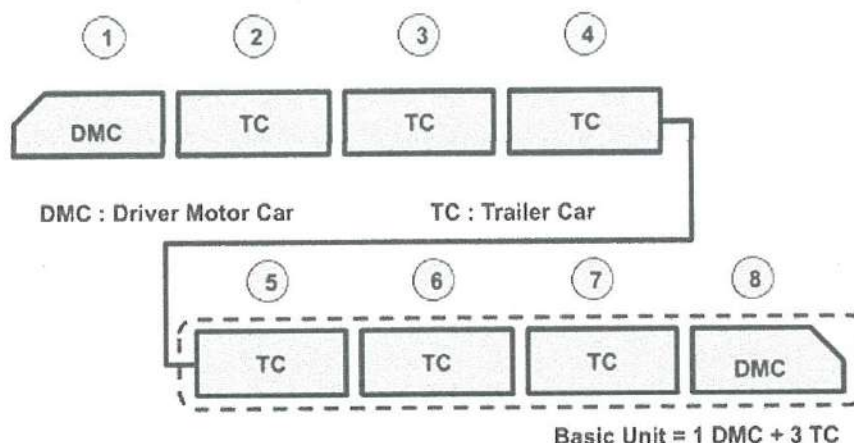


Technical Specification for MEMU Bogie Fabrication Fixture

1.1 Introduction

- 1.2 Modern Coach Factory (MCF), Raebareli is augmenting infrastructure in its Bogie Shop for in-house manufacture of MEMU bogies. At present, the shop has a facility to manufacture and assemble LHB bogies only. Establishment of MEMU bogie manufacturing facilities will diversify the product mix, enhance in-house capacity, and provide greater flexibility and control over MEMU production. The composition of a MEMU rake is shown below.



- 1.3 This specification covers the design, manufacture, supply, installation, commissioning and proving-out of fabrication fixtures required for manufacturing MEMU bogies at various stages in the Bogie Shop at MCF, Raebareli (UP) on turnkey basis.
- 1.4 MEMU bogies covered under this specification are of the following types:
- DMC Bogie** — Powered bogie (with traction motor arrangement)
[Layout Drawing MEMU/DMC3-9-0-301 latest alteration]
 - TC Bogie** — Non-powered bogie (without traction motor)
[Layout Drawing: MEMU/TC2-9-0-201 latest alteration]

Since the bogie frame and bolster layout for both variants are largely identical, except for certain brackets, the tenderer shall demonstrate manufacturing of both variants using the same fixtures, with only minimal additional fixtures, if required.

- 1.5 The tenderer shall be responsible for complete design and engineering of fixtures, based on available drawings and interface requirements. In cases where complete drawings are not available, the tenderer shall carry out necessary design development and verification to ensure suitability of fixtures for manufacturing MEMU bogies.
- 1.6 The scope shall include complete design, manufacture, supply, installation, commissioning, and proving-out of fixtures, along with all necessary documentation, to deliver fully functional and production-ready systems at MCF, Raebareli.

2.1 Scope of Work and Responsibilities of the Tenderer

- 2.2 The fixtures shall be designed, manufactured, supplied, installed, commissioned and proven out, complete in all respects, in accordance with the relevant bogie assembly, sub-assembly and component drawings. The drawings of MEMU bogies shall be provided by MCF as reference to design and develop fixtures. For tendering purposes, available drawings of the fixtures are enclosed for reference.

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2.3 The scope of work and responsibilities of the bidder shall include, but not be limited to, the following:

