

Tender Specification No.  
CLW/ES/C-53

SPECIFICATION  
FOR  
CABLE CLEAT MADE  
OF SYNTHETIC RESIN  
BONDED GLASS FIBRE  
(SRBGF) FOR 25 KV AC  
ELECTRIC LOCOMOTIVES  
CLASS : WAG-7 & WAP-4

Issued by: Dy. Chief Electrical Engrg/D-I  
Chittaranjan Locomotive Works  
PO:Chittaranjan Dist:Murdwan  
West Bengal.

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<i>[Signature]</i> 29-1-2000	<i>[Signature]</i> 31-1-2000	<i>[Signature]</i> S.B. Das	<i>[Signature]</i> 6/3/20 DY. CEE/D		
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DETAILS OF ALTERATIONS

Alt. No.	Date	Description	Proposed	Approved	Remarks
A	6-01-03	Flame retardant test has been introduced as clause 13-2 in sheet No. B.	Amended 6.1.03	Approved 6/1/03	

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1.0 SCOPE OF SUPPLY

This specification covers the manufacture and supply of cable cleats made of SRGFP. The above cable cleats are suitable for fitment on 25kV, single phase, 50 C/s, A.C Electric locomotives of the Indian Railways .

2.0 SERVICE CONDITIONS

- 2.1 As the cable cleats covered by this specification are mounted on locomotive, they shall be subjected to considerable vibrational and buffing shocks during service.
- 2.2 Cable cleats shall be suitable for working satisfactorily in an ambient temp. varying from 0°C to 60°C and a maximum relative humidity of 100%. The locomotive shall be working in altitude upto a maximum of 1000 metres above mean sea level.
- 2.3 The cable cleat shall be suitable for heavily dust laden atmosphere.
- 2.4 The cable cleats shall be rounded all the sharp edges to make suitable to hold cables without any damage.

3.0 Deviations

- 3.1 Any deviation from the specification laid down may be given with a view to improve the performance. However, complete particulars with technical justification shall be furnished to Dy.CEE/D while applying for any deviation.

4.0 Approval of samples

- 4.1 The supplier shall make available at least two prototype samples of cable cleats proposed to be supplied by him for inspection and tests at his works and advise Dy.CEE/D, Chittaranjan locomotive works as and when he is ready with the prototype and necessary testing and measuring apparatus and facilities for carrying out the tests at his works.
- 4.2 After the tests, if it is considered necessary by the Dy. Chief Electrical Engineer (Design) to carryout any further tests or trials of the prototypes at Chittaranjan, the supplier will arrange for the same by the quickest means.

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- 4.3 Any short comings or defects in the design and workmanship of the cable cleats shall be pointed out after the tests, to enable the manufacturer to incorporate the necessary improvements before bulk manufacture is commenced, without affecting the guaranteed deliveries or guaranteed performance characteristics.
- 4.4 Any testing and approval by the purchaser of the design, working drawing and prototype shall in no way absolve the supplier of his responsibilities under the terms of a contract for the equipment supplied.
- 4.5 The supplier shall not offer cable cleats of series production to the inspector authorised under the contract until the prototype has been finally approved.
- 5.0 Condition of contract  
The Standard I.R.S condition of contract will be applicable for the supply of the equipment.
- 6.0 Technical documents & drawings to be furnished by the supplier as part of the contract.
- 6.1 Dimensional drawings shall be supplied by the supplier.
- 6.2 Detail dimensional drawings in twenty (20) copies shall be supplied in standard sizes of paper viz 'A4', 'A3', 'A2' etc. indicating the constructional features to such a scale as to enable appreciating details of constructions, assembly etc.
- 7.0 Guarantee
- 7.1 The supplier shall give a guarantee of clear 18 months from the date of commissioning of the cable cleat on the locomotive or 24 months from the date of supply whichever is earlier and any damage or defect noticed during the period due to defective materials or workmanship, will be replaced by the supplier free of cost.
- 8.0 Submission of Tender Quotation
- 8.1 All tender documents including the quotation shall be submitted in duplicate including any correspondence till the contract is finalised.
- 8.2

