

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(RDSO)

AMENDMENT - 1 OF 2018
TO
INDIAN RAILWAY STANDARDS SPECIFICATION
FOR
10 mm Thick COMPOSITE GROOVED RUBBER SOLE PLATES FOR
PLACING BENEATH RAILS
SERIAL No. RDSO/M&C/RP-200/2007

1. New Para 'b' has been added Under the Clause 3.1.1 as under:

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.

2. Existing clause 3.1.1 has been re-numbered as 'a' under the Clause 3.1.1.

3. The following new tests have been added at SI No. 9, 10, 11, 12 & 13 of Clause 3.2

S. No.	Property/Test	Units	Acceptance Value	Test Method
9.	Ash Content	%	For compound 'A' 29 (Max) For compound 'B' 20 (Max)	IS 3400 (Part 22) : 1984
10.	Specific Gravity	-	For compound 'A' 1.27 (Max) For compound 'B' 1.17 (Max)	IS 3400 (Part IX) : 2003
11.	Secant Stiffness Test	KN/mm	100 - 170	Appendix - H
12.	Adhesion Strength Test	Kgf	8 (min)	Appendix - I
13.	Impact Attenuation Test	%	40 (min)	Appendix - J

All the above tests shall be performed on Composite Grooved Rubber Sole Plates (10 mm thick). Impact Attenuation test shall be conducted at the time of initial approval and/ or quality audit of firms by RDSO.

4. The Existing Appendix H & I will be renumbered as K & L respectively.

5. A new Clause 3.6 has been added as under:

3.6 Finger Printing of Chemical Composition

3.6.1 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 Grooved Rubber Sole Plate in regular supply.

- i) Specific Gravity – Approved value ± 0.03
Subject to not exceeding 1.27 for compound 'A' and 1.17 for compound 'B'
- ii) Ash content % – Approved value ± 5
Subject to not exceeding 29% for compound 'A' and 20% for compound 'B'

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.

6. A new para 'e' has been added under Clause 5.0 'Marking' as under:

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.

7. The existing sub Clauses 11.1 & 11.2 have been reworded /merged and shall be read as under:

11.1 The 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 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.

8. The existing sub Clauses 11.1 & 11.2 have been merged under Clause 11.1, therefore Clause 11.3 has been renumbered as Clause 11.2.

Sd/-
for Director General/M&C

SECANT STIFFNESS TEST

1. Place the test pad between steel platens, as shown in Figure1. A piece of '0' number emery paper shall be placed between the pad and the platens, with the abrasive side against the pad.

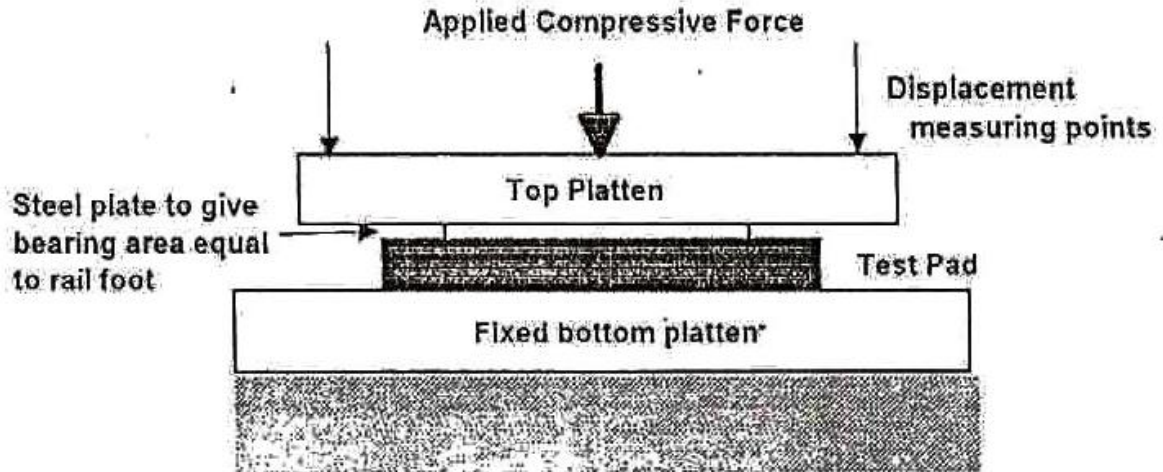


Figure 1

2. Apply consecutive loading of 100 KN, and remove it, six times. The loading times shall each be at least 12 seconds.
3. Upon release of the final pre-conditioning deformation a pre-load up to 100N shall be applied before setting deflection measuring devices to zero.
4. Apply a compressive force up to 100 KN at a rate of 50 ± 10 KN/min. As the load increases, record continuously the displacement at the four corners. From this record, determine the displacements with applied loads of 20 KN and 90 KN. If the difference between the largest and smallest of the four displacement measurements is more than 30% of the mean value, the test results are invalid, and the test must be repeated, ensuring that the pad is suitably placed in the test machine. If the difference is less than 30% of the mean calculate the mean displacement, S_{20} , with 20 KN applied, and the mean displacement, S_{90} , with 90 KN applied. For used pads drawn from service, this difference shall be considered as 40%, max.
5. Two number samples to be tested per lot and each individual value shall meet the requirement of the specification.
6. The static secant stiffness, k_{20-90} , is calculated from

