

RAIL COACH FACTORY, KAPURTHALA

SPECIFICATION FOR TESTING TROLLEY FOR MEMU DMC COACHES

Specification No. Mech/M&P/2700/GM/17

IMPORTANT NOTE:

- (i) Bidders are required to give clause wise comments on the technical specifications, confirming compliance/non-compliance with details of deviations if any along with their effect on the performance. Back references to be avoided, offers are likely to be ignored in case of non-compliance of these instructions for furnishing the information.
- (ii) The bidders should quote for sub-systems of makes as specified in these specifications. Other makes of sub-systems will not normally be acceptable. In case, for reasons to be indicated by the bidder, it becomes necessary for him to quote for makes other than those specified, the alternative makes may be accepted only, on merit.
- (iii) Tenderers must offer and quote the price of all the concomitant accessories specified, as considered essential for commissioning and utilization of the machine. Offers received deficient of price of any of the concomitant accessories specified, are liable to be considered as incomplete.

1.0 PREFACE:

This specification covers the requirements of design, manufacture, testing and supply of testing trolley for MEMU DMC coaches being manufactured at RCF.

2.0 SCOPE OF SUPPLY :

The testing trolley shall comprise of a light weight movable trolley fabricated with the help of MS square tubes of min. size 25 x 50 mm and MS sheet thickness 2.0 mm (min). The trolley shall be provided with all the equipments / switchgear to fulfill the requirements of testing as mentioned in above clauses. This specification is for broad guidance only and the firm shall be wholly responsible and for provision of additional switchgear / indicating instruments i.,e voltmeters /ammeters and other accessories to ensure that testing trolley complies to the requirements to conduct the above tests in coaches. If required the testing procedures may be seen by the firm's representative at RCF for any technical clarifications before quoting.

3.0 TESTING OF MEMU DMC COACHES - REQUIREMENTS :

The test panel shall be required for testing of the following systems and parameters of the completely furnished coach:

Prepared By	Checked By	Approved By

a) Voltage Ratio of Main Transformer:

The step down transformer of Continuous Rating 1000 KVA at 25 KV is provided as per the technical details given below:

- i. Primary winding 25 KV / 40 Amp
- ii. Secondary winding 782 Volt / 1280 Amp.
- iii. Auxiliary winding I 266 Volt / 55 Amp.
- iv. Auxiliary winding II 141 Volt / 250 Amp.
- v. Frequency 50 Hz.

To test the transformer before installation in the coach different voltage ratios of the transformer are checked with the help of testing trolley at low voltage on primary side and corresponding voltages on secondary tapplings are recorded. Generally this test is conducted at 230 V/ 241 V on input side of the transformer.

The test is repeated after installation in the coach also with cable head termination and all the other equipments connected in the circuit and oil circuit filled with insulating oil.

b) Rotation checking of the DC motors:

To ensure the correct rotation of the DC traction motors after lowering of the coach on bogies it is important that the DC voltage with correct polarity is available in the connection boxes provided on the under frame of DMC coaches and meant for the connections of traction motors. A test for checking the polarity of DC supply is conducted on each coach before lowering by connecting the 141 V AC supply available in the testing trolley on the input side of the full wave bridge rectifier. This results in generation of a DC voltage of ≈ 190 V after rectification in the connection boxes. On the other hand , the testing trolley is equipped with 4 nos. DC motors which simulate the actual traction motors provided on bogies. The direction of rotation is clearly and legibly indicated as ' Forward ' and 'Reverse' on the front panel of the testing trolley. To simulate the correct rotation of each motor, DC supply which is available in the motor connection boxes is fed to the DC motors provided in the trolley through individually designated 4 nos. connectors provided on the trolley and the rotation of these motors is examined.

c) 266 V Testing :

The transformer is having an auxiliary winding at 266 V AC as mentioned above and the auxiliaries i.e compressor motor , battery charger, rectifier cooling fans etc are provided in each Driver Motor Coach which run at 266 V. The performance/satisfactory functioning of these auxiliary equipments is tested after installation in the coach before the coach is placed for actual testing on OHE. For con-

Prepared By	Checked By	Approved By

ducting this test 266 V power supply outlet of adequate capacity is available on the testing trolley.

d) 141 V Testing :

MEMU DMC coaches are provided with 30 nos. of 450 mm sweep RC fans and light fittings rated at 140 V AC. The testing of light and fan circuit is conducted with the testing trolley at 140 V AC power supply of adequate capacity.

e) 110 V DC Testing:

In case of emergency 110 V DC light fittings are provided in the coach. To test the functioning 110 V DC lighting circuit power supply is connected from the trolley to MCB panel provided in the coach end wall/MLT panel.

f) Contuinity Testing:

The electrical power at 141 V AC from main transformer alongwith 110 V DC power and other communication is transmitted from DMC coach to the adjoining TC coaches in the rake through inter coach connectors called A,B,C,D couplers. These couplers are provided on end walls of TC coaches. To check the correctness of the connections in the couplers, end wall terminal boards/MLT panel , continuity check is conducted.

