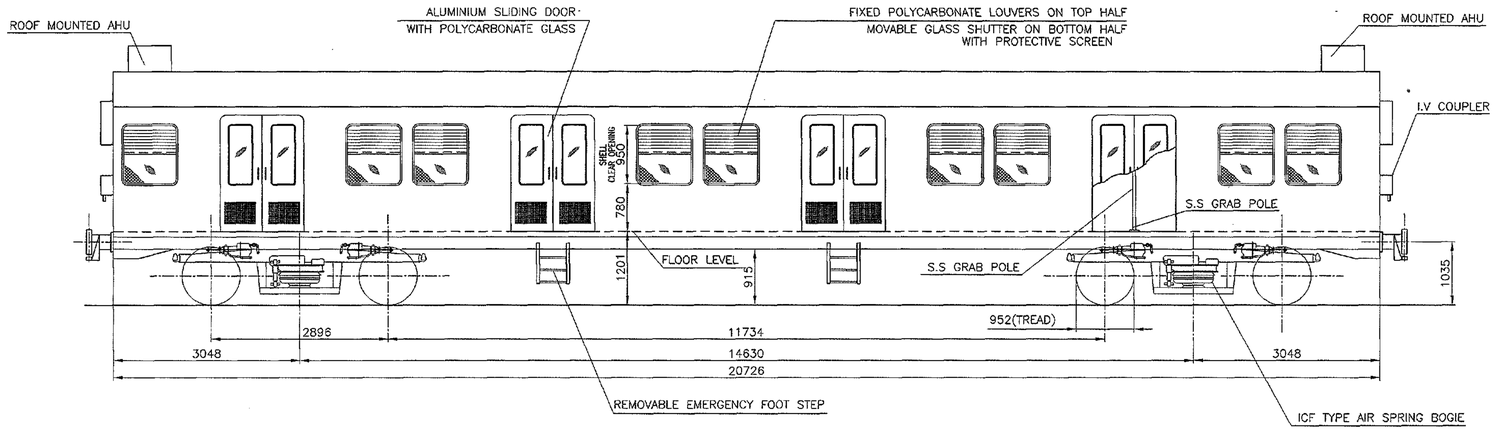
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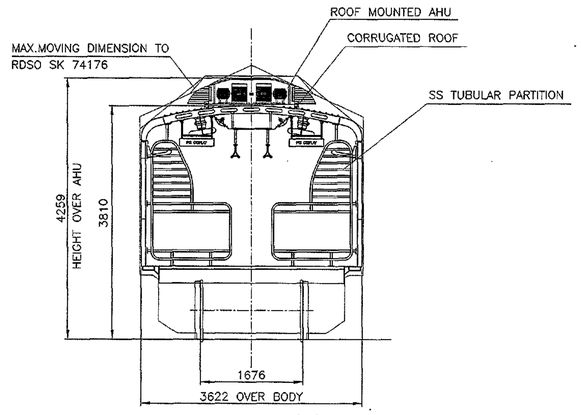
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FORM:–IR.A1–840X600

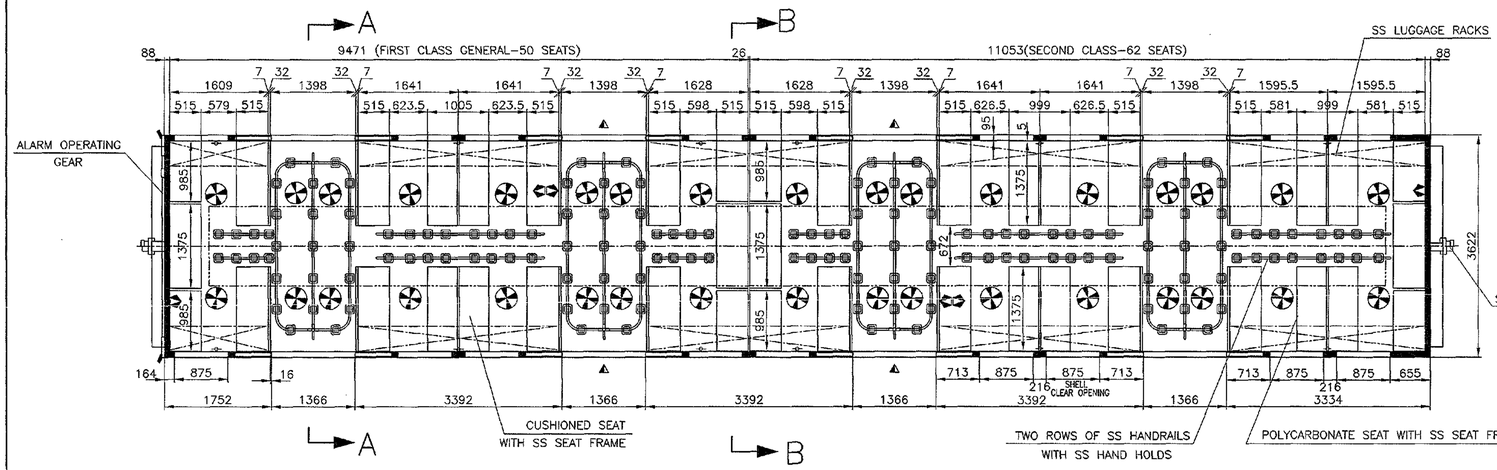
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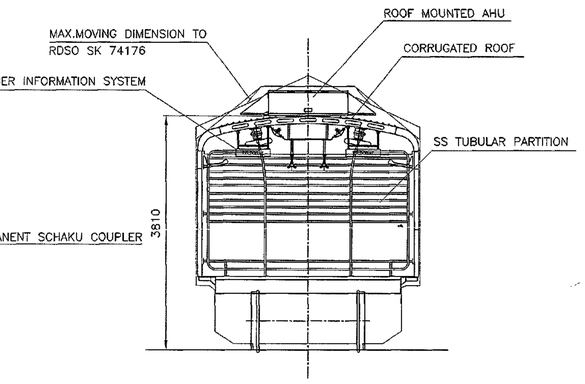
ALTERATIONS



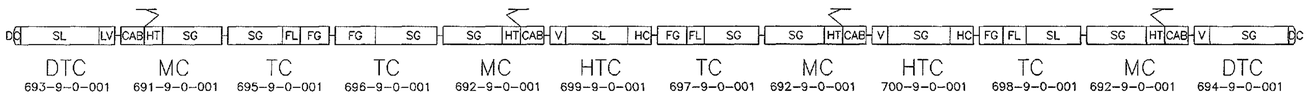


SECTION–AA

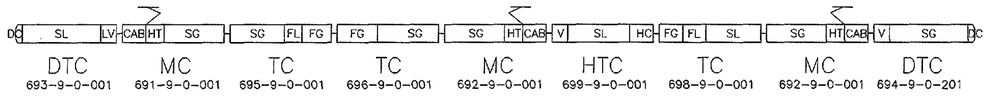




SECTION–BB



12 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

I CLASS GENERAL –50
II CLASS------- –62
TOTAL SEATING CAPACITY –112

4. SEATED PASSENGER LOAD (112X60kg) ----------6.72 TONNES
5. ADDL, STANDING PASSENGER LOAD(SDCL–451x60kg)---27.06 TONNES
TOTAL PAY LOAD ------33.78 TONNES
6. TARE WEIGHT ---------- 37 TONNES (APPROX.)

FAN
ALARM PULL HANDLE
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
EMERGENCY FOOT STEP

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:	

LAYOUT OF 3 PHASE AC EMU TRAILER 'C' COACH (C.RLY.) FOR HARBOUR LINE & CIDCO

SCALE 1:50	SSE/D			
	CHD			
	ALTD			
	DRN	N.Shanmugavel		

Alpha Alt:–

INTEGRAL COACH FACTORY CHENNAI–38

			ASSEMBLY DRAWINGS		
			30–03–2017		
0	Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME	

