

**Government of India
Ministry of Railways
Research Designs and Standards Organisation (RDSO)
Manak Nagar, Lucknow (INDIA) -226011**

GLOBAL NOTICE

(Notice No. CT/EF/Policy/Global RFP/ HP Pad dated 26.07.2018)

for

'REQUEST FOR PROPOSAL'

Ministry of Railways, Research Designs and Standards Organisation (R.D.S.O.), Lucknow is inviting the proposal from the firms whose product "High Performance Rail pad" qualifies the technical criteria given in Annexure-C for short-listing the products for considering for 'Field Trial on Indian Railways". After successful field trial of the product i.e. High Performance Rail pad, the adoption of this new product will be dealt as per Railway Board letter no. 2013/Tk-II/22/7/4(General Policy) dated 08.03.2016 regarding "New Policy on development and adoption of new product / technologies for track/bridge related items".

Firms who can supply the High Performance Rail pad meeting the technical criteria i.e. generic specification / performance parameters of High Performance Rail pad as given in Annexure-C of this document are requested to see the complete details and RFP document on RDSO's website www.rdso.indianrailways.gov.in→Tenders →EoI.

For any clarification, Firms may contact Director/Track-IV, RDSO, Lucknow on Telephone No. +91-522-2452796 or / and email: dtd5rdso@gmail.com on any working day for further details.

The firms are requested to submit the proposal and requisite details in the prescribed format to Director/Track-IV, Anusandhan Bhawan, Track Design Directorate, RDSO, Manak Nagar, Lucknow -226011 (INDIA) up to 01.10.2018.

Firms submitting proposals shall note that:

1. This 'RFP is only for the purpose of short-listing the product i.e. High Performance Rail pad meeting the stipulated 'Generic Specification/Performance parameters of 'High Performance Rail pad' as given in Annexure-C of this document for considering for undertaking field trial of High Performance Rail pad in the Indian Railways.
2. The relevant values/properties of the proposed High Performance Rail pad meeting the technical requirements as given in Annexure-C needs to be provided.

Director/Track-IV
for Director General (Track)
RDSO, Lucknow
(for & on behalf of President of India)

Instructions/ Guidelines for the firms submitting proposals against this Global 'Request for Proposal' (RFP)

1. DISCLAIMER:

Indian Railways reserves the right not to proceed with the process or at a later stage to change the process as per the requirements of Indian Railways. It also reserves the right to decline to discuss the process further with any party submitting the proposal. This RFP shall not be considered in any way a proposal for procurement of High Performance Rail pad but only for short- listing of product i.e. High Performance Rail pad meeting the technical requirements i.e. generic specifications / performance parameters of High Performance Rail pad given in Annexure-C for considering for undertaking only field trial. The intending participants will furnish proposals at their own cost and no claims, whatsoever; in this reference will be entertained by the Railways.

2. PURPOSE OF INVITING RFP:

The purpose of this RFP is to short-list the product i.e. High Performance Rail pad, for undertaking field trial and invite the proposals from firms who can supply the High Performance Rail pad meeting technical parameters as per Annexure-C.

With above objective, Indian Railways seeks to establish proveness of effective High Performance Rail pad through field trial over Indian Railway track, meeting the technical requirements i.e. generic specifications / performance parameters of High Performance Rail pad for their possible use in future in Indian Railways. The generic specifications / performance parameters of High Performance Rail pad is given in this document as **Annexure- 'C'**.

3. GENERAL INSTRUCTIONS FOR SUBMITTING PROPOSALS to the RFP:

3.1 Eligibility criteria

- i) Applying firms should be following:
 - a) Existing manufacturer of GRSP/CGRSP appearing in vendor directory issued by QA/Civil Dte.
 - b) Manufacturer / Supplier of High Performance Rail pad or fastening system with High Performance Rail pad to any world railway system having Collaboration Agreement or Joint Venture partnership with any Indian firm appearing in vendor directory issued by QA/Civil Directorate on the date of issue of RFP.

However, the firm/JV who have past experience in use of High Performance Rail pad and have done R&D on this subject will be preferred.

- ii) The High Performance Rail pad offered by the Firm should meet the generic specifications / performance parameters mentioned in this document (Annexure – 'C').

3.2 The proposals of High Performance Rail pad not meeting the technical requirements given in Annexure-C shall be summarily rejected without further consideration and decision of RDSO will be final in this case.

3.3 If the offered High Performance Rail pad is a proven product, then the Firm shall provide the details of supply & its performance on any of the World

Railway in last three years however, the such firm has to submit High Performance Rail pad proposal as per 'Generic Specification/Performance parameters of 'High Performance Rail pad' as given in Annexure-C. If the offered High Performance Rail pad is not proven & meeting the technical requirements given in Annexure-C, in that case the firm can also submit their proposal as per this document.

- 3.4 Specification / performance parameters of offered 'High Performance Rail pad' supplied earlier to any world railway system as per Para 3.3 can be attached as separate document while submitting the RFP proposal.
- 3.5 Technical details to be provided by firm: Technical details such as relevant values/properties of the proposed High Performance Rail pad purposed as per the technical requirements given in Annexure-C, shall be submitted by the firm along with their proposals. The firm will be required to furnish supporting documents along with lab reports and field reports etc. to establish that they are meeting the laid down requirements.
- 3.6 The details submitted by the firm shall be scrutinized by RDSO. The deficiency as observed in the proposal during technical scrutiny or additional information as considered necessary will be advised to the firm. The additional information must be made available by firm within one month of intimation.
- 3.7 Submission by firms: The firm shall ensure the submission in the format given in Annexure - B.
- 3.8 The submission by the firms shall be made to Director/Track-IV, RDSO, Anusandhan Bhawan, Manak Nagar, Lucknow- 226011 in the enclosed Format for "Letter of Response at Annexure B". In the proposal submitted, the firms should mention RDSO's Notice No. CT/EF/Policy/Global RFP/HP Pad dated 26.07.2018.
- 3.9 The firms must furnish the application form & details in duplicate as required in the enclosed Format for "Letter of Response" at **Annexure-B** and details stipulated in Annexure-C. All pages of the documents should be signed with stamp.
- 3.10 In case the offered 'High Performance Rail pad' is claimed to be patented one already, the firms/JV will submit the patent registration details and documents/drawings in the support of the same.
- 3.11 In case the offered 'High Performance Rail pad' is claimed to be non-patented or free from any IPR, the firms/JV will submit undertaking (notarized affidavit) that the same has been developed by them and not copied from an existing product/design/drawing. It does not violate any valid/live patent and the same is not patented/developed by any other firms/JV. In addition the firms/JV will also required to indemnify IR/RDSO as per proforma given in **Annexure-D** against any possible dispute/litigation in feature pertaining to IPR infringement of any product/technology/design. It shall also be incorporated in such an

undertaking that the firm/JV is fully aware of the fact that patented product/technology shall not be entitled for any incentive or preferred treatment in case of its adoption by IR.