For continuity testing, a 24 V DC system shall be provided in the trolley for checking the continuity of couplers on both ends of the coach. For this trolley shall have provision of connecting the ABCD coupler sockets on the coach with the help of plug and associated harness of length 20m length of 19 core x 0.75 sq.mm Teflon wires. Suitable connectors shall be provided in the trolley for terminating the 19 - cores of the coupler wires for continuity checking with the help of shorting link and a audio visual device (buzzer) giving beep sound for each correct connection.

3.1 Accordingly, the testing trolley shall comprise of the following provisions in the testing panel:

3.1.1 Transformer of adequate capacity to provide the following voltages for testing of different parameters in the coach

(a) Tapping of 141 V AC of minimum 3 KVA rating.

(b) Tapping of 266 V AC of minimum 3 KVA rating.

(c) Power supply to provide 110 V DC of 2 KW capacity.

The trolley shall be equipped with industrial outlet sockets of adequate rating for the above mention supply points.

3.1.2 DC motors - 04 nos. indicating the direction of traction motors as 'Forward' and 'Reverse' on the front panel. Additional indication with Green LED indicator for forward direction and Red LED indicator for reverse direction shall also be provided.

Prepared By	Checked By	Approved By

- 3.1.3 Multi-pin dedicated sockets on the testing trolley for connecting the power supply to DC motors provided in the panel. Interconnecting cables compatible plug on testing trolley side and heavy duty crocodile clamps on other side for making inter connections between the trolley and traction motor connection boxes.
- 3.1.4 Traction motor connection boxes provided in the coach underframe and the testing trolley. The entire length of the cables shall be protected with proper means to ensure protection from mechanical damage. The length of the cables shall be 20 metres each.
- 3.1.5 To energise the testing trolley a pre cooling plug with input cable of appropriate rating according to the full load capacity of the transformer provided in the testing trolley with minimum length of 20 metres of cables shall be provided.
- 3.1.6 An extension of 415 V, 3 Ø supply through 125 A pre cooling socket shall be provided in the trolley with an ON-OFF switch of 100A rating.
- 3.1.7 For continuity testing socket outlets (2 nos. for each coupler i.e A,B,C,D coupler) on the trolley shall be provided. These sockets shall be internally wired and terminated on individual terminal strips provided in the trolley and a shorting link shall be provided for checking the continuity by shorting each pair of adjacent terminals.
- 3.1.8 For interconnection of each coupler socket with the testing trolley socket , Cable harness with 0.75 sq.mm x 19 core Teflon cable (20 m in length) with coach compatible plug on one end and trolley compatible plug on other end shall be provided. Testing leads (10 m length 0.75 sq.mm Teflon cable) for checking the continuity on plug side and shorting link shall also be provided in the trolley.
- 3.1.9 Provision of protection equipment i.e MCCB of adequate rating as per requirement and of reputed make i.e M/s Seimens / ABB / Schneider / L&T shall be provided for protection of each circuit.

4.0 CONSTRUCTIONAL REQUIREMENTS – MEMU DMC COACHES.

- 4.1 The testing trolley shall be provided with 4 nos. hard rubber wheels with 360 deg rotation and of minimum diameter 200 mm for to and fro movement inside the workshop area. Prior approval of the wheels shall be taken before fitment in the trolley. The trolley shall have handles at suitable height on both front and rear side to facilitate easy movement by testing personnel.
- 4.2 Cable reel for input connecting cable of minimum 20 metres length with manual rolling arrangement shall be provided with the trolley for rolling over the cables. Also space shall be provided on the trolley to keep inter connecting

Prepared By	Checked By	Approved By

leads for DC motors in position and wrapping arrangement of the associated harness of min 20 metres length, while not in use, with anti theft arrangement.

- 4.3 All the equipments shall be fitted on the trolley to ensure ease in routine maintenance / replacement / checking.
- 4.4 All the switchgear and protective devices shall be housed in a single control box and shall be mounted on the trolley alongwith the the other equipments.
- 4.5 The internal wiring shall be done with Halogen free electron beam irradiated Radox cables of M/s LAPP KABEL or PTFE cables of reputed makes only. The size of cables shall be adequate to carry the rated full load current of step down transformer.
- 4.6 All cables shall be adequately secured with cables ties and laid in fire retardant PVC alleys of M/s L&T make only.
- 4.7 The outgoing/incoming terminal connections shall be brought out to adequately rated and robust terminal blocks. All cables leading to a terminal block shall be properly secured/clamped before termination. It shall be ensured that not more than two wires are terminated at one point.
- 4.8 Ring/tubular copper crimping sockets of M/s Ascon / M/s Billets and of adequate rating shall be used with suitable palm size to prevent loose connections.
- 4.9 All cut-outs wherein cables enter/exit, control panel shall be provided with V-grooved Neoprene / EPDM grommets for protection against sharp edges.
- 4.10 Proper arrangement for providing earthing to all the equipments provided in the testing panel shall be provided to prevent electric shock to the user. External earthing leads shall be provided with the test panel and shall be in the scope of supply of the firm.
- 4.11 All steel items shall be powder coated to thickness of 50-60 microns to Siemens Grey shade no. 6102/08038 of M/s Nerolac Paints or 877 of M/s Berger Paints, after giving requisite surface treatment.