- a. The bidder shall be responsible for complete design, manufacture, supply, installation, erection, commissioning and proving-out of the fixtures at MCF, Raebareli (U.P.) on turnkey basis.
- b. In case of any revision in MEMU bogie or component drawings during execution of the contract, the fixture design shall be modified accordingly, without any additional cost implication to the purchaser, to conform to the latest approved drawings.
- c. The bidder shall submit complete design, detailed drawings, and technical details of the jigs and fixtures to MCF Design Department for approval prior to commencement of manufacturing. Manufacturing shall be taken up only after obtaining written approval from MCF.
- d. The bidder shall design, supply and construct all foundations, including foundation layout, foundation bolts, inserts, grouting arrangement, and associated civil requirements necessary for installation of fixtures.
- e. The bidder shall carry out complete installation and erection of fixtures at site in accordance with approved drawings and actual site conditions.
- f. The bidder shall supply all accessories, hardware and consumables required for installation and commissioning, including but not limited to foundation bolts, nuts, shims, leveling pads, anchor fasteners, grouting material, and associated items.
- g. The bidder shall make its own arrangements for electrical power and water supply required for foundation preparation, installation of fixtures, and execution of any other associated work. In case the bidder opts to utilize water and/or electricity from MCF sources, the applicable charges shall be levied as per the latest rates notified by MCF. It is further clarified that power supply points in the shop may be available only at discrete locations. The tenderer shall be responsible for making necessary arrangements for extension of power from these points to the required workplace, if needed.

Electrical power shall be provided by MCF free of cost for the purpose of proving out the suitability of the supplied fixtures, during preparation of bogie frames, bolsters, and sub-assemblies on the delivered fixtures. For this proving-out activity, MIG/MAG welding sets shall also be provided by MCF.

- h. Any additional work, material, equipment, or services not specifically mentioned but necessary for successful installation, commissioning, and operation of the fixtures shall be deemed to be included within the scope of the bidder.
- i. The bidder shall provide calibration certificates for all critical locating and measuring elements of the fixtures. The bidder shall also provide recommended maintenance schedule, calibration periodicity, and replacement intervals for consumable and wear items such as clamps, pads, locators, bushes, and similar components.
- j. The fixtures shall be handed over only after **successful proving-out and acceptance** by MCF.



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2.4 List of fixture drawings

Sl. No.	Description	Drg. No. / Reference
1	Welding fixture for Bogie Bolster for Air Spring Bogie	J&T/W-1008/01 Alt.-'nil'
2	Details of Welding fixture for Bogie Bolster	J&T/W-1008/02 Alt.-'nil'
3	Details of Welding fixture for Bogie Bolster	J&T/W-1008/03 Alt.-'nil'
4	Welding fixture for Bogie Bolster	J&T/W-0853/01 Alt.-'nil'
5	Welding fixture for Bogie Bolster arrangement	J&T/W-0881/01 Alt.-'b'
6	Welding fixture for Details for Bogie Bolster	J&T/W-0882/01 Alt.-'nil'
7	Welding fixture for Guide Rail for Bogie Bolster	J&T/W-0972/01 Alt.-'nil'
8	Welding fixture for Bogie Bolster Webs	J&T/W-0980/01 Alt.-'nil'
9	Welding fixture for Rib arrangement (for Bogie Bolster arrangement)	J&T/W-1015/01 Alt.-'nil'
10	Bogie frame jigs & fixture	J&T/W-0084/01 Alt-u
11	Bogie Side Frame Jigs & fixtures	J&T/W-0712/01 Alt-nil
12	Head Stock complete for Bogie Frame Jigs & Fixtures	J&T/W-0100/01 Alt-i
13	Welding fixture for Bogie frame arrangement	J&T/W-1035/01 Alt.-'b'
14	Welding fixture for Bogie frame arrangement	J&T/W-1035/03 Alt.-'nil'
15	Modification to Welding fixture for Bogie frame	J&T/W-1035/04 Alt.-'nil'
16	Stop & clamp details for Welding fixture for Bogie frame	J&T/W-1035/02 Alt.-'a'
17	Trammel fixture for axle guide	No drawing available
18	Trammeling gauges for dimension checking	1-M/832, 1-M/833, 1-M/854, 1-M/855,

NOTE

- Above mentioned drawings are attached at Appendix-I. These drawings are for reference purposes only.
- Work instructions for fabrication of Bogie frame and its assembly are provided in Appendix-II. These instructions are for reference only.
- If any modification, wherever required, to the above mentioned fixture at site shall be carried out by the bidder in accordance with the actual site conditions during installation.

