

Rail Coach Factory, Kapurthala


MD35131

Date: 28.03.2018

Sub: Issue of Specification no. MDTS-213, Rev.- 03, MDST 153, Rev.- 01 and MDTS-241, Rev.- 02.

Please find enclosed copy of the following revised specifications for information and necessary action at your end:

1. MDTS-213, Rev. - 03 for supply of fabricated and machined FIAT type bogie frame.
2. MDST 153, Rev.- 01 for Schedule of Infrastructural Requirements for Brake Support and Centering Disc of Secondary Suspension for FIAT type bogie.
3. MDTS-241, Rev.- 02 for Schedule of Infrastructural Requirements for SGCI Casting and Machining of Control Arm Top and Control Arm Lower LH & RH for FIAT type bogie.


(Jitesh kumar)
ADE/Shell & Bogie

CQM, CPLE, CWE (Shell), CMM/HSQ, CMM/TKJ,

Dy. CMM/LHB/Shell, Dy. CMM/G, CMT, Dy. CPLE-III, Dy. CME/Bogie

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


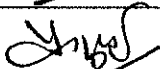
Dy. CME/D1
CDE

**Schedule Of Infrastructural Requirements For SGCI Casting and Machining of Control Arm Top
and Control Arm Lower LH & RH for FIAT type bogie**

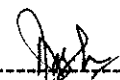
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Issue/REV.	Detail of changes	Date
Rev. 01	Clause 3.4.1.1 deleted and renumbered	30.12.16
Rev. 02	Clause 3.4 modified. Some clauses renumbered.	23.03.18



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Schedule Of Infrastructural Requirements For SGCI Casting and Machining of Control Arm Top and Control Arm Lower LH & RH for FIAT type bogie

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1. General:

This specification covers the infrastructure requirements to be complied by the tenderer for casting and machining of Spheroidal Graphite Cast Iron Control Arm Top and Control Arm Lower LH & RH and their testing and quality control.

2. Scope of supply:

- 2.1. The Control Arm Top and Control Arm Lower LH & RH are to be supplied conforming in all respects to the relevant drawings & specification of tender.
- 2.2. The tenderer is required to coordinate and liaise with the purchaser during manufacture of the prototype components.

3. Eligibility Criteria:

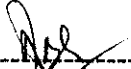
- 3.1. The tenderer must submit detailed clause-wise comments on the specification. In absence of above, offers shall be deemed as incomplete and may not be considered.
- 3.2. Since SGCI Control Arm Top and Control Arm Lower LH & RH casting has complexity in shape and requires development time for setting-up in-house infrastructure/tooling, bulk or regular procurement orders should only be given to the firms who have successfully supplied SGCI Control Arm Top and Control Arm Lower LH & RH to RCF/ICF/IR in past and have the infrastructure as mentioned in para # 3.4 of this specification.
- 3.3. Developmental order can be placed on those tenderer having in-house infrastructure as mentioned in para # 3.4.
- 3.4. **Requirement of Infrastructure and Manufacturing Facilities:** The vendor preferably should have following in-house infrastructure for casting and machining of Control Arm Top and Control Arm Lower LH & RH. In case firm possesses complete infrastructure for only casting or machining it should submit tie-up for remaining infrastructure (machining or casting).

3.4.1. General Requirement for casting:

- 3.4.1.1. The manufacturer should be an ISO-9001-2008 certified company.
- 3.4.1.2. The Manufacturer should have sufficient Covered area for manufacturing, raw material storage i. e. Sand and Scrap etc.
- 3.4.1.3. At least one number tilting type electric arc or electric induction furnace having Ladle-treatment facility.
- 3.4.1.4. Weighing machine of 500 kg capacity for Ferro alloys charge and finished casting weighment.
- 3.4.1.5. The firm should have a compressor.

Sand Preparation and testing:

- 3.4.1.6. Moulds and cores can be prepared using resin sand or green sand.
- 3.4.1.7. Green sand mould and core preparation:
- 3.4.1.8. Automatic sand mixer machine for making 'Mould' and 'Core' should be available, the mixer should be intensive type or sand mixing Muller with arrangement of ensuring correct mixing of ingredients.


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3.4.1.9. For testing incoming virgin sand, moulding sand, core sand following equipment at least one number each should be available.

- i. Permeability tester
- ii. Sand Rammer
- iii. Quick Moisture teller
- iv. Chemical balance
- v. Sand sieve shaker
- vi. Sand Muller for preparing test samples
- vii. Shatter Index tester
- viii. Dry compression strength tester
- ix. Sand mouldability / Compatibility tester
- x. Sand flowability tester
- xi. Mould/Core hardness tester
- xii. Portable hardness tester

3.4.1.10. Resin sand Mould and core preparation:

3.4.1.11. Continuous sand mixer with calibration facility should be available to manufacture resin sand moulds and cores.

3.4.1.12. Facilities to check:

- i. Sieve shaker
- ii. Clay content stirrer
- iii. Scratch hardness tester
- iv. Tensile strength Permeability meter
- v. Gas evolution tester

Heat Treatment:

3.4.1.13. Heat treatment furnace should be oil fired, LPG fired or electric type.

3.4.1.14. Heat treatment furnace should be provided with digital indicators & cut offs for each point (one point at every five feet length)

Shot Blasting Machine:

3.4.1.15. Shot blasting machine conveyor monorail type or Twin table type.

Chemical Laboratory:

3.4.1.16. Computerized emission spectrometer with automatic printer should be available for analysis and recording of chemical composition at different stages of manufacturing.


