

Specification No. RDSO/M&C/RP-185/2020 (Revision 2.0)

**Government of India
Ministry of Railways**

Indian Railway Standard Specification for
Rubber Expansion Joint for Concrete Bridge Deck (Revision 2.0)

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

0.0 FORWORD:

- 0.1 This specification is issued under fixed Serial No RDSO/M&C/RP-185/2020 (Revision 2.0), the final number indicates year of adoption as standard or in case of revision, the year of last revision. This specification was first adopted in the year 1994.
- 0.2 This specification is intended to cover the technical provision relating to materials, manufacture and tests and does not include all the necessary provisions of the contract.
- 0.3 This specification draws reference to some of the relevant IS specifications. Latest versions of these standards shall be taken as references.
- 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 results 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.
- 0.5 In framing the specification, due consideration has been given to the development in the field of elastomeric materials and process technologies, serviceability requirements of the Indian Railways and the practices followed in advanced countries in this field.
- 0.6 This specification contains a code of practice for quality control and inspection of rubber components (Appendix 'A') to ensure satisfactory process and quality control at the works of the manufacturers. The provisions of this code shall be applicable for all the rubber components being used on the Railways. Similarly provisions on "Sampling and criteria for conformity" and "Inspection and testing facilities" shall be applicable for all rubber components.

1.0 SCOPE:

- 1.1 This specification covers the requirements, methods of sampling and tests for fabric reinforced rubber expansion joint for concrete bridge deck. The expansion joint is exposed to extreme out door climatic conditions prevailing all over the country.

2.0 REQUIREMENTS

2.1 Material:

2.1.1 The rubber used in the manufacture of rubber expansion joint shall be polychloroprene elastomer suitably compounded so as to conform to the requirements laid down in this specification.

2.1.2 Reinforcement Fabric:

The reinforcement fabric used in the manufacture of rubber expansion joint shall be either polyester or polyamide with breaking strength 10 kg/cm² width minimum in either direction. The fabric shall be pretreated for effective bonding with the rubber.

2.2 Construction:

2.2.1 Rubber expansion joints shall be as per the relevant drawing. The reinforcement fabric shall extend upto the ends along the length and width and shall lie all over approximately in the mid thickness. The fabric shall preferably be continuous throughout the length but maximum of two overlaps of 50 mm shall be permitted where required. The process of manufacture shall be compression molding by step curing.

2.3 Workmanship & Finish:

2.3.1 The reinforced rubber expansion joints shall have a clean cut sides. The surface of the rubber shall be smooth, free from porosity, blow holes and other molding defects.

2.4 Dimension and Tolerances:

2.4.1 Dimension and tolerances shall be as per the relevant drawings. Unless otherwise specified, a tolerance of ± 5.0 mm on the length, $+2/-0$ on the width and $+0.5/-0.0$ mm on the thickness shall be permitted.

2.5 Tests:

2.5.1 Physical Properties

The rubber compound shall conform to the following requirements:

Sl No.	Properties	Specified value
1.	Hardness (IRHD/Shore 'A')	70±5
2.	Tensile Strength (MPa), min	12.0
3.	Elongation at break (%), min	250
4.	Compression Set (%), at 100 ± 1°C for 24 +0/-2 hrs. max	30

Note: All the tests shall be carried out on finished components where practicable or from prepared test slabs of approximately the same degree of vulcanization using the same rubber compound. The method of tests shall be as per IS: 3400, unless otherwise special conditions are stipulated in this specification.

2.5.2 Accelerated Ageing:

After ageing at 100 ± 2°C in an air oven for 72 + 0/-2 hours the hardness, tensile strength and elongation at break (%) shall not vary from the values obtained before ageing more than the following:-

Sl No.	Properties	Specified value
1.	Hardness (Shore 'A')	+ 5 - 0
2.	Tensile Strength	± 20%
3.	Elongation at break (%)	+10% -30%

2.5.3 Adhesion:

The adhesion between the rubber and the reinforcement fabric shall be such that any effort to separate rubber shall result into tearing.

2.5.4 For the purpose of confirming/co-relating the composition of the test slabs with that of the components, the following tests shall be performed both on the test slabs and the components and shall comply with the requirements as given under:-

- (a) Identification of polymer : Observation shall be identical
- (b) Specific Gravity : Test results shall be within ± 0.02
- (c) Percent Ash : The results shall be within ± 1.0
- (d) Swelling by volume % in Reference Fuel 'B' at $27 \pm 2^\circ\text{C}$ for 24 +0/-2 hrs : The results shall be within ± 5.0

3.0 SAMPLING CRITERIA FOR CONFORMITY

- 3.1.1 Five samples from a lot of 100 nos. offered for inspection shall be selected at random for dimensional check and out of which one sample shall be subjected to destructive test for tests. Should the samples fail to meet the requirements, double the number of samples from the same lot shall be drawn for re-testing. Should any of the re-test samples fail to comply with the requirement, the entire lot shall be rejected.
- 3.1.2 In the event of samples not conforming in dimensions the manufacturers shall be permitted to segregate the material once and re-offer.
- 3.1.1 In the event of rejection after the re-testing of the samples, the entire lot offered for inspection shall be made unusable in the presence of Inspecting/Purchasing authorities.

4.0 INSPECTION AND TESTING FACILITIES

- 4.1.1 The Inspecting/Purchasing authorities shall have access, at all reasonable time to the works where the materials/components are being manufactured or where they are stored. The materials offered for inspection shall not be withdrawn during the course of inspection. Any move to withdraw the materials or to interfere with the inspection in any way will render the entire lot being rejected. The manufacturers shall supply all equipment and chemicals required for testing free of charge, and shall be at their own cost, supply labor and apparatus for such tests as may be carried out at their works. Should the manufacturers fail to provide facilities at their works for carrying out the prescribed tests, they shall bear the cost of carrying out these tests, elsewhere by an approved testing authority, with the prior approval of the Inspecting/Purchasing authorities. Confirmatory test samples, in addition, may be drawn by the Inspecting/Purchasing authorities and submitted for tests to the approved testing authorities.

4.0 **MARKING:**

- 5.1.1 Letters 'IRS', part number, manufacturer's name (initials/trade mark) and the quarter/year of manufacture shall be inscribed on each rubber expansion joint in raised letters on suitable locations..

6.0 **PACKING:**

- 8.1.1 The rubber expansion joint shall be dusted with French chalk and packed suitably to avoid movement or distortion or damage during transit and storage. The package shall bear the order number, quantity and markings similar to clause 5.1.1.

7.0 **STORAGE**

- 7.1.1 The rubber expansion joints shall be stored in cool and dry place. For guidance regarding proper storage of rubber components IS: 6713:2016 shall be referred.
- 8.0 "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'

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

A.1 THE SYSTEM

A.2 RECORDS, TESTS & SAMPLING:

A.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.

A.3 APPROVED MANUFACTURERS:

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

A.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.

A.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.

A.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.