3.1 Technical Requirements

- The fixtures, upon installation and commissioning in the shop of MCF shall be capable of manufacturing complete MEMU bogies, i.e. TC and DMC bogies.
- A complete MEMU bogie consists of a bolster, frame, axle guide, etc. Kindly refer to the complete MEMU bogie drawings for details. The indicative material of bogie components/assemblies is E250 Cu C as per IS 2062.
- The ambient condition of MCF, Raebareli, is between 5° to 50° C, relative humidity up to 98% and dusty atmosphere during hot weather. Fixtures should provide required dimensional stability within prescribed limits in these ambient conditions.
- Details of dimensions, material, quality of sub-assemblies /parts/ components of the fixtures are indicated in their respective drawings.
- All contacting surfaces of locators/stoppers/clamps/sliders (coming in contact with








bogie assembly/subassembly/components) shall be of stainless steel/hardened steel.

- f. The material of clamps shall be steel with zinc plated finish. Clamps shall be procured from reputed sources like Steel Smith (Mumbai) or equivalent. **Bidders shall indicate the source/make of their clamps in their offer.**
- g. All hardware (channels, fasteners, nuts, bolts, etc) is to be procured from branded manufacturers. **Bidders shall indicate their source/make of hardware in their offer.**
- h. All jacks, clamping arrangements, screw clamps, toggles, support stopper shall be manufactured from steel conforming to specification indicated in the corresponding fixture drawings (wherever available) and suitably heat treated and hardened to maximize the life of these components.
- i. The fixtures shall be such that they do not deflect/distort due to the heat from the environment or from welding of components on the fixtures.
- j. The locators of fixtures shall be properly aligned to facilitate manufacturing of assembly/subassemblies to specified dimensions within limits mentioned in their respective drawings.
- k. Fixtures shall be designed such that loading and unloading of assemblies are possible using overhead cranes.

3.2 Trammelling Requirement

Accurate location and fixing of axle guides on the bogie frame is a critical requirement in the fabrication of MEMU bogies. This operation shall be carried out using suitable trammelling fixtures. The successful bidder shall design, manufacture, supply, and commission suitable trammelling fixtures for this purpose.

Further, after completion of manufacturing of the bogie frame, verification of relative distances and dimensional accuracy shall be carried out using trammelling gauges. The successful bidder shall supply suitable trammelling gauges for this purpose (refer Item No. 18 of the table under Clause 2.4 above).

3.3 Joint Receipt Inspection (JRI), Installation, Commissioning and Prove Out

- a. JOINT RECEIPT OF INSPECTION (JRI): The Contractor or their authorized representative shall be required to inspect the consignment at the consignee's premises prior to unpacking and to carry out a joint verification of the received components. This joint inspection shall be conducted in coordination with the nominated supervisors of MCF (Production, Project & Plant) to avoid any subsequent complaints regarding short shipment or transit damages. A joint report shall be prepared by this team accordingly.
- b. The tenderer shall arrange installation and commissioning (including demonstration) of the equipment at the site of Modern Coach Factory, Rae Bareilly, Uttar Pradesh, India. The Supplier or their authorized representative shall be required to carry out a joint inspection and verification with the nominated representative of MCF during commissioning.
- c. Skilled as well as unskilled manpower required for installation and commissioning shall be arranged by the Contractor. Any specific assistance that may be required by the firm for erection and commissioning of the fixtures shall be clearly indicated

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in the offer. The tenderer shall deploy an adequate number of personnel to ensure that installation and commissioning activities are completed without delay.

- d. For successful commissioning, the contractor shall, inter alia, demonstrate each supplied fixture by fabricating eight (08) bogie set assemblies on the respective fixture using its own manpower. The complete lot of eight (08) assemblies produced on each fixture shall be subjected to quality inspection and testing as per applicable standards and specifications.

In the event of rejection of any assembly from the lot, the contractor shall re-demonstrate the fixture by fabricating a fresh lot of eight (08) bogie set assemblies. Such re-demonstration shall be repeated, if required, until all assemblies in a lot meet the specified quality requirements and satisfactory results are achieved.