3.4.1.17. Metallographic polishing equipment, Belt polisher etc. should be available.

Physical Laboratory:

3.4.1.18. Universal testing machine of minimum 20t capacity with graphical recording facilities for conducting tensile test.

3.4.1.19. Brinell Hardness testing machine.

3.4.1.20. Impact testing machine for conducting impact test at room temperature and sub zero temperature should be available. Liquid Nitrogen container and stainless steel bath or Acetone container with temperature indicator for sub zero test arrangement must be available.


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- 3.4.1.21. Liquid penetrate test facilities for checking surface welding cracks.
- 3.4.1.22. Magnetic particle inspection facilities for cracks detection should be available.
- 3.4.1.23. Metallurgical microscope with magnification up to 400x should be available.
- 3.4.1.24. Hot air oven, Hot plate, Electrical oven and other accessories and chemical agents necessary for wet analysis should be available including platinum crucibles.
- 3.4.1.25. The firm should have in-house or sub-contract radiographic testing facility as per requirement of ASTM-E-446-81.

Other Testing Facilities:

- 3.4.1.26. The firm shall have adequate facilities for preparation of test sample. Facilities like machining, grinding, polishing etc. should be available in house.

3.4.2. General Requirement for Machining of control arms:

- 3.4.2.1. Minimum 4 axis (X,Y,Z & B axis) CNC Horizontal Machining Centers with probing facility (for reference and inspection), axis movements/traverse of X=800mm, Y=700mm & Z=800mm and with rotary index table (B axis) having 1°x360 indexing positions (indexing accuracy ± 3 sec). for the required machining of control arm top, lower LH & RH bores and facing etc. from every angle.
- 3.4.2.2. Fixtures for machining of control arms of different types.
- 3.4.2.3. Level surface table of minimum size 2MX1M.

4. Documentation:

- 4.1. Incoming raw-material register with TC reference of supplier as well as internal test result.
- 4.2. Stage inspection and test result.
- 4.3. Calibration records.
- 4.4. Casting records Sr. no. wise, components wise, month wise.
- 4.5. Register for heat treatment indicating charge wise, loading serial no wise Temperature graph must be pasted on the H.T register.
- 4.6. Weighment records of casting once in a month.

5. Pilot sample approval:

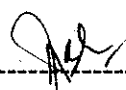
- 5.1. Manufacturer should get pilot samples approved from CDE/RCF, Kapurthala before start of series manufacture and bulk supply.

6. Quality Assurance Plan:

- 6.1. Firm has to get QAP approved by CDE/RCF Kapurthala for the product covering incoming material, in-process, stage inspection and final testing.

7. Inspection:

The inspection shall be carried out by inspecting agency as indicating below:



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- 7.1. Inspection of control arms complete after machining as per approved QAP/tendered specification/drawing.
- 7.2. Dimensional control charts shall be supplied along with the control arms to the purchaser.

8. Dimensions and Tolerances:

- 8.1. All dimension/tolerances shall be as per details given in the drawings.
- 8.2. Detailed dimension control charts/sheets shall be prepared for each control arm in which measurements of critical dimensions shall be recorded and kept for evaluation and verification by the inspecting agency.
- 8.3. All the un-toleranced dimensions shall be in accordance with IS: 2102 (Medium).
- 8.4. Gauges, fixtures and templates and accurate measuring instruments shall be used to ensure the correctness of the dimensions.

9. Code of Practice for Quality Control and Inspection:


- 9.1. The manufacturers shall furnish to the purchasing/ inspecting authorities information in respect of quality control systems in force at their works on various materials used in the manufacture of castings.
- 9.2. The manufacturers shall furnish to the Purchasing/ Inspecting authorities the details of tests and inspection records and other relevant records as required under the quality control systems in force.
- 9.3. These records and reports shall be maintained by the Competent Technical Authority of the manufacturer and shall be open to examination by the Purchasing/ Inspecting Authorities at all reasonable time.
- 9.4. Purchasing/ Inspecting Authorities at their discretion may draw samples of products at any stage of production for conformity tests at the works of the manufacturer or in an approved laboratory. In case the samples do not conform to the requirements of the specification, double the number of samples from the same lot/batch shall be drawn for re-tests. If any of the re-test samples do not conform to the requirements, the entire lot/batch shall be rejected.
- 9.5. RCF may carry out in-process inspection of casting and machining of control arms at the firm premises or sub contractor's premises.
- 9.6. The purchasing/ inspection authority shall inspect the rough casting as per specification and drawing for Mechanical properties, Dimensions and non destructive testing as per approved Quality Assurance Plan.

10. Identification Marking: Each control arm shall be stamped with an easily visible identification indicating the control arm serial number, year of manufacture and manufacturer's name to facilitate identification/correlation with the inspection/ test results.

11. Packing:

- 11.1. All machined surfaces shall be applied with suitable rust preventive which shall prevent it from corrosion & oxidation for a minimum period of one year of storage.
- 11.2. The packing shall be such that all the machined surfaces shall be properly protected against rubbing/impact/scratches with other control arms or with mode of transportation i.e. wagon/truck/trailers etc.

12. Warranty: The manufacturer shall warrant the control arm for conformance to quality for a period of 30 months from date of supply or 24 months from date of installation whichever shall be sooner, as per IRS conditions.


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