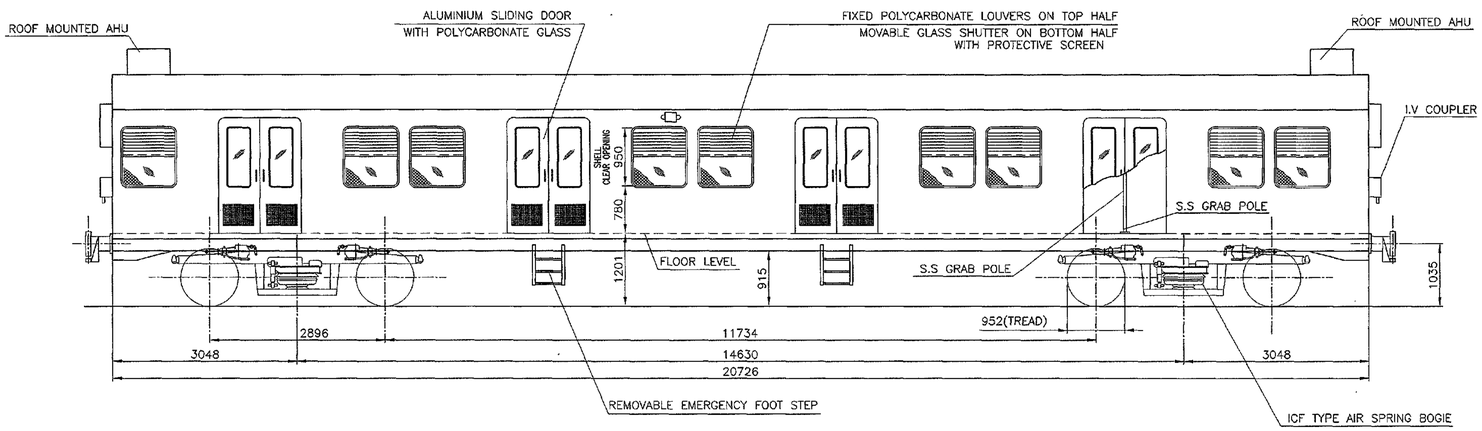
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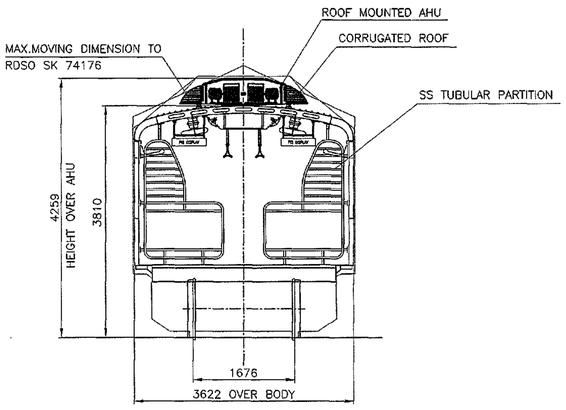
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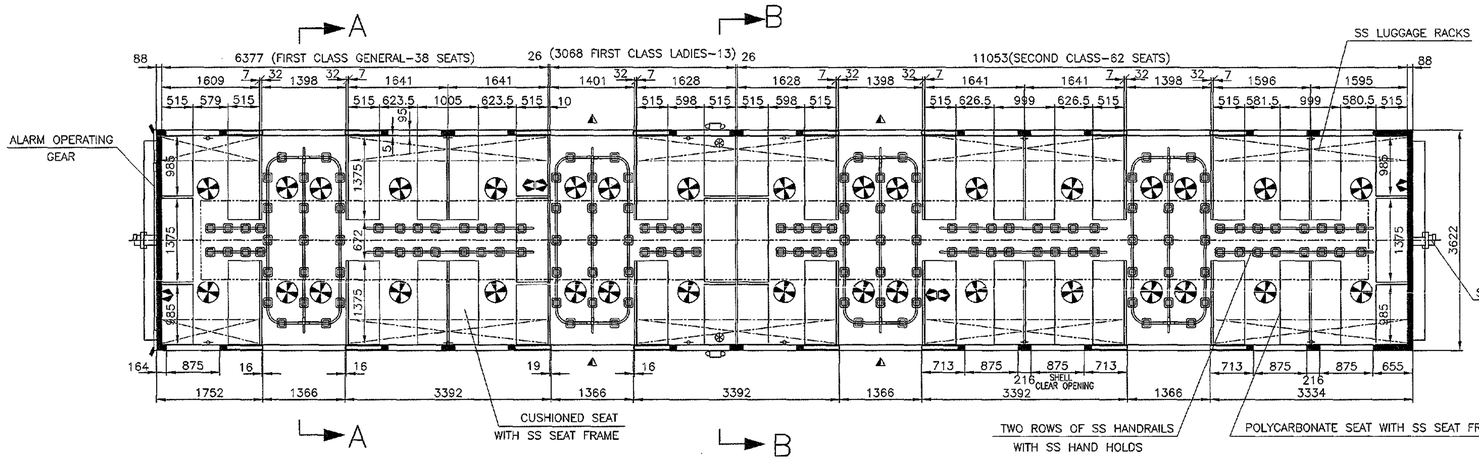
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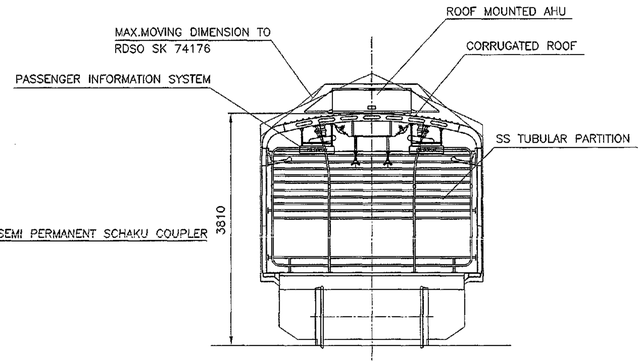
ALTERATIONS



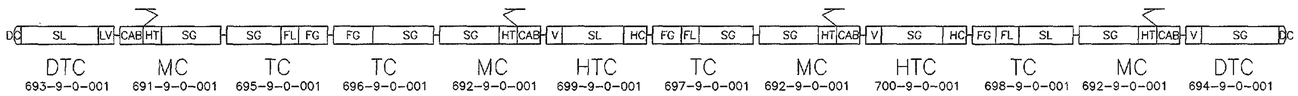


SECTION–AA

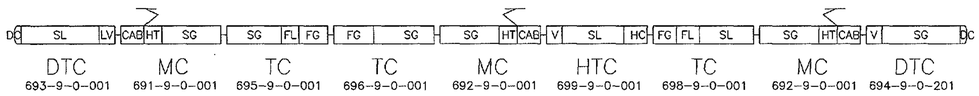




SECTION–BB



12 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

I CLASS GENERAL	–38
I CLASS LADIES	–13
II CLASS----------	–62
TOTAL SEATING CAPACITY	–113

4. SEATED PASSENGER LOAD (113X60kg) ----------6.78 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL–442x60kg)----26.52 TONNES

TOTAL PAY LOAD --------33.30 TONNES

6. TARE WEIGHT ---------- 37 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- PASSENGER ALARM INDICATION LIGHT
- BUZZER

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:	

LAYOUT OF 3 PHASE AC EMU TRAILER 'C' COACH (C.RLY.) FOR HARBOUR LINE & CIDCO

SCALE 1:50	SSE/D
	CHD
	ALTD
	DRN N.Shanmugavel

Alpha Alt:–

INTEGRAL COACH FACTORY CHENNAI–38

ASSEMBLY DRAWINGS			
	30–03–2017		
0 Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME

DATA CODE NO. 697

INDIAN RAILWAY STANDARDS

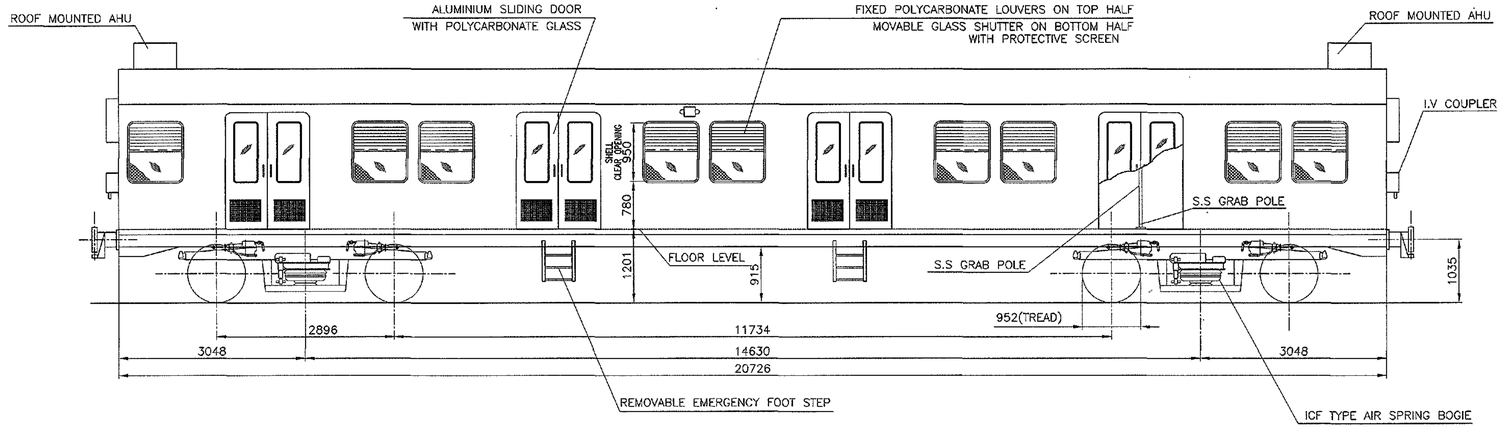
SHEET 1 OF 1

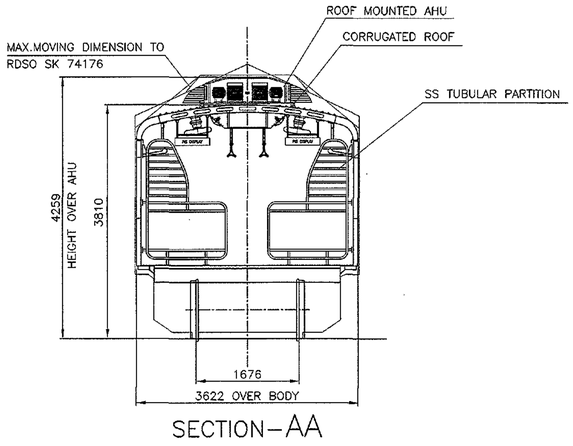
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FORM:–IR.A1–840X600