- 3.12 RDSO reserves all the right of this exercise. In case of any doubt/dispute, decision of RDSO shall be final.

4. SELECTION CRITERIA:

The product meeting the eligibility criteria will be shortlisted by RDSO for considering for undertaking field trial on Indian Railways, broadly based on the following criteria:

S. No.	Item
1	Technical suitability of proposed High Performance Rail pad as per the generic specification / performance parameters given in Annexure-C
2	Experience and expertise in the field of High Performance Rail pad

**Director/Track-IV,
For Director General (Track)
RDSO, Lucknow**

FORMAT FOR LETTER OF RESPONSE

Respondents Ref No.:

Date:

Director/Track-IV
Building: Anusandhan Bhawan,
Research Designs & Standards Organization (RDSO)
Ministry of Railways, Manak Nagar
Lucknow (INDIA), Pin - 226011

Dear Sir,

Subject: RESPONSE TO – GLOBAL RFP FOR PARTICIPATION

1. We, the undersigned, offer the following information in response to the 'Request for Proposals' sought by you vide your Notification No. CT/EF/Policy/ Global RFP/HP Pad dated 26.07.2018.
2. We are duly authorized to represent and act on behalf of _____ (hereinafter the "respondent")
3. We have examined and have no reservations to the RFP Document including Addenda No(s)_____.
4. We are attaching with this letter, the copies of original documents defining: -
 - 4.1 The Respondent's legal status;
 - 4.2 Its principal place of business;
 - 4.3 Its place of incorporation (if respondents are corporations); or its place of registration (if respondents are cooperative institutions, partnerships or individually owned firms);
 - 4.4 Self certified financial statements of last three years, clearly indicating the financial turn over and net worth.
 - 4.5 Copies of any market research, business studies, feasibility reports etc sponsored by the respondent, relevant to the project under consideration
5. We shall assist Ministry of Railways (MoR) and/or its authorized representatives to obtain further clarification from us, if needed.
 - 5.1 RDSO and/or its authorized representatives may contact the following nodal persons for further information on any aspects of the Response:

S. No.	Contact Name	Address	Telephone	E Mail

6. This application is made in the full understanding that:
 - 6.1 The RFP is only for short-listing of the products i.e. for considering for undertaking field trial of High Performance Rail pad and the firms who can supply the High Performance Rail pad meeting generic specification / performance parameters for carrying out field trial by Zonal Railways of Indian Railway and suitable for use on IR network under prevailing & envisaged operating conditions for 25T axle load and not for its procurement.
 - 6.2 Information furnished in response to RFP shall be used confidentially by RDSO as required. Confidentiality of the information furnished by the firm in this RFP will be maintained by RDSO.
 - 6.3 RDSO reserves the right to consider or not to consider any or all applications, cancel the RFP without any obligation to inform the respondent about the grounds of same.
7. In response to the RFP, we hereby submit the following details annexed to this application -
 - 7.1 Turn-over of the firm during the last three financial years with the copies of annual report.
 - 7.2 Details of customer(s)/Railways where High Performance Rail pad have been supplied by the firm including quantity during last 3 years. (Para 3.3)
 - 7.3 Details of supply and performance as detailed in Para 3.3 of Annexure-A.
 - 7.4 Specification / performance parameters of supplied High Performance Rail pad as per para 3.3 of Annexure-A.
 - 7.5 Budgetary cost of High Performance Rail pads as per drawings enclosed as Annexure E, Annexure-F & Annexure-G to be submitted.
 - 7.6 Complete details of the High Performance Rail pad with drawing and specification as per Annexure-C of this RFP.
 - 7.7 Details of Intellectual Property Rights (IPR) held, patent filed/held and MoU/ agreement signed.
 - 7.8 Details of ISO/equivalent certification, if any.
 - 7.9 Documents in proof of Eligibility criteria
 - 7.10 Para-wise compliance of Requirements as per Annexure-C and supporting documents.
 - 7.11 Undertaking/ indemnification as per **Annexure-D**.
8. The undersigned declare that the statements made and the information provided in the duly completed application are complete, true, and correct in every detail.

Yours sincerely,

(Signature)

Name:

In the Capacity of duly authorized to sign the response for and on behalf of

Date:

Generic Specification/Performance Parameters of High Performance Rail pad in Indian Railway.

World over, use of 'High Performance Rail Pad' is gaining popularity for mainly high resilience with increased life minimum of 8 years or 300 GMT in track. However, Indian Railways is exploring the use of High Performance Rail pad in Indian Railways. For this purpose, draft generic specifications for “**High Performance Rail pad**” have been framed for use on Indian Railways for shortlisting of product for conducting the field trials for evaluating the performance of High Performance Rail pad. The product / system will be shortlisted for considering conducting field trial on the basis of information furnished by the applicants as per technical conditions of RFP. Presently, most commonly Rail pads 6.2mm thick Composite Grooved Rubber Sole Plates (RDSO/T-6618) & 10mm thick Composite Grooved Rubber Sole Plates (RDSO/T-7010 & 8528) are used for BG track in India. Copies of drawings are enclosed for reference as Annexure-E, Annexure-F & Annexure-G.

The typical operating conditions of BG track on IR are as under:

Existing Track Structure on Indian Railways:

UIC 60 grade-880 Rails laid on Pre-stressed Concrete Sleepers (170.4 mm & 160mm rail seat width) at sleeper density 1540/1660 nos. per km with elastic fastenings and ballast cushion of 300/350 on important Broad Gauge routes.

