

In response to uploaded Draft Amendment 1 of 2018 to IRS Specification for Composite Grooved Rubber Sole Plates (10 mm thick) for placing beneath rails. Serial No. RDSO/M&C/RP-200/2007, reasoned document has been prepared as under based on the comments from vendors.

Clause	Proposed clause of Specification	Comments of firm	RDSO's comments / discussion	Final Clause
1	2	3	4	5
<p>3.1.1-b (New clause to be added)</p> <p>Existing clause of 3.1.1 will be re numbered as a.</p>	<p>For Composite Grooved Rubber Sole Plates (CGRSP) made of natural rubber with a particular grade of RSS 1 to 4, the manufacturer should have license from Rubber Board for procurement of the raw rubber to be used for manufacturing of rail pads. During inspection of rail pads, the supplier should submit invoice in support of procurement of natural rubber of a particular grade from the approved sources of Rubber Board with proof of filing annual return with Rubber Board. Similarly, invoice of carbon blacks of suitable ASTM grades as per ASTM D 1765 procured from the primary manufacturing sources or their authorized dealer shall be submitted at the time of RDSO inspection. A record shall be maintained showing procurement & consumption of natural rubber and carbon blacks used for the production of rubber sole plates.</p>	<p>NA</p>		<p>For Composite Grooved Rubber Sole Plates (CGRSP) made of natural rubber with a particular grade of RSS 1 to 4, the manufacturer should have license from Rubber Board for procurement of the raw rubber to be used for manufacturing of rail pads. During inspection of rail pads, the supplier should submit invoice in support of procurement of natural rubber of a particular grade from the approved sources of Rubber Board with proof of filing annual return with Rubber Board. Similarly, invoice of carbon blacks of suitable ASTM grades as per ASTM D 1765 procured from the primary manufacturing sources or their authorized dealer shall be submitted at the time of RDSO inspection. A record shall be maintained showing procurement & consumption of natural rubber and carbon blacks used for the production of rubber sole plates.</p>

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<p>Clause No. 3.6</p>	<p>Finger printing of the chemical composition of CGRSP shall be done by measuring the values of Specific Gravity and Ash content which shall not vary from initial approved values and specified tolerance duly communicated to the firm at the time of fresh registration so that there will be no major change in composition of Composite Grooved Rubber Sole Plate in regular supply.</p> <p>i) Specific Gravity – Approved value ± 0.03 Subject to not exceeding 1.27 for compound 'A' and 1.17 for compound 'B'</p> <p>ii) Ash content % – Approved value ± 5 Subject to not exceeding 29% for compound 'A' and 20 for compound 'B'</p>	<p>NA</p>	<p>The proposed limits of Specific Gravity and Ash Content are based on the test results of CGRSP samples obtained during approval/ regular inspection of the samples of different shortlisted manufacturers. The mode values of a discrete probability distribution are taken as the maximum accepting limits of Specific Gravity and Ash Content for compounds 'A' and 'B' considering their most likely occurrence in the frequency distribution table. It has been observed from the test results that all accepting criteria of the existing specification are achievable with these values of Specific Gravity and Ash Content.</p> <p>The method for statistical evaluation of the data to decide the accepting limits of ash content (%) and specific gravity is available separately as annexure II, III & IV.</p>	<p>Based on the comments /discussion as per column 4, the proposed clause 3.6 shall be retained as it is as per column 2.</p> <p>The following test parameters are proposed to be added at SI No. 9 of Clause 3.2</p> <p>Ash content (%) for compound 'A' – 29 (max) and for compound 'B' – 20 (max)</p> <p>The following test parameters are to be added at SI No. 10 of Clause 3.2</p> <p>Specific gravity for compound 'A' – 1.27 (max) and for compound 'B' – 1.17 (max)</p> <p>The following modification is to be incorporated at Clause 3.6</p> <p>3.6 Finger printing of chemical composition</p> <p>3.6.1 Finger printing of the chemical composition of CGRSP shall be done by measuring the</p>

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				<p>values of Specific Gravity and Ash content which shall not vary from initial approved values and specified tolerance duly communicated to the firm at the time of fresh registration so that there will be no major change in composition of Composite Grooved Rubber Sole Plate in regular supply.</p> <p>i) Specific Gravity – Approved value ± 0.03 Subject to not exceeding 1.27 for compound 'A' and 1.17 for compound 'B'</p> <p>ii) Ash content % – Approved value ± 5 Subject to not exceeding 29% for compound 'A' and 20 for compound 'B'</p> <p>3.6.2 The manufacturers if so desire shall be permitted to seek changes in the specific gravity and percent ash content of the approved samples within specified tolerances subject to the maximum limits set forth for these properties in clause 3.6.1. Any such changes will be permitted after evaluation of fresh samples by RDSO as per extant rules.</p>

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Clause 5.0	A new para 'e' has been added under Clause 5.0 'Marking' as under:	NA	For easy identification of the 'TOP' surface of pad in field, a new point has been added under clause 5	Clause 5.0 'Marking': e) For easy identification of the 'TOP' surface of pad in field, a yellow colour un-vulcanized rubber label of minimum preferable size 25mm x 10mm shall be stick on the Compound "A" hard layer side of Composite GRSP before vulcanization. After vulcanization, the yellow label should be distinctly visible on the 'TOP' surface of the pad.
11.1 & 11.2	<p>The existing sub Clauses 11.1 & 11.2 have been reworded/merged and shall be read as under:</p> <p>Composite grooved rubber sole plates shall be packed such that each of 25 pads are placed flat on top of one another and bound by rubber bands in two perpendicular directions. The rubber bands used for packing the pads shall be of 15-20 mm width and due care shall be taken to avoid any extra stress developed in such packing. Six such packets placed flat one upon another shall then be placed in a plastic bag / HDPE</p>	NA		<p>The existing sub clauses 11.1 & 11.2 have been reworded and merged to clause 11.1 which is given as under-</p> <p>Composite grooved rubber sole plates shall be packed such that each of 25 pads are placed flat on top of one another and bound by rubber bands in two perpendicular directions. The rubber bands used for packing the pads shall be of 15-20 mm width and due care shall be taken to avoid any extra stress developed in such packing. Six such packets placed flat one upon another shall then be placed in a plastic bag / HDPE bag (except PVC bag) and this bag</p>