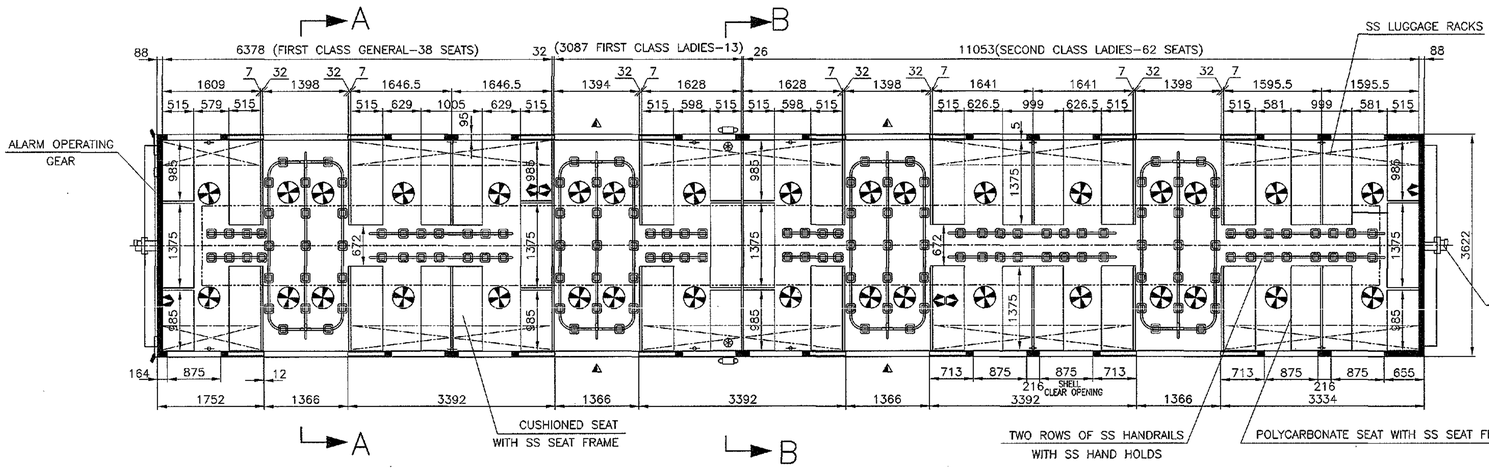
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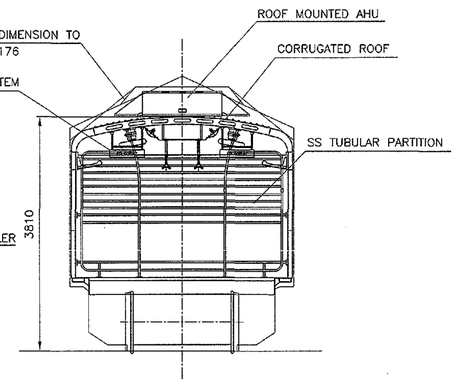
ALTERATIONS



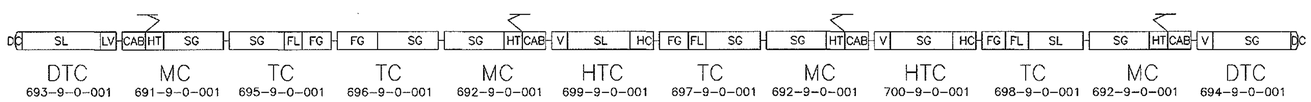


SECTION–AA

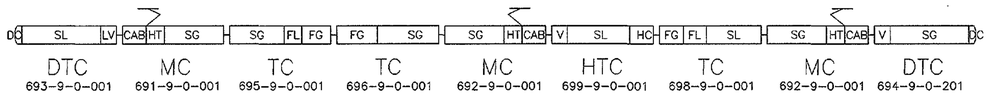




SECTION–BB



12 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

I CLASS GENERAL	–38
I CLASS LADIES	–13
II CLASS LADIES	–62
TOTAL SEATING CAPACITY	–113

4. SEATED PASSENGER LOAD (113X60kg) ----------6.78 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL–442x60kg)----26.52 TONNES

TOTAL PAY LOAD -------33.3 TONNES

6. TARE WEIGHT ---------- 37 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- PASSENGER ALARM INDICATION LIGHT
- BUZZER

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:	

LAYOUT OF 3 PHASE AC EMU TRAILER 'C' COACH (C.RLY.) FOR HARBOUR LINE & CIDCO

SCALE 1:50	SSE/D	N.Seeni	
	CHD		
	ALTD		
	DRN	N.Shanmugavel	

Alpha Alt:–

INTEGRAL COACH FACTORY CHENNAI–38

ASSEMBLY DRAWINGS		
30–03–2017	P. Wayfyn	
DATE OF FIRST ISSUE	AME/SME	

0	Num. Alt.	DATE OF LATEST ALT

DATA CODE NO. 698

INDIAN RAILWAY STANDARDS

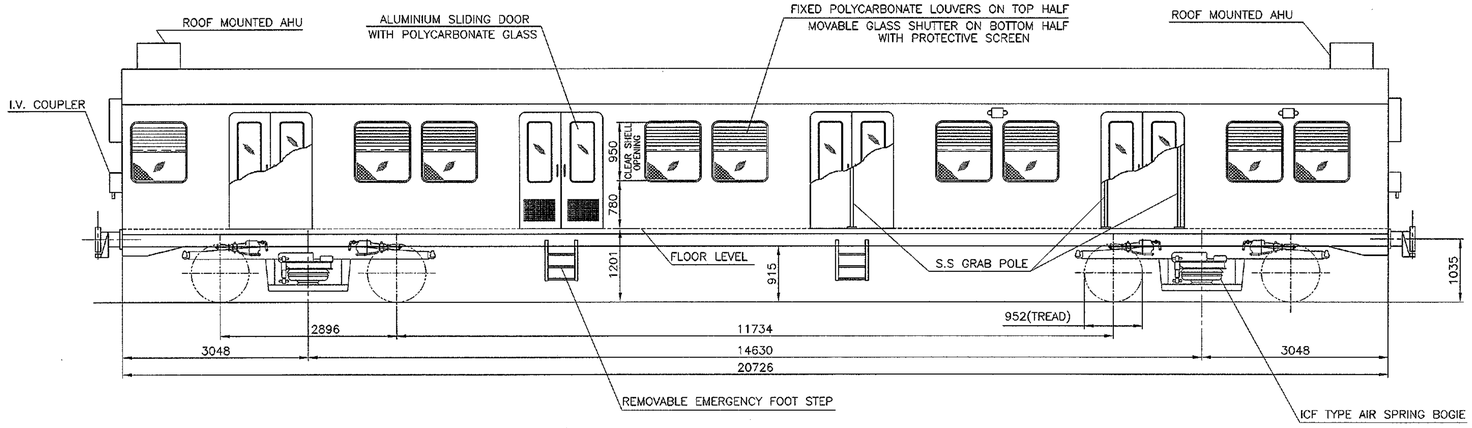
SHEET 1 OF 1

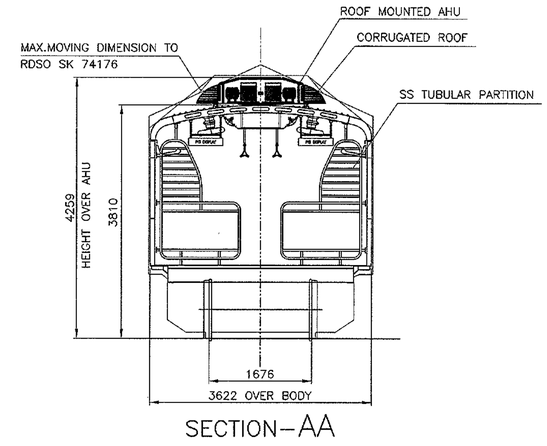
EMU/C6/3PH/HL-9-0-001

FORM:–IR.A1–840X600

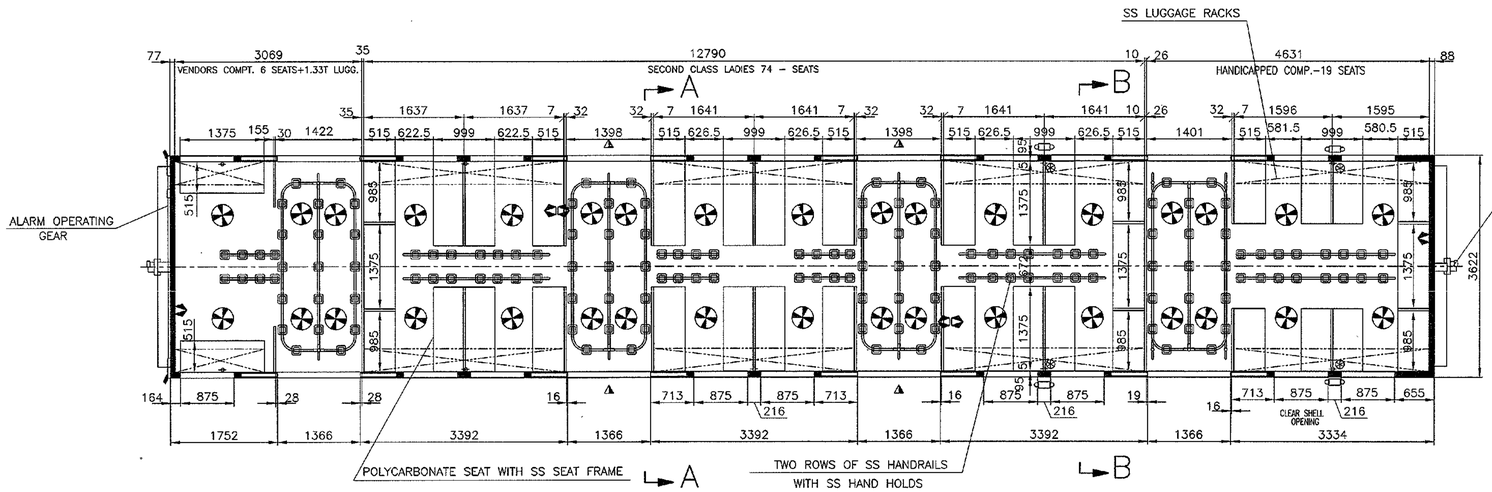
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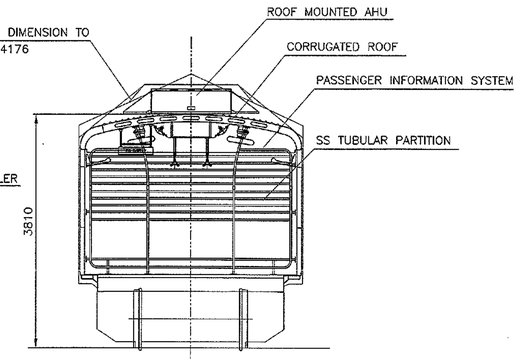
ALTERATIONS