Operating conditions of IR:

- i) Axle load and Speed

Traffic Type	Axle Load	Speed upto
Goods	25T	100 kmph
Passenger	22T	160 KMPH (Existing) 200 kmph(Proposed)

- ii) Traffic Density, GMT(A Route) : 7.0 to 130
iii) Electric Traction (Minimum) : 25 KV AC.
iv) Track Circuits : DC (2 – 6 volts) / AC 110V & AFTC
v) Gauge : Broad Gauge, Nominal (1676 mm)
vi) Ambient Temperature : (-) 5⁰C to 50⁰C.
vii) Rail Temperature : (-) 15⁰C to (+) 76⁰C.
viii) Humidity : Max. 100%

(A) Specification of the High Performance Rail pad –

1.0 MANUFACTURE

1.1 MATERIAL, DESIGN & MANUFACTURING PROCESS

- 1.1.1 a) The high performance rail pad shall be manufactured using natural rubber, Ribbed Smoked Sheet (RSS) either of grade 1 to 3 or a blend with synthetic rubber suitably compounded and vulcanized so as to conform to the requirements of the specification. The natural rubber based pads shall meet the qualifying criteria as given in Table A1.

b) Alternatively, thermoplastic elastomers (TPEs) or any other polymeric materials other than rubber shall be used for manufacturing of rail pads which shall be resistant to UV radiation, hydrolysis and permanent deformation under loading conditions especially at higher rail temperatures during summer of the order of 70°C. The rail pads shall conform to the requirements as given in Table A2.

1.1.2 The manufacturer should state the name of the base polymer used to manufacture rail pads and all of its properties. The relevant documents shall also be submitted for use of this material in rail pads for other international railways.

1.1.3 The high performance rail pad shall have suitable design so as to meet the qualifying criteria of the specification. The applicants / offeror may submit the pad according to their own design. After evaluation of the product performance through field trial and decision on best product and design, the drawing and design of the pad will be finalized. The major dimensions of the pad are given at clause no. 2.0.

1.1.4 No particular method of manufacturing is laid down in the specification. However, the manufacturer should state the general procedure to be employed for manufacture in his offer. At each stage of manufacture the supplier must use the most up to date procedures and apply all the production controls necessary to ensure that the product satisfies the requirements of this specification.

1.2 PHYSICAL PROPERTIES OF RUBBER/TPE/ANY OTHER SUITABLE MATERIAL

1.2.1 The acceptance criteria of the pads have been divided into two major parts:

- (A) Qualifying criteria
- (B) Monitoring of performance during field trial

1.2.1 (A) Qualifying criteria:

(A1) Rubber based pads as mentioned in para 1.1.1(a) above:

S. No.	Properties	Units	Values		Test methods
			Mixed Traffic routes	DFC/ Freight pre-dominant / Heavy haul routes	
1.	Hardness, min.	Shore 'A'	70 ± 5	85 ± 5	Appendix A
2.	Tensile strength				Appendix B
	a) Before ageing, min	kg/cm ²	170	150	
	b) After ageing at 100 ± 1 °C for 96 +0 -2 hrs, min	kg/cm ²	140	120	
	c) Percentage retention after ageing, min	%	80	80	

3.	Elongation at break a) Before ageing, min. b) After ageing at 100 ± 1 °C For 96 hrs. + 0, Min -2 c) Percentage retention after ageing, min	% % %	300 220 70	200 150 70	Appendix B
4.	Modulus (relaxed) at 100% Elongation a) Before ageing b) Percentage change after ageing at 100 ± 1 °C for 96 + 0 hrs. -2	Kg/cm ² %	35-50 +30 -10	50-65 +30 -10	Appendix C
5.	Compression set, subjected to 50% compression at 100 ± 1 °C For 24 + 0 hrs, Max. -2	%	30	30	Appendix D
6.	Tension set, subjected to 50% stretch at 100 ± 1 °C For 24 + 0 hours, Max -2	%	25	25	Appendix E
7.	Load compression test	mm	0.6-0.8	0.4-0.6	Appendix F
8.	Electrical resistance, Min a) Before immersion b) After immersion	Mega Ohms	100 100	100 100	Appendix G
9.	Impact attenuation, Min	%	30	20	Appendix H
10.	Secant Stiffness	KN/mm	80 -150	> 150	Appendix I
11.	Durability test	%	Change in values within 25%	Change in values within 25%	Appendix J

At this stage, the limiting values of Ash Content & Specific Gravity have not been stipulated in this document & preference has been given to performance parameters only. However, the stipulated value of Ash Content & Specific Gravity for 6mm thick GRSP to IRS Specification T-47 is 29% max & 1.27 max respectively.

The specified values of Tensile strength, Elongation at break and Relaxed modulus represent the values obtained from the plain dumbbell specimen prepared from test slabs of thickness $6 +0.5/-0.0$ and of size 200 x 130 mm which are made by using the same rubber compound and identically vulcanized as that of the finished pads. Authentication of the test slab with that of the finished pad shall be done as per clause 1.2.1.1.

1.2.1.1 For the purpose of confirming /correlating the composition of test slabs with that of the finished rubber pad the following tests shall be performed both on the test slabs and the finished pad and shall comply with the requirement as given under:

- | | |
|---------------------|--|
| a) Hardness Shore A | The values shall be within ± 2 |
| b) Specific Gravity | The results shall be within ± 0.02 |
| c) Percent Ash | The results shall be within ± 1.0 |

1.2.1.2 Finger printing of the chemical composition of rubber rail pads shall be done by measuring the values of Specific Gravity and Ash content which shall not vary from the initial approved values and specified tolerance that there will be no major change in composition of rail pads during the period of field trial.

(a) Specific Gravity – Approved value ± 0.03

(b) Ash Content % - Approved value ± 5

(A2) TPE or any other suitable variant of polymer / composite / other than rubber as mentioned in para 1.1.1(b) above:

S. N	Properties	Units	Values		Test methods
			Mixed Traffic routes	DFC/ Freight predominant / Heavy haul routes	
1.	Hardness	Shore D	50 (min)	65 (min)	ASTM D-2240
2.	Tensile Strength at peak at 50 mm/min speed on plain dumbbell test specimen	Kg/cm ²	200 (min)	250 (min)	ASTM D-638 (Dimensions of dumbbell specimen as per Fig 1)
3.	Elongation at Peak on plain dumbbell	%	250 (min)	200 (min)	ASTM D-638
4.	Compression set, subjected to 50% compression at 100 \pm 1 °C For 24+ 0/-2 hrs	%	30 (max)	30 (max)	Appendix D
5.	Load compression test	mm	0.6 - 0.8	0.4-0.6	Appendix F
6.	Electrical resistance, Min a) Before immersion b) After immersion	Mega Ohms	100 100	100 100	Appendix G
7.	Impact attenuation, Min	%	30	20	Appendix H
8.	Secant Stiffness	KN/mm	80 -150	> 150	Appendix I
9.	Durability test	%	Change in values within 25%	Change in values within 25%	Appendix J
10.	Ash content	%	0.1 %, Max	0.1 %, Max	Appendix K
11.	Specific gravity	-	Shall be stated by the manufacturer as per the specification of raw materials used to manufacture rail pads	Shall be stated by the manufacturer as per the specification of raw materials used to manufacture rail pads	Test procedure as per BS 2782 part 6 - 1980 method 620 A

1.2.1.3 Tensile strength and Elongation at break shall be carried out from plain dumbbell test specimen moulded separately from the same raw materials used to manufacture rail pads. All other tests shall be carried out on finished rail pads.