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	<p>bag (except PVC bag) and this bag shall be placed in a corrugated box to IS:7151-91, a quality suitable for para dropping of supplies and has waterproofing property for the outer layers of the box, to avoid any damage in transit. This corrugated box shall also be bound by two plastic straps of 15-20mm width in two perpendicular directions using suitable strapping tensioner & sealer tool. The packing shall ensure that no displacement of rail pads should occur during transit.</p>			<p>shall be placed in a corrugated box to IS:7151-91, a quality suitable for para dropping of supplies and has waterproofing property for the outer layers of the box, to avoid any damage in transit. This corrugated box shall also be bound by two plastic straps of 15-20mm width in two perpendicular directions using suitable strapping tensioner & sealer tool. The packing shall ensure that no displacement of rail pads should occur during transit.</p>
<p>SN 12 of clause 3.2</p>	<p>Adhesion Strength Test <i>Units : Kgf</i> <i>Acceptance Value : 8 (Min)</i> <i>Test Method : Appendix - I</i></p>	<p>M/s Avadh Rubber</p> <p>Adhesion value between layers should be 4.0 kgf instead of 8 kgf, reason is that other reinforcing pad (ref: RDSO/M&C/RP-201/2007) spec value is 4.0 kgf, while it has reinforced</p>	<p>The value of Adhesion strength Test has been decided upon the basis of test results obtained from various 10 mm CGRSP pad obtained from different shortlisted firms of 10 mm CGRSP.</p> <p>In refereed specification RDSO/M&C/RP-201/2007 it is the adhesion between Nylon cord and rubber, However in CGRSP it is the adhesion between two layers of composite Pad, hence both cannot be compared with each other.</p>	<p>SI No. 12 of Clause 3.2</p> <p>Adhesion Strength Test <i>Units : Kgf</i> <i>Acceptance Value : 8 (Min)</i> <i>Test Method : Appendix - I</i></p>

<p>SN 11 of clause 3.2</p>	<p>Secant Stiffness Test <i>Units : KN/mm</i> <i>Acceptance Value : 100-170</i> <i>Test Method : Appendix - H</i></p>	<p>M/s. Avadh Rubber Kindly removed one test either Load deflection or Secant Stiffness, Because both test measure same parameter and are repetitive test.</p>	<p>Load deflection vs Secant Stiffness Test-</p> <p>Rail pads are required to bear axle load, and it is important that the static deflection should be limited to an acceptable level. Load deflection test is carried out to determine permissible rail deflections under a given load. For example, Brandl and Woldringh had suggested that the following elastic deflections, δ, are acceptable under a passing wheel load of approximately 200 kN (Ref: Railway Transportation: Policies, Technology and Perspectives, Publisher: Nova Science Publishers, Editos: Nicholas P. Scott)</p> <p>$1.0 \text{ mm} \leq \delta \leq 2.2 \text{ mm}$ for train speeds $\leq 160 \text{ km/h}$ $1.5 \text{ mm} \leq \delta \leq 2.0 \text{ mm}$ for train speeds $> 160 \text{ km/h}$</p> <p>Considering these aspects load deflection value has been stipulated in the IRS specification.</p> <p>Track stiffness has a major influence on the performance of a railway track as trains traverse along it. It must lie within certain limits not only to control deflections, but also to maintain track geometry and ensure the longevity of track</p>	<p>SN 11 shall be appended in clause 3.2 as under:</p> <p>Secant Stiffness Test <i>Units : KN/mm</i> <i>Acceptance Value : 100-170</i> <i>Test Method : Appendix - H</i></p>
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			<p>components. A track support that is too soft, or varies too widely over a short distance, may lead to excessive deformation and a rapid loss of geometry. A track support that is too stiff may result in damage to components such as rails and clips.</p> <p>In a typical railway track system, the rails are supported by a number of elements in series – in descending order, the rail pads, sleepers, ballast, sub-ballast and sub grade or formation. In a well-constructed and well-maintained track, these elements all deform essentially elastically (in the sense that the majority of their deflection is not permanent) when loaded and unloaded during train passage. The stiffness of individual components will contribute to the overall stiffness of railway track system.</p> <p>Considering these aspects Secant Stiffness test has been incorporated in The specification.</p>	
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Apart from the above, some other issues have been raised by the manufacturers of CGRSP which are summarized as under-

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S N 7 of clause 3.2	Load deflection Test <i>Units : mm</i> <i>Acceptance Value : 0.8-1.1</i> <i>Test Method : Appendix - F</i>	The specification value load deflection of 10mm CGRSP should be 0.9 - 1.3 mm instead of 0.8 – 1.1 mm.	The Acceptance value for Load deflection Test has been decided upon the basis of test results obtained from various 10 mm CGRSP pad obtained from different regular supplier of 10 mm CGRSP. The majority of the values were lying in the above given range.	Load deflection Test <i>Units : mm</i> <i>Acceptance Value : 0.8-1.1</i> <i>Test Method : Appendix - F</i>