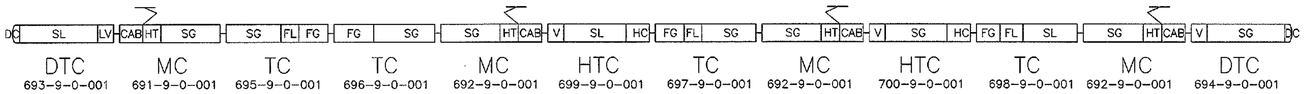


SECTION–AA





SECTION–BB



12 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT

FAN
ALARM PULL HANDLE
PASSENGER ALARM INDICATION LIGHT
REMOVABLE EMERGENCY FOOT STEP
BUZZER
PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS LADIES--------	74
VENDORS COMPT.--------	6
HANDICAPPED COMPT.-----	19
TOTAL SEATING CAPACITY	– 99

4. SEATED PASSENGER LOAD(99X60kg)----------5.94 TONNES
5. LUGGAGE----------1.33 TONNES
6. ADDL, STANDING PASSENGER LOAD(SDCL–403x60kg)---24.18 TONNES

TOTAL PAY LOAD -------31.45 TONNES

7. TARE WEIGHT _____ 38 TONNES (APPROX.)

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
	LAYOUT OF 3 PHASE AC EMU TRAILER 'D' COACH WITH HANDICAPPED COMPT.(C.RLY.) FOR HARBOUR LINE & CIDCO				SUPERSEDES:	

SCALE	SSE/D	
1:50	CHD	
	ALTD	
	DRN	N.Shanmugavel

Alpha Alt:–

INTEGRAL COACH FACTORY CHENNAI–38

				ASSEMBLY DRAWINGS		
0	Num. Alt.	DATE OF LATEST ALT		30–03–2017	AME/SME	

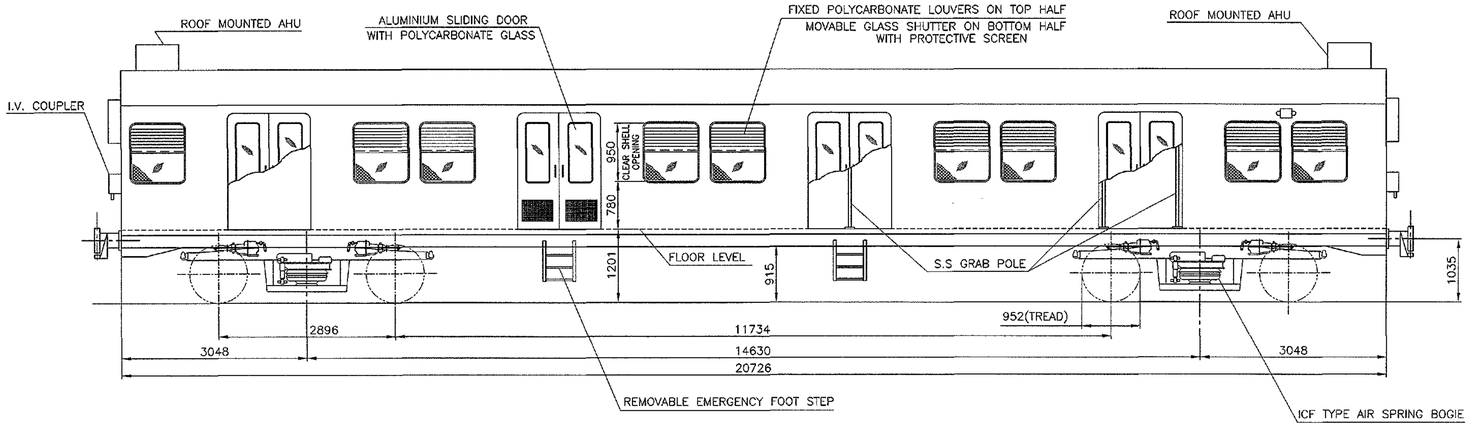
DATA CODE NO. 699 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1

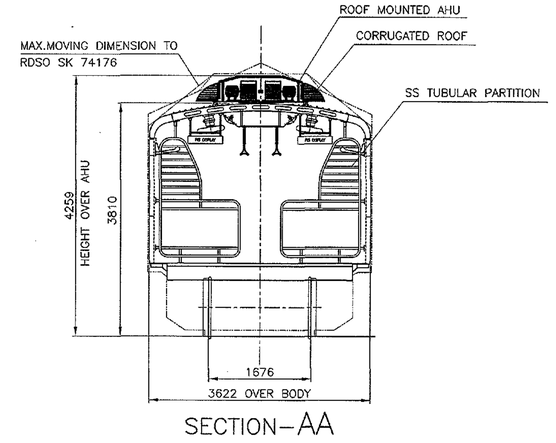
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FORM:–IR.A1–840X600

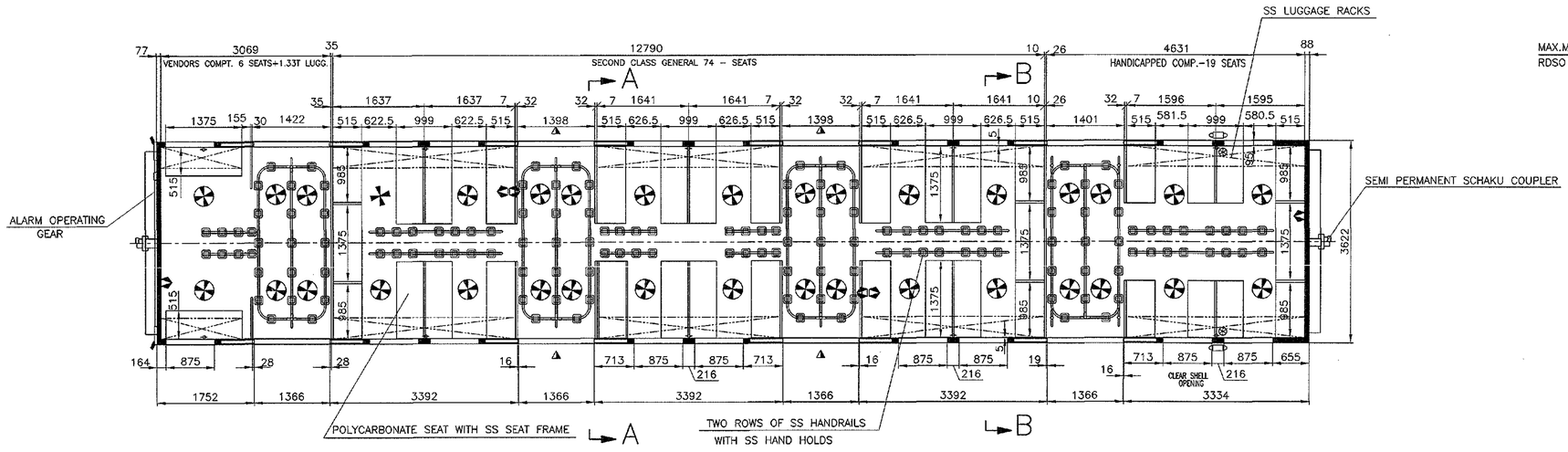
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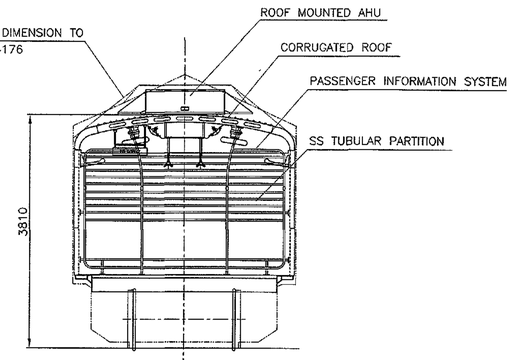
▽ ROUGH MACHINED	(01) ROUGH CLEANING	ALTERATIONS
▽▽ FINISH MACHINED	(18) CHAMFERED	
▽▽▽ FINE FINISH MACHINED		



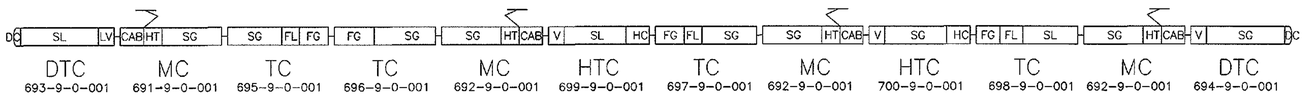


SECTION–AA

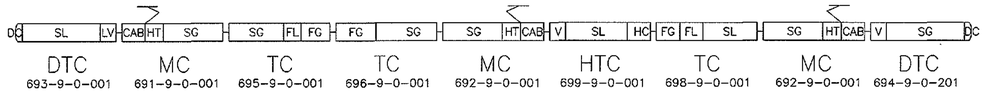




SECTION–BB



12 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT



9 COACH FORMATION AS PER CENTRAL RLY'S REQUIREMENT

- FAN
- ALARM PULL HANDLE
- PASSENGER ALARM INDICATION LIGHT
- REMOVABLE EMERGENCY FOOT STEP
- BUZZER
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)