1.2.1.4 For compression set test, same test conditions shall be applicable both for rubber and other materials considering end use of the rail pads and their modes of failures as observed during earlier field trials of the rail pads made of TPE or other thermoplastic materials. These pads shall not be deformed during service due to excessive creep of

thermoplastic nature of the material at higher ambient temperature when the rail temperature is likely of the order of 70 °C in India during summer.

1.2.1.5 Authentication of the dumbbell test specimen with that of the finished pad shall be done as per clause 1.2.1.6.

1.2.1.6 For the purpose of confirming /correlating the dumbbell test specimen with that of the finished TPE/other rail pad the following tests shall be performed both on the dumbbell test specimen and the finished pad and shall comply with the requirement as given under:

a) Hardness Shore D	The values shall be within ± 2
b) Specific Gravity	The results shall be within ± 0.02
c) Percent Ash	The results shall be within ± 1.0
d) Melting Point	The results shall be within ± 2.0

1.2.1.7 Finger printing of the raw material used to manufacture TPE or other rail pads shall be done by measuring the values of Specific Gravity, Ash content and Melting Point which shall not vary from the initial approved values and specified tolerance so that there will be no major change in composition of rail pads during the period of field trial.

- (a) Specific Gravity – Approved value ± 0.02
- (b) Ash Content % – Approved value ± 2.0
- (c) Melting Point (°C) – Approved value ± 2.0

1.2.1.8 If the pads are of composite material and manufactured using combination of the same material or different material as given in Clause 1.1.1(b), then the individual layer of pads / test slabs of specified thickness shall conform to the qualifying criteria as given in Table A1 and Table A2 individually as the case may be. However, if composite pads are combination of raw material other than that stated in Clause 1.1.1(b) above, then test results as per relevant standards for parameters e.g. Hardness, Tensile Strength, Compression set, Electrical resistance, Secant Stiffness, Durability test etc. (as per table A1 & A2) shall be submitted to RDSO. Evaluation of such pads shall be done by RDSO on the basis of satisfactory test results and to be decided by RDSO based on the characteristic of such pad offered. Decision of RDSO in this regard shall be final and binding.

1.2.1 (B) Monitoring of performance during field trial:

The trial of shortlisted pads shall be done on heavy haul routes of Indian Railway where 22.9t/ 25t axle load are operational. The applicant/ offeror may submit any type of pads or more than one alternatives along with their offer as per Appendix ‘L’.

The sample pads shall be taken out after one year service life or as per trial scheme and would be subjected to the following tests:

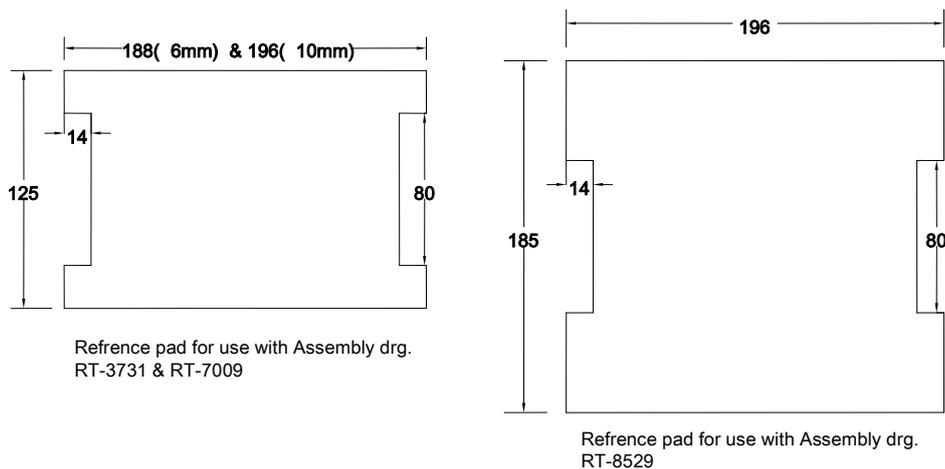
SN	Properties	Units	Values	Test methods
1.	Visual Examination (a) Reduction in thickness (b) Increase in width	mm mm	Thickness not less than 20% of the original specified thickness ignoring the tolerance value 10 mm, max from the original specified width ignoring the tolerance value	
2.	Change in Tensile strength	%	Not more than 20% of the original value	Appendix-B
3.	Change in Load Compression value	%	Not more than 20% of the original value	Appendix F
4.	Change in Secant stiffness	%	Not more than 20% of the original value	Appendix-I
5.	Toe-load checking		Difference of toe-load not to be more than 20% of the toe-load obtained with a new rubber pad vis-à-vis the same obtained with the old rubber pad.	

- 1.2.2 For evaluation of service performance of pads Tensile strength, Secant stiffness, Load compression and Toe-load tests shall be carried out from the finished pads and the values obtained shall only be used for comparison with original values of the finished pad at the time of offer. In case of rubber pads backed with plastic plates, the tests shall be carried out by removing the plastic back plates whenever necessary. For grooved design of pads, dumbbells shall be prepared in a manner such that the groove coincides with the central line of the test specimen and the area of the groove shall not be deducted. For stud/button type of pads, the dumbbells shall be cut from studded portion of the pad and minimum thickness shall be considered for calculation of Tensile strength and Elongation at break.
- 1.2.3 After evaluation of the in-service performance of pads through field trial, best design shall be finalized & with the data so obtained through trial necessary review/modifications in the various parameters/ physical properties of the pads (as specified in this specification) may be done before finalization of the specification for using product for regular use in future.
- 1.2.4 The samples removed from trial shall be visually examined for any defects. There should be no significant tears, holes or cuts in the pad affecting the performance of the pad. To measure the minimum thickness and maximum width of the pad, average of five measurements at different locations shall be considered.
- 1.2.5 If the values of the parameters specified above for in service evaluation cross the limit at any stage, the trial will be treated as concluded and no further evaluation will be done for the firm.
- 1.2.6 The tests after one year would be conducted by RDSO to monitor the performance of the pads in service.

