

Specefication No. RDSO/M&C/RP-184/2020 (Revision 1.0)

**Government of India
Ministry of Railways**

Indian Railway Standard Specification for
**Polyethylene Foam for Ballast less Track
Assembly (Revision 1.0)**

**M&C Directorate
Research Designs & Standards Organization
Lucknow - 226011**

0. FOREWARD

- 0.1 This specification is issued under fixed Sl.No. RDSO/M&C/RP-184/2020 (Revision 1.0), the final number indicates the year of adoption as standard or in case of revision, the year of last revision.
- 0.2 This specification was first adopted in year 1994 and has been revised mainly for incorporating quality control practices. A code of practice for quality control and inspection of rubber and plastic components (Appendix 'B') is incorporated to ensure satisfactory process and quality control at the works of the manufacturers. The provision of this code shall be applicable for all the rubber & plastic components being used in the railways.
- 0.3 This specification is intended to cover the technical provisions relating to materials, constructions and tests, and does not include all the necessary provisions of the contracts.
- 0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with the IS:2:1960 (Reaffirmed 2016). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1.0 SCOPE

- 1.1 This standard specifies requirements, methods of tests and sampling for polyethylene foam used in ballast less track.

2.0 MANUFACTURE

- 2.1 Polyethylene foam shall be manufactured as per required thickness by proven process so as to conform to the requirements stipulated in the specification. Slitting from bulk foam into required thickness is not permitted.

3.0 FREEDOM FROM DEFECTS

- 3.1 The surface shall be substantially free from ruptured cells.

4.0 **DIMENSION & TOLERANCES**

4.1 The dimensions and tolerances of the foam shall be as agreed to by the purchaser and manufacturer. Unless otherwise specified, a tolerance of ± 10 mm shall be allowed on the length, $+0/-2$ mm on width and ± 0.5 mm on the thickness.

5.0 **LOT SIZE AND SAMPLING**

5.1 The lot size shall be 100 nos. or part thereof in case ordered quantity is not a multiple of 100 nos. or as agreed to by the Purchaser/Inspecting Authority and manufacturer.

6.0 **TESTS**

6.1 The test shall be carried out from the finished foam offered for inspection and shall comply with the requirements stipulated in clause 6.2.

6.2 **Physical characteristics of the rubber:**

SN	Properties	Specified Value	Method of test
1.	Bulk density (g/dm^3)	35 +5 -2	By weight and volume measurements
2.	Compression Set (%), max	50	Appendix 'A'

7.0 **RE-TEST**

7.1 Should the samples fail to meet with the requirements of the tests of clause 6, the tests shall be repeated in the same manner with double the number of samples from the same lot comprising two sets of tests. Should any of the set of tests fail to meet the requirements, the entire lot represented by these test samples shall be rejected.

7.2 In the event of rejection of the entire lot, after the retest, the lot offered for inspection shall be made unusable in the presence of Inspecting/Purchasing authority.

8.0 DIMENSIONAL CHECK

- 8.1 The rubber foam complying with requirements of clauses 6 and 7 shall be arranged in lots of 100 or part quantity thereof.
- 8.2 Two percent of foam selected at random shall be checked for dimensions and tolerances as stipulated.
- 8.3 If any of the sample foam does not conform to the dimensions and tolerances as stipulated in drawing, twice the number of samples taken for check earlier shall be checked. Should any of these samples fail to meet the requirements of dimensions, the lot represented by these samples shall be rejected and or otherwise, the batch shall be accepted.
- 8.4 If foam does not meet the stipulations of clause 8.2 and 8.3, the manufacturer shall re-submit the quantity of rubber sole plates after sorting out the defective pieces. The quantities so offered shall meet the requirements of clauses 8.2 and 8.3.

9.0 MARKING

- 9.1 Each foam shall bear the following marking in inedible ink.
- a) Manufacturer's initial or trade mark as approved by the purchaser
 - b) Last two digits of the year of manufacture along with the quarter of manufacture.
 - c) Drawing Number.