1. BOGIE----------AIR SPRING BOGIE
2. AXLE CAPACITY----------20.32 TONNES
3. NO. OF PASSENGERS TO SEAT

II CLASS LADIES--------	74
VENDORS COMPT.--------	6
HANDICAPPED COMPT.----	19
TOTAL SEATING CAPACITY	– 99

4. SEATED PASSENGER LOAD(99X60kg)----------5.94 TONNES
5. LUGGAGE---------- 1.33 TONNES
6. ADDL, STANDING PASSENGER LOAD(SDCL–403x60kg)--24.18 TONNES

TOTAL PAY LOAD ------31.45 TONNES

7. TARE WEIGHT ---------- 38 TONNES (APPROX.)

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES:	

LAYOUT OF 3 PHASE AC EMU
TRAILER 'D' COACH WITH HANDICAPPED COMPT.(C.RLY.)
FOR HARBOUR LINE & CIDCO

			ASSEMBLY DRAWINGS		
			30-03-2017		
0	Num. Alt.	DATE OF LATEST ALT	DATE OF FIRST ISSUE	AME/SME	

SCALE	SSE/D		
1:50	CHD		
	ALTD		
	DRN	N.Shanmugavel	

Alpha Alt:–

INTEGRAL COACH FACTORY CHENNAI–38

DATA CODE NO. 700

INDIAN RAILWAY STANDARDS

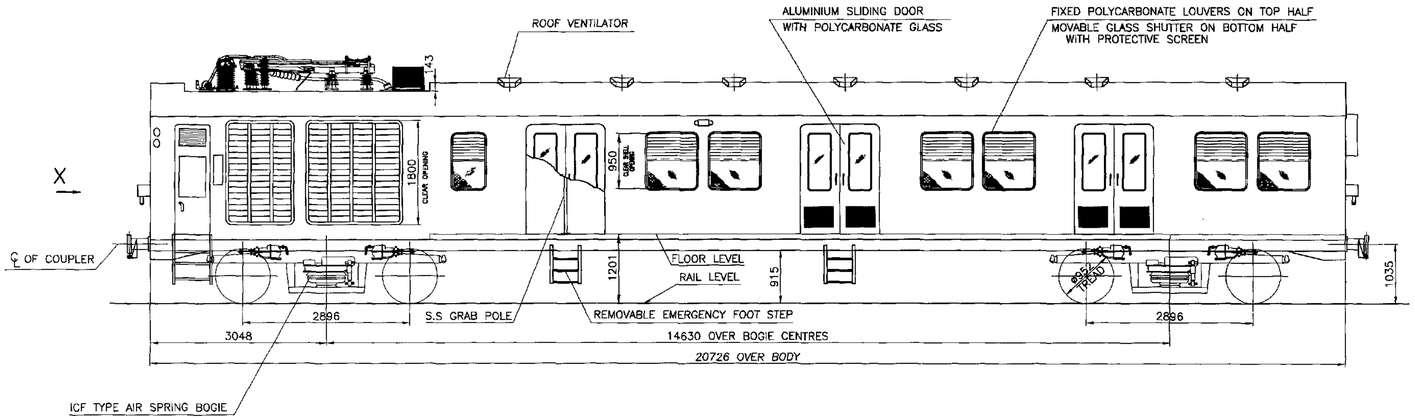
SHEET 1 OF 1

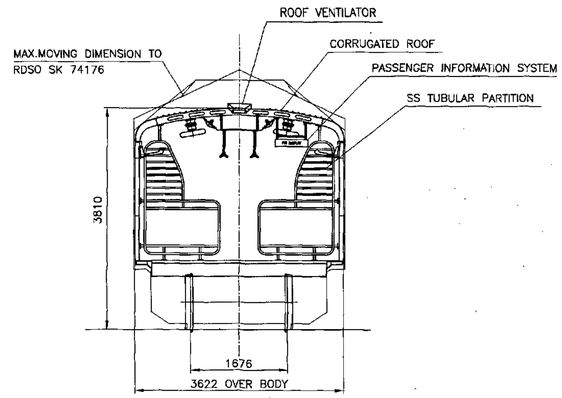
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FORM:–IR.A1–840X600

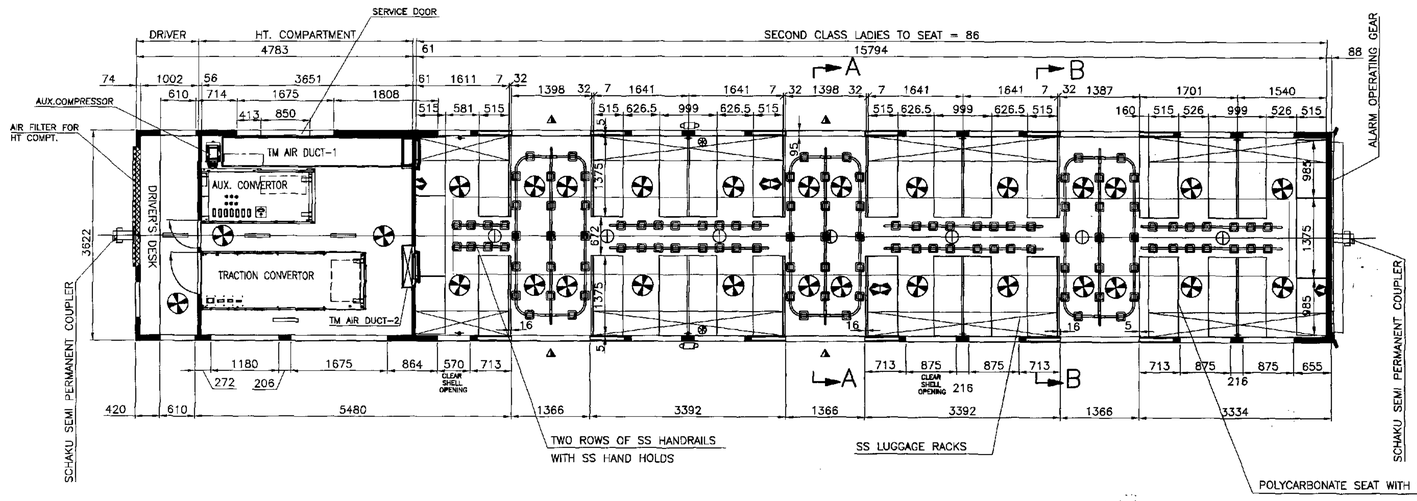
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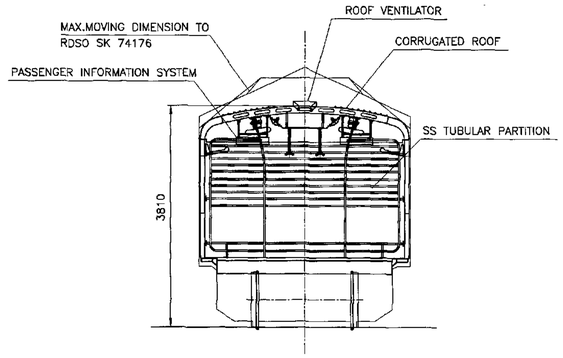
ALTERATIONS	
(a)	07/2017
COACH FORMATION REVISED.	
Sd/- SSE/D	Sd/- SME/DSD
(b)	03/2022
COACH FORMATION REVISED. RMVU REMOVED & VENTILATOR ADDED.	
SSE/D	AME/D



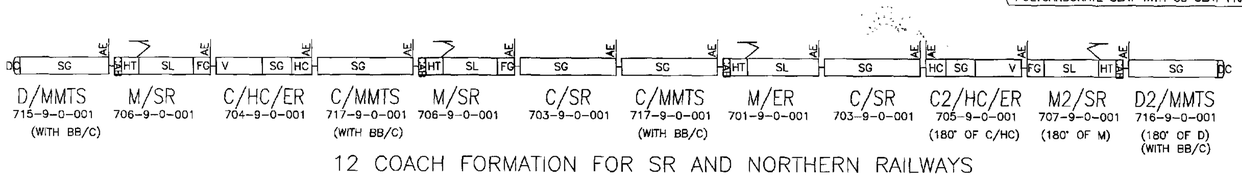


SECTION–AA

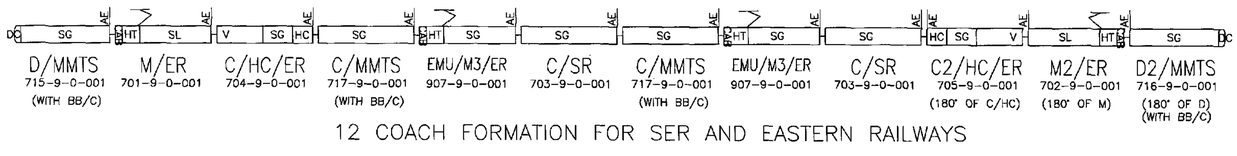




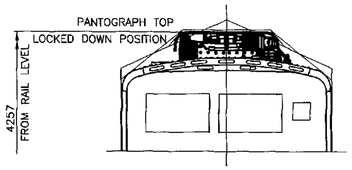
SECTION–BB



12 COACH FORMATION FOR SR AND NORTHERN RAILWAYS



12 COACH FORMATION FOR SER AND EASTERN RAILWAYS



VIEW – X

NOTE:

1. LUGGAGE RACKS, PARTITION FRAMES, SEAT FRAMES, HANDHOLD FRAMES, GRAB POLES AND WINDOW PROTECTIVE SCREENS ARE OF STAINLESS STEEL.
2. STAINLESS STEEL ENDWALL, SIDEWALL & CORRUGATED ROOF.
3. FRP INTERIOR PANELS FOR SIDE WALL, ENDWALL & ROOF PANELS.
4. STAINLESS STEEL HAND HOLDS.
5. STAINLESS STEEL SEATS.
6. SS CHEQUERED SLIP FREE FINISH FLOORING.
7. PASSENGER INFORMATION SYSTEM (SINGLE SIDED) @ 2 LOCATIONS
8. PASSENGER INFORMATION SYSTEM (DOUBLE SIDED) @ 2 LOCATIONS
9. EXTERIOR PU PAINTING

1. BOGIE——AIR SPRING BOGIE
2. AXLE CAPACITY——20.32 TONNES
3. NO. OF PASSENGERS TO SEAT——86
4. SEATED PASSENGER LOAD (86x60kg ——5.16 TONNES
5. ADDL. STANDING PASSENGER LOAD(SDCL–352x60kg) –21.12 TONNES

TOTAL PAY LOAD ——26.28 TONNES

6. TARE WEIGHT —— 54 TONNES (APPROX.)

- FAN
- ALARM PULL HANDLE
- PASSENGER INFORMATION SYSTEM (SINGLE SIDED)
- PASSENGER INFORMATION SYSTEM (DOUBLE SIDED)
- EMERGENCY FOOT STEP
- FLUORESCENT LIGHT
- PASSENGER ALARM INDICATION LIGHT
- BUZZER
- ROOF VENTILATOR

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
	GROUP: 9–0				SUPERSEDED BY:	
					SUPERSEDES: EMU/M/ER-9-0-001/Alt: 'a'	

LAYOUT OF 3 PHASE AC EMU MOTOR COACH FOR EASTERN RAILWAY

SCALE 1:50	SSE/D
	CHD
	ALTD N.Shanmugavel
	DRN N.Shanmugavel
Alpha Alt:– b	

INTEGRAL COACH FACTORY CHENNAI–38

ASSEMBLY DRAWINGS					
0	Num. Alt.	21-03-2022 DATE OF LATEST ALT	23–06–2017 DATE OF FIRST ISSUE	AME/SME	

DATA CODE NO. 701 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1

EMU/M/ER–9–0–001

FORM:–IR.A1–840X600

MEMU/TC6-9-0-001

▽ ROUGH MACHINED		(Q1) ROUGH CLEANING	
▽▽ FINISH MACHINED			
▽▽▽ FINE FINISH MACHINED			

ALTERATIONS

(a) 7/2017
NUMBER OF STANDEES REVISED.
-Sd- SSE/D -Sd- SME/DSS

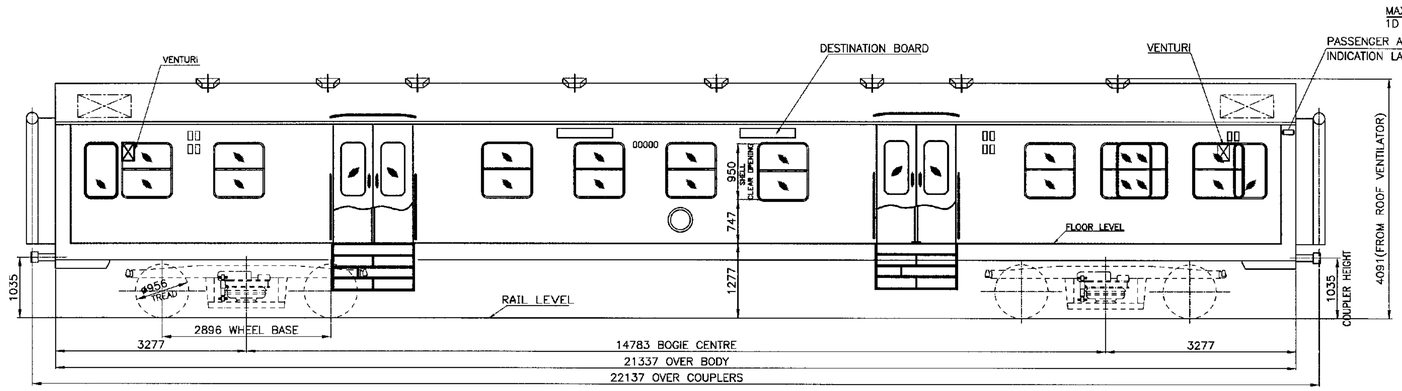
(b) 8/2017
NOTE-1 REVISED.
-Sd- SSE/D -Sd- SME/DSS

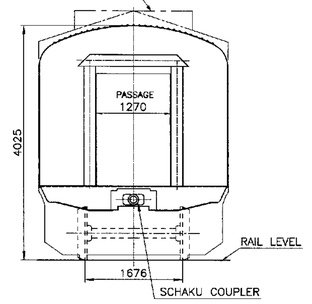
(c) 8/2017
END WALL ELECTRICAL CABINET INTRODUCED.
-Sd- SSE/D -Sd- SME/DSS

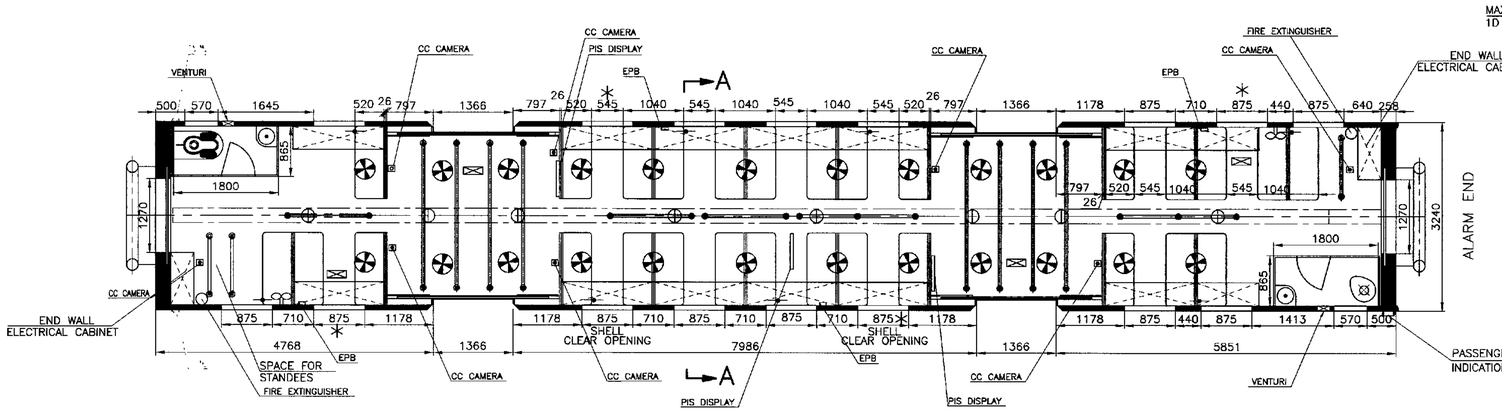
(d) 02/2020
TITLE REVISED.
-Sd- SSE/D -Sd- SME/DSS

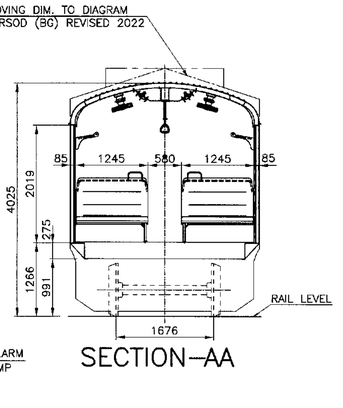
(e) 02/2021
ALARM END TOILET MODIFIED FROM INDIAN STYLE TO WESTERN STYLE.
-Sd- SSE/D -Sd- SME/DSS

(f) 05/2023
12 CAR FORMATION ADDED. MMD AND AMENETIES UPDATED
SSE/D AME/D

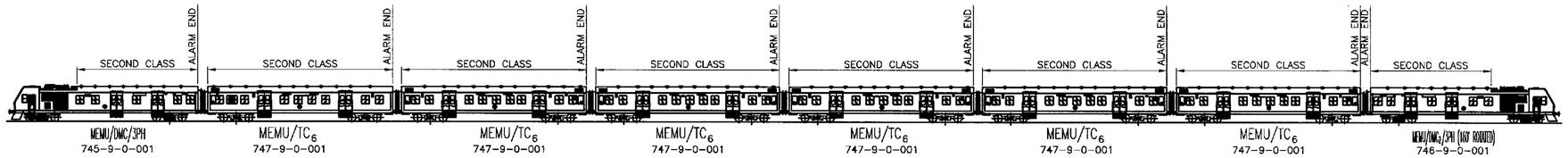




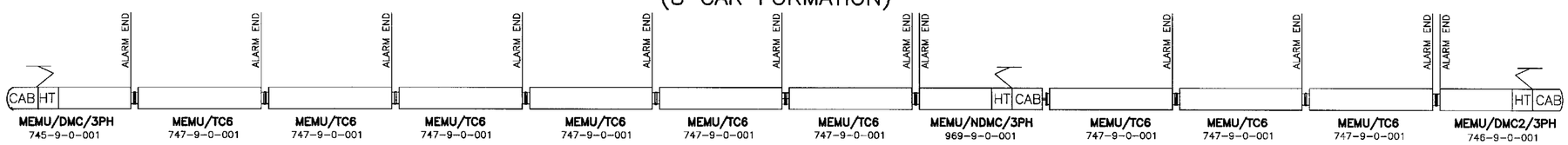




SECTION–AA



(8 CAR FORMATION)



(12 CAR FORMATION)

- RAILWAY CREST
- RAILWAY INITIALS
- 00000 COACH NUMBER
- FAN
- VENTILATORS
- ALARM PULL
- EMERGENCY WINDOW
- FAN
- EMERGENCY PUSH BUTTON (EPB)
- DISASTER ANAGEMENT LIGHT

PASSENGERS TO SEAT	84
NO. OF STANDING PASSENGERS	241
TOTAL NO. OF PASSENGERS	325
NO. OF DOORS ASIDE	2
PASSENGERS PER DOOR ASIDE	162
AXLE LOAD CAPACITY	20.3 Tonnes

NOTE:

1) THIS LAYOUT IS BASED ON MEMU/TC2-9-0-201 Alt 'b/-'.