1.2.7 RDSO can carry out additional tests on the pads removed from trial track other than mentioned in para 1.2.1(B) above e.g., change in impact attenuation, elongation at break, etc. to ensure satisfactory performance of the pad after one year service and the decision of the RDSO in this regard will be final.

2.0 DIMENSIONS AND TOLERANCES:

2.1 Some important dimensions of the pad are given in the following sketch. The thickness of the pads shall be 6 mm for mixed traffic application and 10 mm for DFC. Unless otherwise specified a tolerance of $+5/-0$ mm shall be allowed on the length, $+0/-2$ mm on width, and $+0.5/-0.0$ mm on the thickness. The other dimensions and design of the pad are presently left to the manufacturer and shall conform to the drawings supplied by the applicant/offeror. The final dimensions of the pad will be finalized after selection of product for trial in consultation with RDSO.



2.2 The design of 6 mm thick or 10 mm thick pads shall be such that these pads can be used in the existing concrete sleeper assembly i.e. RT-3731 (for PSC Sleeper RT-2496) in case of 6mm thick pad and in concrete sleeper assembly i.e. RT-7009 & RT-8529 (for PSC Sleeper RT-7008 & RT-8527 respectively) in case of 10 mm thick pad.

2.3 The RDSO can accept either of the above two alternatives or both the alternatives in part.

3.0 MARKING

Each sole plate shall bear the following marking in 0.8 mm raised letters / figures in one horn of the sole plate.

- (a) Manufacturers' initials or trademark.
- (b) First 2 digits for the month and last two digits for years as follows:
01-02
02-02 etc
- (c) 'HPRP' for identification of high performance rail pad

4.0 FREEDOM FROM DEFECTS:

The rail pads shall have clean-cut sides and shall be free from defects such as porosity, blowholes or the presence of any other extraneous matter. The rail pads

shall also have smooth surface and the grooves shall be unobstructed at the ends and along their whole length for grooved design of the pad.

5.0 TEST CONDUCTED FOR SHORTLISTING OF PADS OF THE PROSPECTIVE FIRMS THROUGH RFP:

5.1 For short listing of the offered pads through RFP, the firm has to submit adequate number of samples of rail pads as per test scheme given in Appendix 'L'. No testing charges shall be levied in case of testing at RDSO. However, for outside testing the testing charges as applicable shall be borne by the firm. All tests as per para 1.2 (A1 & A2) except durability test shall be conducted in RDSO. However, Durability test shall be conducted through outside agencies i.e. Government Laboratory or from lab accredited by Accreditation agency as per extant guideline issued by RDSO or National Test House or Regional Test Centre (RTC) & cost of such test shall be borne by the firm. In case of testing in RDSO is not possible due to various reasons, the firm has to conduct tests as given in para 1.2 (A1 & A2) at his cost as directed by RDSO. The decision of RDSO in this regard shall be final & binding.

5.2 Rail pads shall be submitted by the offering firms for testing in RDSO as per test scheme of testing laid down in Appendix-L of this generic specification. For shortlisting of product, the sample pads shall meet the requirements as given in para 1.2 (A1 & A2).

6.0 ACCEPTANCE TESTS (for acceptance of the trial quantity)

6.1 **Lot Size** : For the purpose of inspection, 10,000 numbers of rail pads or part thereof shall constitute a lot.

6.2 **SAMPLE SIZE:** Sampling scale for dimensional and visual check shall be as follows:

<u>Quantity of pads</u>	<u>Number of samples</u>
Upto 10,000	50
Upto 20,000	80
Upto 30,000	100
Above 30,000 and up to 50,000	120
Above 50,000 and up to 70,000	140
Above 70,000 and up to 1, 00,000	150

15 pads for 10,000 nos. above 1, 00,000 of pads to same drawing number. The system of sampling shall be as per IS: 4905.

6.3 TESTS:

6.3.1 Except for dimensions, the general scheme of testing for the inspection of a lot of High Performance Rail Pads shall be as per Appendix 'L'. Tests shall be done as per the nature of polymeric materials used to manufacture rail pads as given in the Tables A1 and A2.

6.3.2 The test methods shall be as per Appendix 'A' to 'K' and the criteria for acceptance and rejection of the particular test shall be as per Para 1.2. However, all the values obtained shall meet the requirement of the specification.

6.3.3 For approval/acceptance, the sample shall meet the requirements given in Para 1.2 of this generic specification.

7.0 RE-TEST:

7.1 Should the test results be not satisfactory in more than one property under test clause 6.3 (excluding dimensions) no re-testing shall be done and the entire lot is rejected and should be made unusable.

7.2 Should the samples fail in only one property under test clause 6.3 (other than dimensions) the particular test shall be repeated in the same manner with twice the number of samples drawn from the same lot. For acceptance of the lot, these samples should meet with the acceptance requirements of that particular test.

7.3 Should the samples fail in dimensions, the manufacturer may re-offer the sole plates lot-wise after sorting out the defectives after written permission from the inspecting authority. The re-offered material shall be inspected for all the tests in terms of clause 6.3.

8.0 FINAL INSPECTION/TESTING AND DOCUMENTATION:

The manufacturer shall carryout the final inspection and testing internally in accordance with the requirement of tests under clause 6.3.

9.0 PACKING:

9.1 The Rail Pads shall be packed such that each of 50 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.

9.2 The boxes shall be sealed and labeled bearing:

- a) Name of supplier
- b) Purchase order number and date
- c) Quantity
- d) Consignee

DETERMINATION OF HARDNESS

A.1 Number of test samples:

Five pads shall be considered for hardness test.

A.2 Test Methods:

A.2.1 Apparatus: Shore 'A' durometer

A.3 Test method IS : 3400 Part II shall apply

A.3.1 It is proposed that minimum 5 samples shall be checked for shore hardness 'A'. Test method and apparatus shall be as per IS: 3400 Pt. II. Five measurements shall be taken at different places on each rail pad.

