

Specefication No. RDSO/M&C/RP-171/2020 (Revision 1.0)

Government of India
Ministry of Railways

Indian Railway Standard Specification for
Rubber Grommet Push Rod Sleeve of Diesel Locomotives (Revision 1.0)

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0. FOREWORD :

- 0.1 This specification was first adopted on the Indian Railways in the year 1992 and was issued under fixed serial No. RDSO/M&C/RP-171/2020(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 is intended to cover the technical provisions relating to materials constructions and tests, and does not include all the necessary provisions of the contracts.
- 0.3 This specification draws reference to some of the relevant national and international specifications. Latest versions of these specifications shall be taken as reference.
- 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 polymeric materials and process technologies and serviceability requirements of the Indian Railways.
- 0.6 This specification contains a code of practice for quality control and inspection of rubber & plastic 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 & plastic components being used on the railways.

1.0 SCOPE

- 1.1 This specification covers the requirements, methods of sampling and tests for rubber grommet push rod sleeves of diesel locomotives herein after referred to as 'Rubber Grommet', used in contact with oils at temperature of up to 85°C under axial compression up to 10%. The rubber grommet is fastened to the sleeve in order to prevent leakage of lubricating oil rolls down the push rod.

2.0 **REQUIREMENTS**

2.1 **Material :**

2.1.1 Rubber used for the manufacture of grommet shall be synthetic elastomers or a blend thereof suitably compounded so as to conform to the requirements as specified in this specification. The base elastomer shall preferably be acrylonitrile-butadiene (NBR) co-polymer.

2.2 **Construction, Workmanship & Finish :**

2.2.1 The grommets shall be as per the relevant drawings. The surface finish shall be smooth, free from pin holes, blisters, porosities, embedded foreign matters and other visual flaws. The molded flash shall be removed in such a manner so that no groove is formed on the body of the components.

2.3 **Dimensions & Tolerances :**

2.3.1 The dimensions and tolerances shall be as per the relevant drawings.

3.0 **Test:**

3.1.1 Physical Properties

Sl No.	Properties	Specified value
1.	Hardness (IRHD/Shore 'A')	60±5
2.	Tensile Strength (MPa), min	12.5
3.	Elongation at break (%), min	300
4.	Compression Set* (%), at 100 ± 2°C for 24 +0/-2 hrs, max	20

*The test shall be carried out using specimen cut from the grommet, 25 mm approx. in length along the circumference and 6.5 mm in height along the axis after buffing both the sides. The height shall be accurately measured and compressed by 25% as per the procedure given in IS.

3.1.2 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 by more than the following:-

Sl No.	Properties	Specified value
1.	Hardness (Shore 'A')	+ 7 - 0
2.	Tensile Strength	± 20%
3.	Elongation at break (%)	+10% -30%

3.1.3 Resistance to Fuels & Oils

3.1.3.1 The swelling by volume percent in reference fuel 'B' containing 70 parts pure Isooctane (2, 2, 4-Trimethyl Pentane) and 30 parts pure Toluene at $27 \pm 1^\circ\text{C}$ for 24 +0/-2 hours shall be within +35/-0.

3.1.3.2 The change in weight percent after immersion in reference fuel 'B' as in clause 3.1.3.1 shall be within +0/-10. For the purpose of computation of change in weight percent, the test specimen after the test as per the clause 3.1.3.1 shall be dried in an air oven at 105°C (for 4 hrs) till constant weight.

3.1.3.3 The swelling by volume percent in oil (aniline point 105 to 115°C , viscosity 15.5 to 16.3 CST at 100°C and flash point 225°C , min) at $100 \pm 2^\circ\text{C}$ for 72 +0/-2 hrs shall be within +10/-0.

3.1.3.4 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) Specific Gravity : The results shall be within ± 0.02
- (b) 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

4.0 **SAMPLING CRITERIA FOR CONFORMITY**

4.1.1 A minimum six samples or 0.5% of the lot offered for inspection whichever is higher, shall be drawn for tests indicated in the relevant specification. In the event of number of samples drawn for tests are not adequate to carry out all the tests, as per the provisions given in the method of tests, the Inspecting/Purchasing

authorities at their discretion shall draw more samples as required. 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.

4.1.2 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.

4.1.3 The manner of distribution of samples for different tests shall be at the discretion of the Inspecting/Purchasing authorities.

5.0 INSPECTION AND TESTING FACILITIES

5.1.1 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 labour 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.

6.0 MARKING

6.1.1 Letters 'IRS', part number, manufacturer's name (initials/trade mark) and the quarter/year of manufacture shall be inscribed on each component where practicable on the location shown in the drawing.

7.0 PACKING

7.1.1 The components 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 6.1.1.

8.0 STORAGE

8.1.1 The rubber components shall be stored in cool and dry place. For guidance regarding proper storage of rubber components IS: 6713:2016 shall be referred .

9.0. “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

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 components.

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.