ASSEMBLY DRAWINGS

		0	Num. Alt.	DATE OF LATEST ALT
06-03-2019	AME/SME			

DATE OF FIRST ISSUE

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC	WEIGHT/UNIT	REMARKS
1	GROUP: 9				SUPERSEDED BY:	
					SUPERSEDES:	MEMU/TC6-9-0-001 Alt 'a/-'

LAYOUT OF MEMU/TC

SCALE 1:50	SSE/D	
	CHD	
	ALTD	M.SIVAKUMAR
	DRN	Jagadeeshwar

Alpha Alt:- F

DATA CODE NO.		SHEET
747	INDIAN RAILWAY STANDARDS	1 OF 1

INTEGRAL COACH FACTORY CHENNAI-38

MEMU/TC6-9-0-001

FORM:-IR.A1-840X600

MEMU/DMC/3PH-9-0-001

▽ ROUGH MACHINED	ⓓ ROUGH CLEANING
▽▽ FINISH MACHINED	
▽▽▽ FINE FINISH MACHINED	

ALTERATIONS

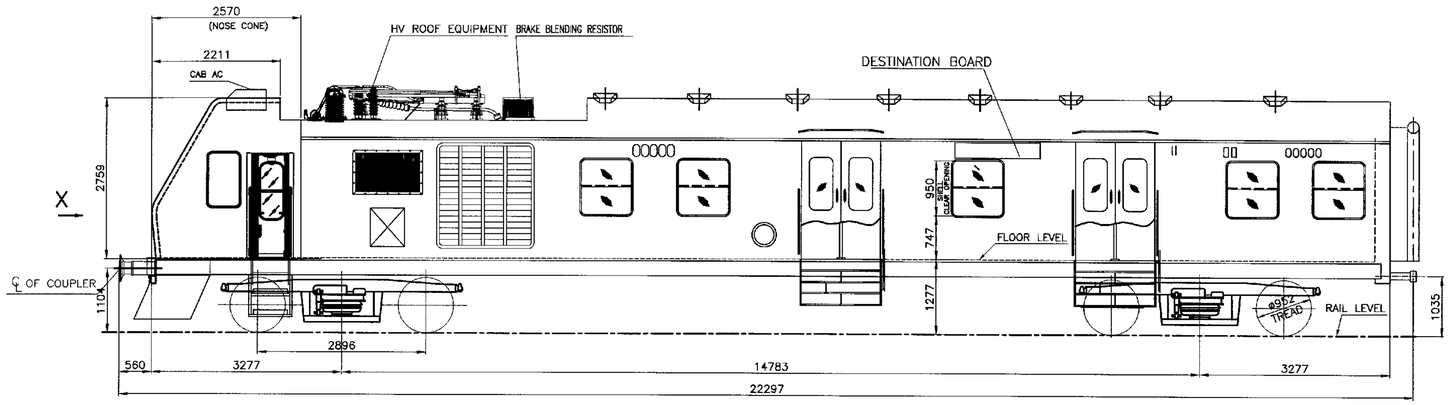
ⓐ 7/2017
AREA OF DRIVER'S CAB H.T. COMPARTMENT AND ADJOINING PASSENGER COMPARTMENT REVISED.
sd/- SSE/D sd/- SME/DSS

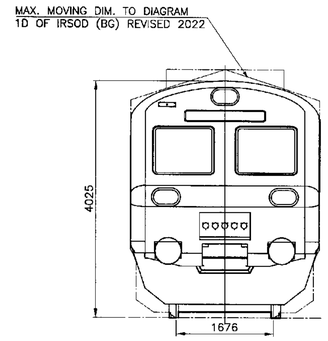
ⓑ 7/2017
LAYOUT REVISED.
sd/- SSE/D sd/- SME/DSS

ⓒ 8/2017
NOTE-1 REVISED.
sd/- SSE/D sd/- SME/DSS

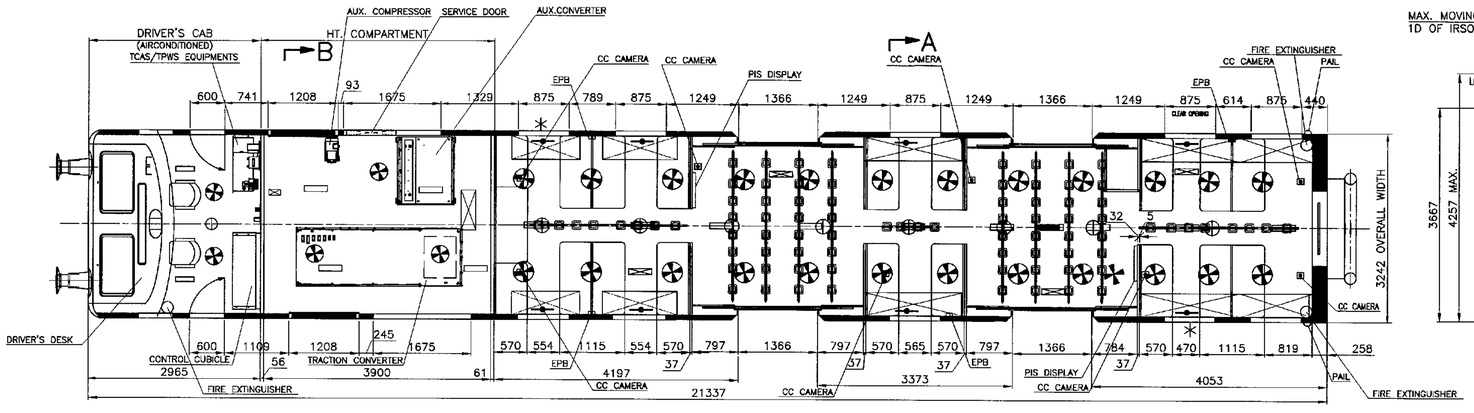
ⓓ 02/2020
TITLE REVISED.
sd/- SSE/D sd/- AME/SME

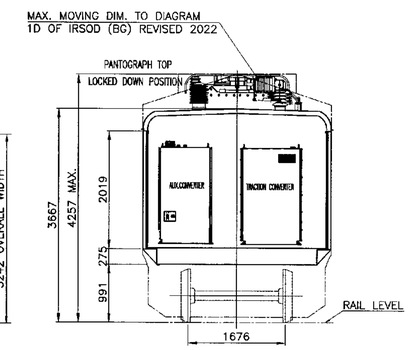
ⓔ 05/2023
12 CAR FORMATION ADDED. MMD AND AMENITIES UPDATED
SSE/D AME/D



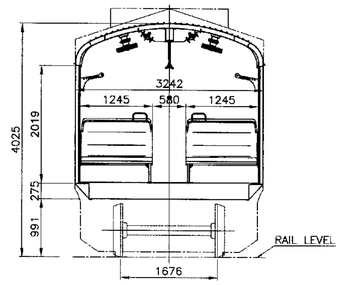


VIEW – X

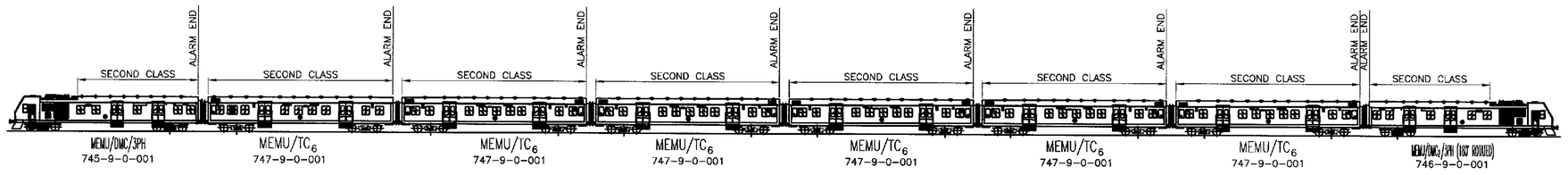




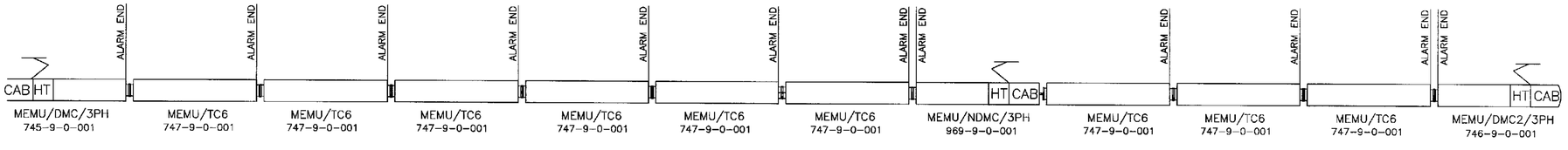
SECTION–BB



SECTION–AA



(8 CAR FORMATION)



(12 CAR FORMATION)

* EMERGENCY WINDOW
RAILWAY CREST
RAILWAY INITIALS
00000 COACH NUMBER
FAN
LED LIGHT
DISASTER MANAGEMENT LIGHT
ALARM PULL
VENTILATORS
EMERGENCY PUSH BUTTON

PASSENGERS TO SEAT ——— 55
NO.OF STANDING PASSENGERS — 171
NO.OF DOORS ASIDE ——— 2
PASSENGERS PER DOOR ASIDE — 113
AXLE LOAD CAPACITY ——— 20.32 tonnes

NOTE:

1) THIS LAYOUT IS BASED ON MEMU/DMC3-9-0-301 ALT 'e/-'.
2) ROOF TO SUIT BOTH HIGH RISE & NORMAL PANTOGRAPH.