A.3.2 For rail pads with studded design, the hardness shall be measured from test slabs of thickness $6 +0.5/-0.0$ and of size 200 x 130 mm which are made by using the same rubber compound and identically vulcanized as that of the finished pads. Authentication of the test slab with that of the finished pad shall be done as per clause 1.2.1.1.

A.4 Report

A.4.1 The median of the five measurements obtained shall be considered as result to be taken into account and reported.

DETERMINATION OF TENSILE STRENGTH AND ELONGATION AT BREAK%

B.1 No. of test samples

Five test specimens shall be tested

B.2 Test Method IS: 3400 Pt.I shall apply.

B.2.1 The test specimens shall be in the shape of dumb bell. The dumb bell shall have the outline and dimensions as shown in Figure 1. Two test specimens shall be cut from each of the five test slabs. The part between the upper edges of the connecting shoulders shall have uniform width and thickness along its length. Gauge length (Lo=50mm) shall be marked on the test specimens for measuring the elongation.

B.2.2 Five test specimens, one from each of the five sample test slabs/sole plates, shall be tested before ageing and the remaining five test specimens shall be tested after ageing at $100 \pm 1^{\circ}\text{C}$ for 96 + 0 hours in an air oven as per IS : 3400 Pt. IV.

- 2

“Accelerated ageing”. The specimens cut from the same test slab shall bear the same number.

B.3 **Tensile strength (T.S.)**

B.3.1 The tensile strength shall be calculated by the formula:

$$\text{T.S. (Kg/Cm}^2\text{)} = \frac{\text{Breaking load (kg)}}{\text{Initial cross-sectional area (cm}^2\text{)}}$$

Note: For calculating the initial cross-sectional area of the test specimen prepared from finished rail pads, the minimum thickness of the pad without stud or any other design shall be taken. In case of grooved pads, for calculating the initial cross-sectional area of the test specimen, the sectional area of grooves shall not be deducted.

B.3.2 Percent retention of tensile strength after ageing:

B.3.2.1 Percent retention of tensile strength after ageing shall be calculated with respect to the reported values before and after ageing.

B.3.2.2 The percent retention of tensile strength after ageing shall be calculated by the formula: -

$$\% \text{ retention of T.S} = \frac{\text{T.S. after ageing}}{\text{T.S. before ageing}} \times 100$$

B.3.3 Elongation at break

B.3.3.1 The elongation at break shall be expressed in percent and calculated by the formula:

$$\text{Elongation at break (\%)} = \frac{L - 50}{50} \times 100$$

where: L= Length in mm between bench marks at break.

B.3.4. Percent retention of elongation after ageing

B.3.4.1 Percent retention of elongation after ageing shall be calculated with respect to reported values before and after ageing.

B.3.4.2 Percent retention of the elongation at break after ageing shall be calculated by the formula:

$$\% \text{ retention} = \frac{\text{Elongation at break (\%)} \text{ after ageing}}{\text{Elongation at break (\%)} \text{ before ageing}} \times 100$$

B 4 - Report

B.4.1 For all the above tests, the results of tests to be taken into account both before and after ageing shall be third in each series of five measurements arranged in order of decreasing values.

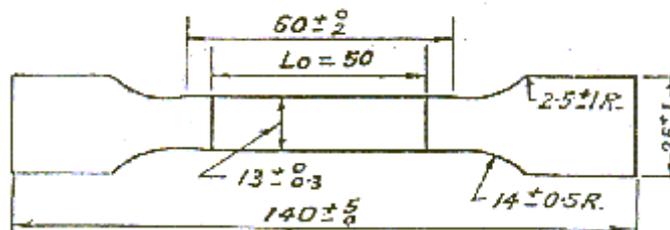


Figure 1

(All dimensions in mm)

DETERMINATION OF MODULUS (RELAXED) AT 100 % ELONGATION

- C.1 Number of test samples -Three test slabs shall be considered for the tests.
- C.2 Test specimens.
- C.2.1 Test specimens shall be cut and marked in similar manner as indicated in clause B.2.1 of Appendix 'B'.
- C.2.2 Three dumb bell specimens, one from each of the three sample test slabs shall be tested before ageing and the remaining three test specimens shall be tested after ageing at $100 \pm 1^{\circ}\text{C}$ for $96 + 0$ hours in an air oven, as per IS : 3400 Part IV,
- 2
"Accelerated ageing".

C.3. For test methods IS: 3400 Part I shall apply. The test specimen shall be stretched to 100% of its gauge length (i.e. upto 100 mm) at the rate of 450-600 mm/mt. and then allowed to return to the normal position at the same rate. Immediately after the first stretching, the test specimen shall be re-stretched to 100% of its gauge length (i.e. upto 100mm) at the same rate, and the load shall be recorded.

C.4 Calculations and Reporting.

C.4.1 Calculations

C.4.1.1 Modulus (relaxed) at 100% elongation shall be calculated by the formula:

$$\text{Modulus (relaxed)} = \frac{\text{Load at 100 \% elongation (Kg)}}{\text{Initial cross-sectional area (cm}^2\text{)}}$$

C.4.1.2 The initial cross-sectional area of the test specimen shall be considered in the same manner as in Clause B.3.1 of Appendix 'B'.

C.4.1.3 Calculation of change of relaxed modulus after ageing at $100 \pm 1^{\circ}\text{C}$ for $96 + 0$ hrs
- 2

shall be as given below:

$$\% \text{ change} = \frac{B - A}{A} \times 100$$

where A = Relaxed Modulus before ageing.

B = Relaxed modulus after ageing.

C.4.2 - **Report**

C.4.2.1 The results of tests to be taken into account (Criteria value) shall be second in each series of three measurements arranged in order of decreasing values, both before and after ageing.

**DETERMINATION OF COMPRESSION SET (%) SUBJECTED TO 50%
COMPRESSION**

D.1 Number of test samples

Three rail pads shall be considered for the tests.

D.2 Test specimens

D.2.1 Three round test specimens, one from each of the three sample rail pads shall be cut 37 mm in diameter. For the rail pads with grooved design, axial plane shall coincide with that of one of the grooves.

D.3 Test Method

D.3.1 For testing IS.3400 (Part X) shall apply.