10. PACKING

- 10.1 The foam shall be packed suitable to avoid any damage during transit. Each package shall be sealed and labeled bearing:
- a) Name of the supplier
 - b) Order No. and date
 - c) Period of manufacture
 - d) Consignee

11.0 .“Firm should comply Make in India policy and Public Procurement (Preference to Make in India) order -2017 under this specification” and subsequent amendment done time to time.

APPENDIX 'A'

- A.1 No. of test specimens.
- A.1.1 Three test specimens measuring 100 x 100 mm with original thickness shall be cut from the foam.
- A.1.2 The test specimens shall be compressed in a compression device up to 25% of its original thickness (T₀) by using spacers (TS) and then the assembly shall be kept at 27 ± 2°C for 244 +0/-2 hrs. The specimens shall then be removed from the device and kept at room temperature for 30 min. The thickness (T_r) of the test specimens shall be measured.

A.2 Calculation:

- A.2.1 Compression set % shall be calculated from the following formula:-

$$\text{Compression Set\%} = \frac{T_0 - T_r}{T_0 - T_S} \times 100$$

- A.2.2 The results to be taken into account shall be second in the series of three measurements arranged in order of decreasing values.

APPENDIX 'B'

CODE OF PRACTICE FOR QUALITY CONTROL AND INSPECTION OF RUBBER AND PLASTIC COMPONENTS

B.1 THE SYSTEM

B.2 RECORDS, TESTS & SAMPLING:

B.2.1 The manufacturer shall furnish the Purchasing/Inspecting authorities the detail of tests and inspection records and other relevant records as required under the quality control systems in force. These records and reports shall be maintained by the Competent Technical Authority of the manufacturers and shall be open to examine by the Purchasing/Inspecting authorities at all reasonable time. The Purchasing/Inspecting authorities at their discretion may draw samples of materials used in manufacture and products at any stage of production for conforming tests either at the works of the manufacturers 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. Should any one of the re-test a sample does not conform to the requirements, the entire lot/batch shall be rejected.

B.2.2 The manufacturer shall supply and submit all gauges for the approval of the Inspecting Officer.

B.2.3 All tests required by the Inspecting Officer shall be carried out in his presence and he shall be supplied with a copy of the results signed by the manufacturer or his representative.

B.2.4 The manufacturer shall furnish the material for all tests required and shall also provide the necessary labour and appliances for carrying out such tests. Failing facilities at his own works, the tests shall be carried out at a testing works approved by the Purchaser at the expense of the manufacturer.

B.2.5 The gaskets shall be supplied to the purchaser when requested, free of cost for testing.

B.2.6 The gaskets found to be defective in any way after delivery may be returned to the manufacturer at his own expense notwithstanding the fact that they may have passed the tests prescribed by the specification and has been accepted by the Inspecting Officer.

B.2.7 The notice shall be given to the Inspecting Officer when the components are ready for inspection.

B.2.8 The gasket shall not be dispatched from the manufacturer's works before an acceptance certificate has been obtained from the Inspecting Officer.

B.3 APPROVED MANUFACTURERS:

B.3.1 The manufacturer should have complete manufacturing and quality control facilities as per the specification at their works.

B.3.2 For reasonable quality assurance, it is desirable that the components are procured from manufacturers approved by Research Designs & Standards Organization (RDSO), Lucknow or by any other agency as assigned by the Purchasing Authority, based on evaluation of the components as per the specification, manufacturing and quality control facilities and quality assurance programme. However, such approval does not guarantee the supply of consistent quality of material/components and therefore every lot offered shall be subjected to inspection and testing as per the specification.

B.3.3 The approved manufacturers shall be subjected to periodical re-appraisal (periodicity for each component shall be assigned by the approving authority). In case of withdrawal of any manufacturing and quality control facilities provided at the time of approval of the component produced at the time of re-appraisal are not conforming to the specification, the manufacturers are liable to be withdrawn from the approved list. The approving authority reserves the right to withdraw the manufacturers from the approved list without assigning any reason.

B.3.4 The consignee may also periodically arrange testing if so desired, at RDSO or in an approved laboratory for confirmatory tests within six months from the date of receipt of the supplies, in their original packing. In case of samples do not conform to the specification, the consignee may at their discretion suspend the manufacturer for further supply and the fact brought to the notice of approving/inspecting authorities for appropriate action.