ASSEMBLY DRAWINGS

0 Num. Alt.	17/05/2023 DATE OF LATEST ALT	20-06-2017 DATE OF FIRST ISSUE	AME/SME	

QTY	DESCRIPTION & DIMENSION	ITEM	REF.DRGS	MAT.SPEC
1	GROUP: 0			

LAYOUT OF MEMU/DMC(3 PHASE)

DATA CODE NO. 745 — INDIAN RAILWAY STANDARDS — SHEET 1 OF 1

WEIGHT/UNIT	REMARKS
SUPERSEDED BY:	
SUPERSEDES:	MEMU/DMC3-9-0-301 Alt 'd/-'
SCALE 1:50	SSE/D
	CHD
	ALTD M.SIVAKUMAR
	DRN JAGADEESHWAR
Alpha Alt:- e	

INTEGRAL COACH FACTORY CHENNAI-38

MEMU/DMC/3PH-9-0-001

FORM:-IR.A1-840X600

2596898/2024/O/o SEE/D/EL/RCF/KXH

Corrigendum- 1 to specification No. EDML-210

"Specification for Automatic Smoke/Fire detection with Alarm system for 3 phase EMU/MEMUs"

The following corrigendum is issued to EDML-210:

SN	Clause No.	Existing Clause	Revised Clause
1	Clause 5 of EDML 210	TCMS interface is not in the scope of supply and separate FDCU shall be provided with HMI display of 7 inches (min.) with metallic enclosure and mounting arrangement to suit at site in each DMC of MEMU rakes and each DTC of EMU rakes. All major components i.e. Fire Control unit, Heat cum Smoke detector, HMI etc. shall be SIL2 complaint (EN54-7, EN54-5, EN54-2 etc.) as mentioned in the RDSO guidelines	TCMS interface is not in the scope of supply and separate FDCU shall be provided with HMI display of 4.3 inches (min.) with metallic enclosure complying with the requirement of EN50155 and mounting arrangement to suit at site and fit in the actual space available in each DMC of MEMU rakes and each DTC of EMU rakes. System shall be SIL2 complaint to EN50128/EN50657 and EN50129. The Smoke detector shall be compliant with EN54-7, EN54-5 as mentioned in the RDSO guidelines or EN54-29 for Point detectors with combination of smoke and Heat sensors.
2	Clause 7(iv) of EDML-210	Six nos. control cables have been dedicated for Fire Detection System (FDS) in the inter coach couplers/jumper cables and shall be in scope of Railways. For all other communication and transmission of data between FDCU and Detectors, the cables and accessories shall be in the scope of supplier.	In general, for Non-AC 3-phase EMUs and MEMUs, 6 nos. spare connection points for train control lines are available as per design. Hence, six nos. control cables have been dedicated for Fire Detection System (FDS) in the inter coach couplers/jumper cables and shall be in scope of Railways.For all other communication and transmission of data between FDCU and Detectors, the cables and accessories shall be in the scope of supplier. The system with 6 pins/8 pins is also acceptable, however it will be the responsibility of the bidder for complete installation/ commissioning of the system in the available rakes at Zonal Railways. Further as mentioned in the guidelines issued by RDSO at clause C-9 'any other requirement of hardware and software to make the system fully functional will be in the scope of

			supplier'. This shall be accomplished without any extra cost of any additional item/ accessories required at site.
	8 (iv) New clause added	--	(iv) Along with prototype approval, the complete scheme for implementation in the entire EMU/MEMU Rakes shall also be submitted and got validated by the firm in one Rake at any one of the Zonal Railway for each combination of rakes before bulk supply and execution of works is taken up.
3	6 A.	-	**A. MEMU Rakes:** The Total quantity for BT 8/12/16-car configuration of to be read as 32/48/64 respectively. Following note for scope of supply at the end of table added: **Note:** Total required quantity for MEMU rake shall be as under: Rake configuration (Medha/BT/ BHEL) — Total quantity 8 car — 32(*) 12 car — 48(*) 16 car — 64(*) (*) These quantities are standardised and shall be supplied against all makes of Propulsion systems and the excess quantities rendered shall be given as spares with User Railways.
4	6 B.	-	Following note for scope of supply at the end of table added: **Note:** Total required quantity for Non-Air conditioned EMU rake shall be as under: Rake configuration (Medha/BT/ Siemens) — Total quantity 12 car — 54(**) 15 car — 67(**) (**) These quantities are standardised and shall be supplied against all makes of Propulsion systems and the excess quantities rendered shall be given as spares with User Railways.
5	Annexure- 1		Annexure-1 (Revised) attached.

Amendment-1 to specification No. EDML-210, Rev- Nil, Corrigendum-1 for Automatic Smoke/Fire detection with Alarm system for 3 phase EMU/MEMUs

This amendment is issued to specification No. EDML-210, Rev- Nil, Corrigendum-1 for Automatic Smoke/Fire detection with Alarm system for 3 phase EMU/MEMUs to incorporate the following changes:

(i) For tender no. 17251162A, clause 3 of EDML 210 to be read as:

Railway	EMU		MEMU		
	12 car	15 car	8 car	12 car	16 car
CR	3	0	0	1	0
ER	44	0	9	2	0
ECR	0	0	3	1	0
ECoR	0	0	3	0	0
NR	6	0	6	6	3
NCR	0	0	4	0	0
SR	14	0	2	0	0
SER	0	0	4	0	0
SCR	6	0	0	0	0
SWR	0	0	3	4	0
SECR	0	0	9	0	0
WR	0	6	4	4	0
NER	0	0	20	0	0
Total rakes	**73**	**6**	**67**	**18**	**3**
Basic units	**322**		**200**		
Total basic units	**522 basic units**				

* The above distribution may vary according to the actual rakes available at site and firm shall carry out the installation, testing and commissioning accordingly.

** The shed-wise holding and consignee details are as per Annexure-2 attached.

*** The allotment of rakes to supplier is interchangeable and may vary as per the requirement of IR and firm shall be required to carry out the work as required by Railways.

(ii) Annexure-1 (Revised) issued vide corrigendum -1 to EDML-210 is not applicable for tender no. 17251162A.

Annexure-2

Consignee details of FSD_EMUs and MEMUs

SN	Railway	Rolling stock	No. of cars	No. of rakes	EMU car shed (respective)	Consignee details
1	CR	EMU	12-car	3	KLVA carshed	Sr. DEE (TRS)/ KLVA
		MEMU	12-car	1		
2	ER	EMU	12-car	44	HWH carshed	Sr. DEE, Howrah, ER
		MEMU	8-car	9		
			12-car	2	RHA carshed	Sr. DEE, Sealdah, ER
3	ECR	MEMU	8-car	3	MEMU car shed, Gaya	DEE/MEMU car shed, Gaya
			12-car	1		
4	ECoR	MEMU	8-car	3	MEMU car shed, Khurda Road	ADEE/MEMU/KUR, MEMU car shed, Khurda Road, ECoR
5	NR	EMU	12-car	6	EMU car shed, GZB	Sr. DEE/EMU/GZB
		MEMU	8-car	6		
			12-car	6		
			16-car	3		
6	NCR	MEMU	8-car	4	MEMU car shed, Kanpur	DEE/MEMU Car shed, Kanpur
7	SR	EMU	12-car	14	car shed, Avadi	Sr. DEE/TRS/AVD
		MEMU	8-car	2		
8	SER	MEMU	8-car	4	EMU Car shed, TPKR	Sr. DEE/TRS/TPKR EMU car shed, Tikiapara, Howrah, SER
9	SCR	EMU	12-car	6	Trainset Maintenance depot, Moulali, HYB division	DEE, Trainset Maintenance depot, Moulali, Secunderabad, Telangana, SCR
10	SWR	MEMU	8-car	3	MEMU shed, BAND	Sr. DEE/MEMU shed, Banaswadi, SWR
			12-car	4		
11	SECR	MEMU	8-car	9	DEMU shed Gondia MEMU car shed, Bhilai	1. DME/DEMU shed Gondia 2. DEE/MEMU car shed, Bhilai SECR
12	WR	EMU	15-car	6	MMCT Car shed	Sr. DEE(RS) EMU car shed, WR Mumbai Central, Mumbai
		MEMU	8-car	4		
			12-car	4		
13	NER	MEMU	8-car	20	Trainset Depot ARJ, BSB Division	Sr. DME/TS/ARJ, TSD/ARJ, NER