- e. The MCF/RBL authority shall issue the commissioning certificate on the basis of a joint note prepared between the MCF nominated team and the supplier, after successful demonstration in accordance with clause 3.3.d during commissioning.
- f. Issuance of the Prove-out Test Certificate (PTC) shall be subject to successful utilization of the jig by MCF with its own manpower for a period of one month as a prove-out and observation period for manufacture of LHB bogie sub-assemblies/assemblies.
- g. The delivery and installation of the group of fixtures shall be carried out simultaneously in a manner that enables completion of a complete production line.

4.1 Responsibilities

4.2 MCF/RBL Responsibility

- a. MCF shall provide suitable site for construction of foundation.
- b. MCF shall provide electric supply (free of cost) for commissioning/proving out only of the fixtures installed. Supply shall be made available at the nearest electrical panel in the shop. Any further extension of power supply and all related arrangements or connections beyond this point shall be carried out by the bidder at their own cost. However, during the installation period, electricity shall be provided by MCF/ RBL on chargeable basis as per Railways rules, based on the actual consumption. For this purpose, the supplier shall deposit the requisite security amount for obtaining the connection and shall also install an electricity consumption meter at their own cost.
- c. Compressed air at a nominal pressure of 6kg/sq. cm shall be made available at the MCF plant (free of cost).
- d. In case the supplier is required to arrange a road mobile crane for material handling, MCF shall provide a clear and unobstructed access route for movement of the crane up to the work site.
- e. MCF shall provide open space for storage of material/equipment required for construction, foundation work, and installation of the equipment. However, all safety and security arrangements for safeguarding the stored material shall be the responsibility of the bidder and shall be arranged at their own cost. Alternatively, bidder may utilize the space provided by MCF for setting up temporary storage facilities for their materials.





- f. EOT crane and MIG/MAG welding set for commissioning/proving out of fixtures (post installation) shall be provided by MCF.

4.3 Responsibilities of Supplier

- a. Unloading of the Machinery and Plant (M&P) and its accessories at MCF/RBL shall be carried out by the supplier at its own cost. The Supplier will ensure the presence of their authorized representative for safe unloading of the machinery and plant (M&P). MCF shall not be liable for any damages, demurrage charges arising on this account. The Supplier shall intimate, at least three days in advance, the expected time of arrival of M&P at MCF site. Further, internal movement of M&P from the unloading point to the installation site shall also be arranged by the supplier.
- b. All fabrication equipment such as welding sets, oxy-cutting equipment, tools and tackles, and related consumables required during installation shall be arranged by the bidder at its own cost.
- c. Detailed foundation drawings and other relevant civil works drawings shall be submitted to MCF by the supplier before taking up ground preparation and installation work.
- d. All facilities required for the Installation and commissioning, including manpower, material handling equipment such as cranes and lifting arrangements, tools & tackles, welding or cutting machine, etc. shall be arranged by the supplier and shall remain within their scope.
- e. All electric power connections, including laying of cable of appropriate rating from the MCF single point power source at the shop column to the fixture installation site, along with provision of suitable sockets/switches for operation of welding sets, lifting arrangement etc. shall be arranged by supplier.
- f. The supplier shall depute its authorized experienced commissioning team immediately upon receipt of material at site at their own cost. The supplier shall ensure that all civil works, including foundation and related electrical works, are completed and kept ready prior to the arrival of equipment at site so that no time is lost after arrival of the M&P and installation work can commence without delay.
- g. Any other resource or facility required for successful installation and commissioning shall be in its scope and arranged by the supplier.

5.1 Painting

- a. All surfaces shall be cleaned so as to be free of rust before painted, except mechanical mating, surfaces, with epoxy or polyurethane paint systems having a long life. The painted surfaces of bought out items need not be disturbed.
- b. Painting scheme shall be as under
 - i The fixture after fabrication should be made free from rust, grease and welding spatters etc.
 - ii Epoxy Zinc Phosphate primer applied on the surface followed by PU surface.
 - iii Final two coats of PU full gloss enamel satin blue IS:5-94, ISC-177 be applied.

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**Annexure I: Drawings of Fixtures & Tramelling****Annexure II: Work Instructions**

Annexure III: MEMU Bogie Drawings shall be provided to the successful bidder only on request.