$$k_{20-90} = 70/(S_{90} - S_{20}) \text{ KN/mm}$$

7. Specified values of Secant Stiffness for 10 mm thick CGRSP shall be 100 - 170KN/mm.

ADHESION STRENGTH TEST

The adhesion strength test between layers 'A' & 'B' shall be done as per IS: 3400 (Part 24) with test specimen of 20 ± 1 mm width cut from the composite grooved rubber sole plate. A layer is to be separated for a distance sufficient to enable the separated ends to be held in the grips of the tensile testing machine. Sometimes, this separation is not possible due to strong adhesion between the layers 'A' & 'B' to enable gripping of the samples in the machine, in that case, the sample shall be treated as passing the adhesion strength test and the same should be reported as 'no separation' without giving any observed value of load required to separate the layers. But, when separation is possible, the maximum load for 20 mm width shall be reported at which separation occurs.

Two numbers of samples shall be tested per lot and each individual value shall meet the requirement of the specification.

FINAL DRAFT

IMPACT ATTENUATION TEST

1. The impact attenuation of the pad is to be measured in a drop weight test rig of the type shown in Figure 2. The drop weight has a mass of between 10 kg and 50 kg. In order to set the calibration of the rig, the rail fastening should first be assembled with 10 mm thick plain hard plastic rail pad(HDPE or EVA), with stiffness not less than 750MN/m. The mass and height of the drop weight should be adjusted so that a clear impulse signal is obtained in the strain gauge, within 2 milliseconds to 5 milliseconds, with the peak strain not exceeding 2/3 of the initial cracking strain of the sleeper. Once these parameters are established for a particular test rig, a new sleeper should be strain gauged and installed for regular testing.

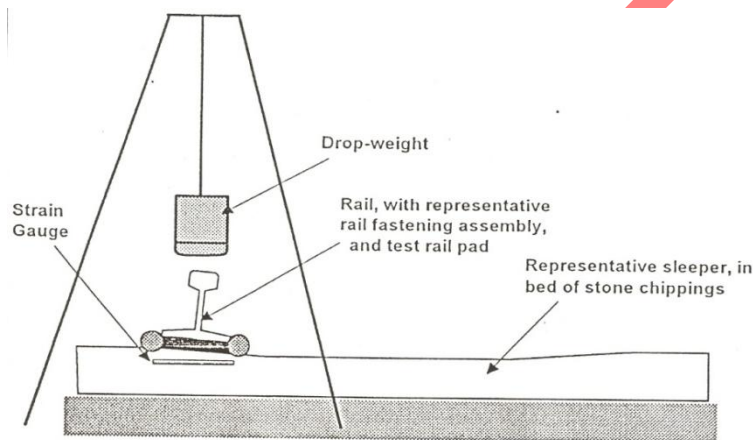


Figure 2

2. For test, standard rail fastening components as per RDSO Drg. No. RDSO/T-7009 or RDSO/T-8529 using concrete sleeper to Drg. No. RDSO/T-7008 or RDSO/T-8529 respectively, are to be used.
3. The test is carried out as follows:
 - 3.1 Place a Bed of stone/rubber mat below the sleeper for support. The support shall permit a vertical deflection in the range 0.1 mm to 0.5 mm during the test.
 - 3.2 With a hard plastic pad (stiffness greater than 750 MN/m) in place in the rail fastening assembly, drop the weight from the height established in the preparatory test, record the peak strain value. Repeat the test twice more. The average value of the three strains is recorded as ξ_{ref} .
 - 3.3 Dismantle the rail fastening assembly, and re-assemble it with the test pad in place. Drop the weight from the same height and record the peak strain value. Repeat the test twice more. The average of these three peak strains is recorded as ξ_{test} .
4. The impact attenuation of the pad A is defined by

$$A = (1 - \xi_{test} / \xi_{ref}) \times 100\%$$
5. Two samples shall be tested during initial approval and/or quality audit of firms by RDSO and each individual sample shall meet the requirement of the specification.