D.3.2 Thickness of test specimen (To) shall be measured and it shall be compressed in a compression device to 50% of its original thickness (To) by using suitable spacers. For rail pads with studded design, the thickness shall be taken along with studs.

D.3.3 The assembly shall be kept at $100 \pm 1^{\circ}\text{C}$ for 24 + 0 hours in an air oven.

- 2

D.3.4 The device shall then be removed from the oven and allowed to cool at ambient temperature for 30-35 minutes. The test specimen shall then be removed from the device. The thickness (Tr) of test specimen shall be measured after 24 hours but not later than 48 hours from the time of removal from the device.

D.4 Calculation and Reporting

D.4.1 Calculations:

Compression set (%) shall be calculated by the formula:

$$\text{Compression set (\%)} = \frac{T_o - T_r}{T_o} \times 100$$

D.4.2 - **Report**

D.4.2.1 The results to be taken into account (criteria value) shall be the second in the series of three measurements arranged in order of decreasing values.

DETERMINATION OF TENSION SET(%)
SUBJECTED TO 50% STRETCH

E.1 Number of test samples:

Three rail pads shall be considered for tests.

E.2 Test specimens:

E.2.1 Three test specimens of the type (Dumb bell) described in clause B.2.1 of Appendix 'B' shall be prepared one from each of the three sole plates.

E.3 Test Method.

E.3.1 For testing IS: 3400 part XIII shall apply.

E.3.2 The gauge length of 50 mm shall be marked on the test specimen and it shall be stretched in a suitable stretching device up to 50% of the gauge length.

E.3.3 The device shall be then kept at $100 \pm 1^{\circ}\text{C}$ for 24 + 0 hours in an air oven.

- 2

E.3.4 The device shall then be withdrawn from the oven and allowed to cool at ambient temperature in stretched condition for 30-35 mts and then freed.

E.3.5 The deformed length (Lr) over the gauge mark shall be measured after 24 hours but not later than 48 hours on removal from the oven.

E.4 Calculation and Reporting.

E.4.1 Calculations

Tension set (%) shall be calculated by the formula

$$\text{Tension set (\%)} = \frac{L_r - 50}{50} \times 100$$

E.4.2 **Report**

E.4.2.1 The results to be taken into account (criteria value) shall be the second in the series of three measurements arranged in order of decreasing values.

LOAD COMPRESSION TEST

F.1 Two number samples to be tested per lot. The sample size will be same as the pad offered for inspection, only the horns (if there any) to be chopped off.

Note: A- If horns are present these are to be chopped off before measurement of area.

Note: B- If the actual pad size is big enough to cut a piece of size 200mm x 130mm, the test shall be done on test pieces of above said size. The size 200 mm x 130 mm i.e. area of 260 cm² is the standard reference size.

F.2 Apparatus:

Compression testing machine: Capacity 50 tonne suitably fitted with two dial gauges capable of reading 1/100th of mm.

F.3 Test Condition:

F.3.1 Test shall be carried out at $27 \pm 2^{\circ}\text{C}$ and at relative humidity $65 \pm 5\%$.

F.4 Test Method:

The test specimen shall be placed between two rigid metal plates, the surfaces of which shall be absolutely parallel with each other. The size of the plates shall be 210 mm x 140 mm (min.). A piece of '0' number emery paper shall be inserted between the test specimen and the metal plates both at the top and bottom. The measurement of thickness variation shall be carried out by means of two dial gauges of least count 0.01 mm attached with hydraulic press and located in the middle of the shorter sides of the test specimen.

F.4.2 Two consecutive loading of $\frac{20 \times A}{260}$ t shall be applied before any deformation readings are taken.

A load of $\frac{A}{260}$ t shall be then applied and the dial gauges shall be adjusted

for '0' reading. Loads in tonnes for 2, 3, 5, 10 & 15 then applied and when each load is static for one minute, the dial gauge readings shall be recorded at load corresponding to 20 tonne. The deformation to be considered for report shall be the average of the readings taken from 2 dial gauges at each load, which shall not differ more than 0.3 mm for a given load.

F 5 - **Report**

F.5.1 Compression (mm) at a load $\frac{15 \times A}{260}$ t for the two rail pads.

NOTE C: If the actual pad size is less than 180 cm², a standard reference size pad as in Note B shall be prepared with thickness of the actual pad using the same rubber compound/TPE raw material and vulcanized/moulded under identical conditions.

DETERMINATION OF ELECTRICAL RESISTANCE

G.1 No. of test samples:

G.1.1 Three test samples shall be considered for the test.

G.1.2 Samples shall be tested first as such and again after immersion in distilled water for 48 hours at ambient temperature.

G.2 Preparation of the test specimen

The surface of the sole plate test specimens shall be gently rubbed with fine emery cloth for the purpose of removing any thin superficial layer of insulating substances with which they may be covered.

G.3 Apparatus.

Million Mega ohm-metre or any other suitable equipment capable of measuring electrical resistance more than 500 Megaohms.

G.4 Test Method.

G.4.1 For testing IS: 3400 (Part XV) shall apply.

G.4.2 The test arrangement shall be as given in Figure 6. The test specimen shall be placed on a metal plate whose dimensions are not less than those of the sole plates. On the test specimen shall then be placed a metal ring of iron or brass whose outer diameter shall be 92mm, inner dia 72mm and height 30 mm. Inside the metal ring a cylindrical metallic disc of iron or brass having 62 ± 1 mm diameter & height 30 mm, shall be placed in concentric fashion & subjected to a load of about 50 kg. The measuring circuit shall be completed and measurement shall be carried out at 200-250 volts after a charge lasting for 60 seconds and measurements shall be repeated after reversing the direction of the current.

G.4.3 In case of test specimen immersed in distilled water it shall be ensured that the sole plates before being tested on removal from water shall be wiped off with a dry cloth or blotting paper so that no apparent trace of water remains, especially in the grooves.

G.5 - **Report**

G.5.1 Individual value before as well as after immersion under water shall meet the minimum requirement laid down before and after reversal of current.

IMPACT ATTENUATION TEST

- H1. 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 between 10 kg and 50 kg. In order to set the calibration of the rig, the rail fastening should first be assembled with 6 mm thick plain hard plastic rail pad (HDPE or EVA), with stiffness not less than 750 MN/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 and 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.