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Specs of  
cable cleats

- 8.2 The tender shall give sufficient information to prove that his factory has adequate facilities and capacities to manufacture the cable cleat to meet fully the requirements of the specification and quality of materials and workmanship.
- 8.3 Quotations shall not be considered complete unless all information is furnished and are therefore liable to be rejected.
- 8.4 Clausewise comments on the specification and test programme.
- 8.5 Full technical particulars.
- 8.6 Technical literature describing construction details and principle of operation.
- 8.7 Dimensional drawing indicating fixing details.
- 9.0 Technical specification
- 9.1 The cable cleats covered by this specification will be used to hold various sizes of cables of the locomotives.
- 9.2 Detailed dimensional drawings consisting of quantity per loco are enclosed.
- 9.3 Material should be *fire resistant* synthetic resin bonded Glass Fibre (SRBF) Grade UP-1 to IS: 10192-1982.
- 9.4 All the cable cleats are used to hold cables and to provide support at the cable entry point so, why the edges shall be rounded off to protect the cables from external damage due to sharp edges of the cleats.
- 9.5 Cable cleats shall have neat finish and appearance. The construction shall be free from air voids.
- 9.6 Cable cleats shall be manufactured by thermosetting of synthetic resin bonded sheets made from glass fibre reinforcements.
- 10.0 Markings
- The manufacturer shall engrave/emboss/imprint/stencil permanent identification marks indicating their name/brand name/monogram and also the month & year of manufacture at a conspicuous place.
- 11.0 Sampling and Acceptance

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## 11.1 Routine and Acceptance Test .

11.1.1 One sample chosen at random out of every 20 samples subject to a maximum of 2 percent of a supply batch shall be subjected to routine tests.

11.1.2 Criteria for Acceptance

- a). The arithmetic mean value of the test results for and individual test shall be the specified value and  
 b). The lowest value obtained for any test shall not be less than 90 percent of the specified value . This is to be allowed for variations arising out of human error, sample cutting etc.

12.0 SCHEDULE OF TESTS

Sl. No.	Description	Method of Test	Type of test	Specified Value	Routine test
1.	Visual Inspection	Cl.13.1	to be done	as per Cl. 13.1	to be done
2.	Specific Gravity	IS:10192	-do-	1.6 Min.	Not required
3.	Water absorption test	-do-	-do-	Appendix A of IS:10192	Not required
4.	Tensile strength, Min.	-do-	-do-	150N/mm <sup>2</sup>	-do-
5.	Gross breaking strength, Min.	-do-	-do-	160N/mm <sup>2</sup>	to be done
6.	Compressive strength, Minimum.	-do-	-do-	230N/mm <sup>2</sup>	-do-
7.	Shear strength, Min.	-do-	-do-	50N/mm <sup>2</sup>	not required
8.	Splitting resistance, Minimum.	-do-	-do-	0.75KN	-do-
9.	Electrical strength (flat wise) Min.	-do-	-do-	6KV/mm	to be done
10.	Impact strength minimum, Min.	-do-	-do-	30KJ/m <sup>2</sup>	Not required
11.	Flame Retardant Test, Min.	Class 13.2	-do-	30sec	to be done
13.0	<u>INSPECTION</u>				
13.1	<u>Visual Inspection</u>				

-Check for general workmanship, finishing and design.

-Dimensions are to be checked as per CLW drg. or firm's approved drawing.

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**13.2 Flame Retardant Test-**

The test shall be carried out in still air, using a bunsen burner/blow lamp/gas burner with an opening of 9 mm. The burner shall be regulated to provide a flame 100 mm and an inner blue cone 50 mm long. The centre line of the burner shall be inclined at an angle of 45° from the vertical.

The sample selected at random for testing shall be placed vertically and at right angle to the centre line of the burner. The sample shall be positioned so that the whole of its periphery is enveloped in flame upto a distance of 100 mm from the lower end and the sample is 35 mm from the opening of the burner.

The flame shall be applied continuously for a period of at least one minute so that ignition takes place. The ignition must be of a subdued nature and must not spread noticeably. Any flame produced on the sample must be extinguished of its own accord within 30 seconds, after being withdrawn from the flame.

**14.0 Other Tests-**

The tests mentioned in the schedule of the tests are to be carried out as per IS:10192 and relative IS mentioned in it.

**15.0 Routine inspection,**

Routine inspection shall be carried out on the basis of random selection as per sampling theory.

16.0 Relevant drawing is enclosed.

17.0 CEM reserves the right to procure material from ISO Certified firms.

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