5.0 GENERAL REQUIREMENTS :

- 5.1 General and safety requirements shall be governed by IS: 13947 (Pt.I) – 1993 and IS: 8623-1993.
- 5.2 The transformer shall be generally conforming to the requirements of IS: 2026 (latest) and the winding shall be done with H-class insulation.
- 5.3 Manufacturer's name plate indicating name and address sr. no. of the panel, specification no., month and year of manufacturer and weight shall be fixed on inside of front door of the panel.

Prepared By	Checked By	Approved By

- 5.4 Only reputed makes of switchgear i.e M/s ABB, M/s Schneider, M/s Seimens , shall be used. For any deviation prior approval from Dy.CEE/P shall be taken.
- 5.5 All fasteners used shall be zinc electroplated and passivated according to IS: 1573-86 and conforming to IS: 1364-92.
- 5.6 All the components / equipment / material including paint shall be fire retardant.
- 5.7 The equipment shall be under warranty for one year from the date of supply.

6.0 DEVIATION:

Normally no deviation shall be accepted, however for superior feature if any deviation from the above stipulations shall be brought out clearly giving advantages of the proposed deviation and approval shall be taken from CWE/Fur or CPE before supply of material to RCF.

7.0 INSPECTION & APPROVAL:

The firm shall submit the detailed drawings indicating overall general arrangement and schematic diagram, protection scheme alongwith complete bill of material for scrutiny / approval to DY CEE/P / RCF before starting the manufacture of the first unit. Inspection for compliance to the requirement of this specification shall be carried out by representative of Dy.CEE/EP/RCF on the finished product at firm’s premises.

8.0 PROVEN DESIGN & SYSTEM CAPABILITY :

The system offered must be of proven design incorporating latest features. The bidder shall provide sufficient evidence that he is a reputed / Proven manufacturer and has experience in manufacturing & supply of similar system. He is required to enclose along with the offer, his performance of last five years mentioning purchaser’s name & address for this purpose. In case a sole distributor is submitting the bid on behalf of the proven manufacturer, an authorization signed by the proven manufacturer should be submitted.

9.0 ELECTRICAL / ELECTRONICS:

- 9.1 Total power requirement shall be indicated by the bidder.
- 9.2 The bidder shall indicate the total connected load of the system.
- 9.3 The bidder shall indicate the electrical energy consumption (in kwh) of the total system when full system is in operation.

Prepared By	Checked By	Approved By

9.4 In case the total connected load exceeds 200 KVA capacity, a separate air circuit breaker for isolation shall be provided with suitable protections system like over current, under voltage, and under frequency protection system for isolating the system as a whole.

9.5 The system shall incorporate electrical safety as per relevant IE rules (latest). It should be certified by authorized Electrical Inspector.

10.0 OPTIONAL ACCESSORIES:

In case bidder desires to suggest any accessories to achieve higher performance and/ or better quality levels, the same shall be clearly explained and quoted separately as Optional accessories. The purchaser has the discretion to order or not to order.

11.0 GENERAL CONDITIONS:

The machine should be capable of operating in severe workshop condition of dust temperature between 0°C to 50°C and humidity up to 98%. The system should be capable of working under these conditions continuously on two shift basis.

12.0 SPARES:

12.1 The tenderer should furnish details of spares covered under warranty.

12.2 The tenderer should also furnish the price list of spare parts required for two years normal maintenance of the equipment.

13.0 COMMISSIONING AND PROVING OUT:

13.1 The successful bidder shall have to commission the Testing Trolley for MEMU DMC coaches within one month from the date of receipt at RCF, Kapurthala.

13.2 The successful bidder will get a general arrangement drawing approved from consignee before supply of the equipment. The GA drawing should indicate the general arrangement of sub-assemblies and functioning of the system.

14.0 TECHNICAL LITERATURE:

14.1 One copy of the printed illustrative catalogue showing features of the Testing Trolley for MEMU DMC coaches.

14.2 The successful bidder will have to furnish for 5 copies (4 hard & 1 Soft) of the spare parts catalogue giving the part List number of each component with exploded views and assembly drawings, maintenance manual, trouble-shooting guide, operational manual of the Testing Trolley for MEMU DMC coaches and all electrical circuit diagrams.

Prepared By	Checked By	Approved By

15.0 AMC

- 15.1 Tenderers are required to quote separately for a comprehensive Annual Maintenance Contract for the machine supplied against this specification, which will be inclusive of all spares, material and labour costs. The duties and taxes as applicable should be indicated separately.
- 15.2 AMC agreement for each installation will be signed between the consignee and the tenderer if opted for by the consignee.
- 15.3 The duration of AMC shall be 3 years from the date of expiry of warranty.
- 15.4 The tenderer must confirm willingness to offer AMC services at all consignee locations without any preconditions.

16.0 WARRANTY:

As per IRS terms and conditions of the contract

Prepared By	Checked By	Approved By