SPECIFICATION No. RDSO/M&C/RP-115/2020 (Revision 2.0)

Government of India

Ministry of Railways

Indian Railway Standard Specification for

Moulded Polyurethane Rubber Components

(Revision 2.0)

M&C Directorate

Research Designs & Standards Organization

Lucknow - 226011

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0. FOREWORD

1.0 This specification (second revision) was first adopted on the Indian Railways in the year 1980.

2.0 In the first revision, changes have been incorporated for physical properties of the rubber compounds and also introduced test for resistance to hydrolysis based on experience gained with the use of components over the years.

0.3 In the second revision, the clauses of sampling, marking, packing and storage have been incorporated. A code of practice for quality control and inspection of rubber & plastic components (Appendix 'A') is also incorporated 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.

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.

1. SCOPE

1.1 This specification prescribes the requirements and methods of tests for moulded polyurethane rubber components with or without fabric insertion for use as EP Brake/Air brake and various other rubber components used on the Indian Railways, in contact with oil, greases or moisture at temperature up to 80°C.

1.2 This standard includes five grades depending upon their physical properties. The Purchaser/Indenting authority shall designate the relevant compound number in the drawing. Fabric insertion where required shall be specially indicated in the drawing.

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2. REQUIREMENTS:

2.1 Material:

2.1.1 The rubber used for the manufacture shall be Moulded Polyurethane elastomers suitably compounded so as to conform to the requirements stipulated in this specification.

2.2 Construction

2.2.1 The component to be manufactured shall be as per the relevant drawing and shall be smooth, free from pin holes, air bubbles and any other moulding defects. The insertion of fabric where required shall be suitably treated to ensure satisfactory bond between the rubber and the fabric.

3. TESTS

3.1 Physical properties of rubber compounds

The rubber compound used in the manufacture moulded polyurethane rubber components shall conform to the following requirements:

Sl No	Property	A	B	C	D	E
1)	Hardness (shore 'A')	60±5	70±5	80±5	85±5	85-90
2)	Tensile Strength (kg/cm^2), Min.	200	250	250	200	200
3)	Elongation at break(%), Min	250	300	200	175	150
4)	Compression set (%)at 80±1°C for 24+0/-2 hrs. Max.	20	20	25	25	25

Note : All test procedure shall be as per the IS : 3400. The tests shall be carried out where practicable from the finished products or from prepared test slabs of approximately same degree of vulcanization and using the same compound.

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3.2 Accelerated ageing test

After ageing at100 ± 1°C in an air oven for 72 +0 hrs., the hardness, tensile -2 strength and elongation at break (%) shall not vary from the values obtained before ageing by more than the following:-

a)	Hardness (Shore 'A')	±5°
b)	Tensile Strength	+10% -15%
c)	Elongation at break	+10% -20%

3.3 Oil resistance test

3.3.1 The swelling as determined by the the method given in IS : 3400 (Part VI):2018 using an imersion period of 72 +0/-2 hrs. at 100 ± 1°C in oil used in the brake system such as Lubrex-150 shall not be more than 20% by volume.

The volume change in greases Servogem-2 or 3 as determined by the method of IS: 3400 (Part VI):2018 using an immersion time of 72+0/-2 hrs. at 100 ±1°C shall not be more than 20% for compounds A & B and 15% for compounds C to E.

Resistance to hydrolysis:

On boiling in distilled water at atmospheric pressure for 72+0/-2hrs, the hardness, tensile strength and elongation at break percent shall not vary from values obtained before boiling by more than the following:

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Sl No.	Property	In compound A & B	In Compound C to E
a)	Hardness(Shore 'A')	±10°	± 5 °
b)	Tensile Strength	±30 %	±20 %
c)	Elongation at break	±25%	±20 %

Fabric insertion

Inserted fabric used for reinforcement shall be either cotton, rayon, polyamide or/and polyester to meet the requirement specified in cl.3.5.2.

Breaking strength

The breaking strength of the fabric insertion, tested by the method as per IS:1969: 2009 (Reaffirmed 2018) shall not be less than 18 kgf/cm in any direction.

4. SAMPLING CRITERIA FOR CONFORMITY

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.

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.

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

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5. MARKING

Letters 'IRS', part number, manufacturer's name (initials/trade mark) and the quarter/year of manufacture shall be inscribed on each component where practicable, except on 'O' rings, on the locations shown in the drawings; on other components, where inscription is not practicable, the markings shall be done with inedible ink. 'O' rings shall be marked with inedible ink where practicable. 'O' rings and other smaller components where even marking with inedible ink is not practicable, shall be packed suitably and sealed with tags, bearing the above markings.

6. PACKING

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 5.

7. STORAGE

7.1 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 to.

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.

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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.

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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.

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