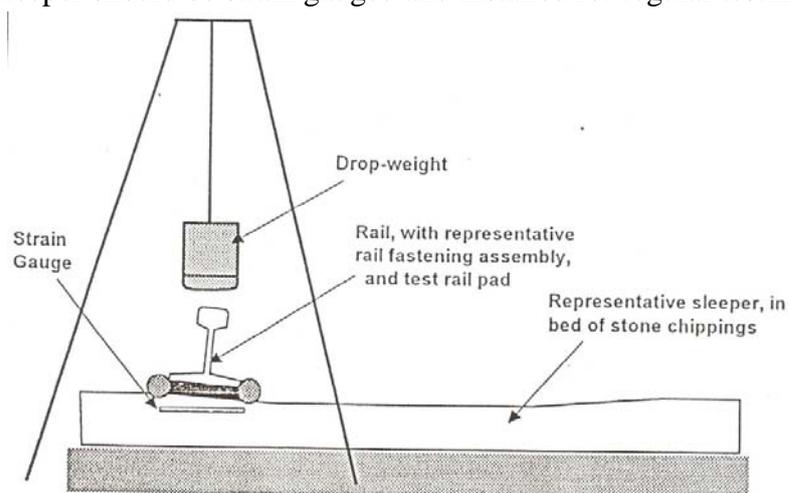


Figure 2

- H2. For test, standard rail fastening components as per RDSO Drg. No. RDSO/T-3731 using concrete sleeper to Drg. No. RDSO/T-2495 and RDSO/T-2496 are to be used.
- H3. The test is carried out as follows:
- 3.1 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} .
 - 3.2 Dismantle the rail fastening assembly, and re-assemble it with the test rail 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} .
- H4. The impact attenuation of the pad A is defined by $A = (1 - \xi_{test} / \xi_{ref}) \times 100\%$
- H5. Two samples shall be tested and each individual value shall meet the requirement of the specification.

SECANT STIFFNESS TEST

11. Place the test pad between steel platens, as shown in Figure 3. A piece of '0' number emery paper shall be placed between the pad and the platens, with the abrasive side against the pad.

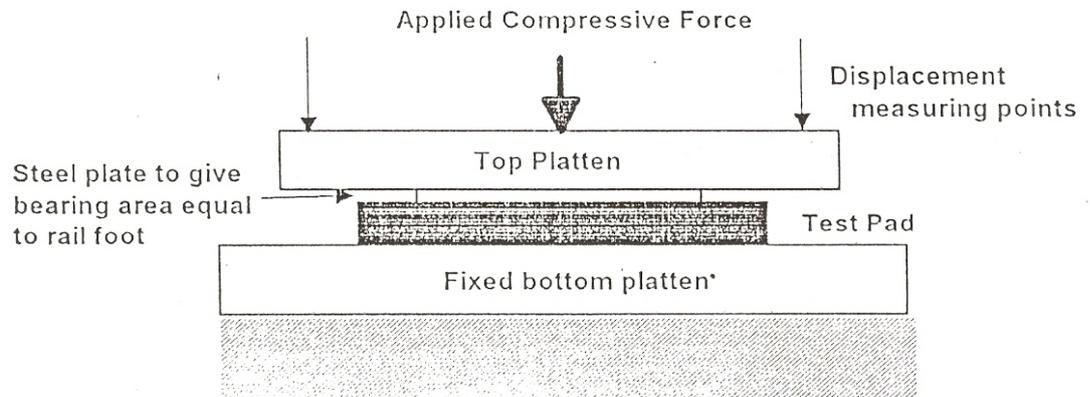


Figure 3

12. Apply consecutive loading of 100 kN, and remove it, six times. The loading times shall each be at least 12 seconds.
13. Upon release of the final pre-conditioning deformation a pre-load up to 100 N shall be applied before setting deflection measuring devices to zero.
14. 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.
15. Two number samples to be tested per lot and each individual value shall meet the requirement of the specification.
16. The static secant stiffness, k_{20-90} , is calculated from

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

INCLINED REPEATED LOAD TEST (DURABILITY TEST)

- J1. For this test, a representative rail fastening assembly, incorporating the test Rail Pad under test, is to be subjected to repeated loading at an elevated temperature. The assembly consists of a concrete sleeper, standard rail clips and insulators, and a short length of rail modified by machining 15 mm from the head, as shown in Figure 4.

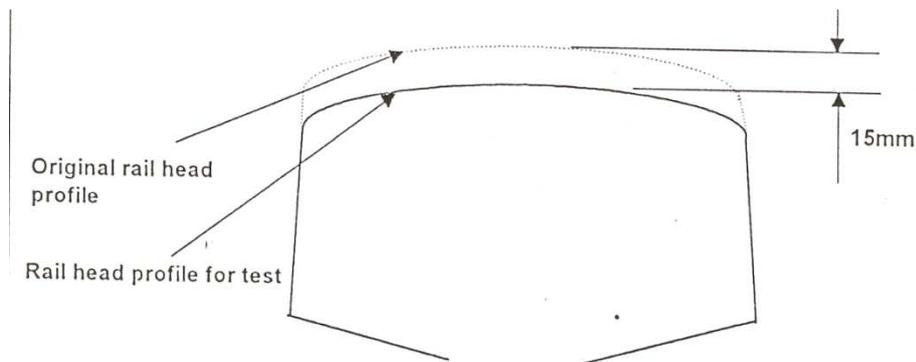


Figure 4

- J2. For this test, standard rail fastening components as per RDSO Drg. No. RDSO/T-3731 using concrete sleeper to Drg. No. RDSO/T-2495 and RDSO/T-2496 are to be used.
- J3. Prior to testing, the following properties should be ascertained for the test pad or for another pad taken from the same manufacturing batch:

Relaxed Modulus
Tensile Strength
Impact attenuation

Six pads from same manufacturing batch shall be taken for the above tests and one pair of pad shall be used for each test.

- J4. The loading configuration is shown in Figure 5. The sleeper is set so that its bottom surface is at an angle 33 degrees to the horizontal.
- J5. In each load cycle, the applied load should have a minimum value of 5 kN and a maximum value of 81 kN. Required arrangement to be done to maintain the temperature of the rail at 50 to 55 Celsius throughout the test. The test must be run continuously for 3 million cycles @ 3 to 5 Hz, without any adjustment or modification to the assembly. Three pads from same manufacturing batch shall be tested individually for Durability Test.

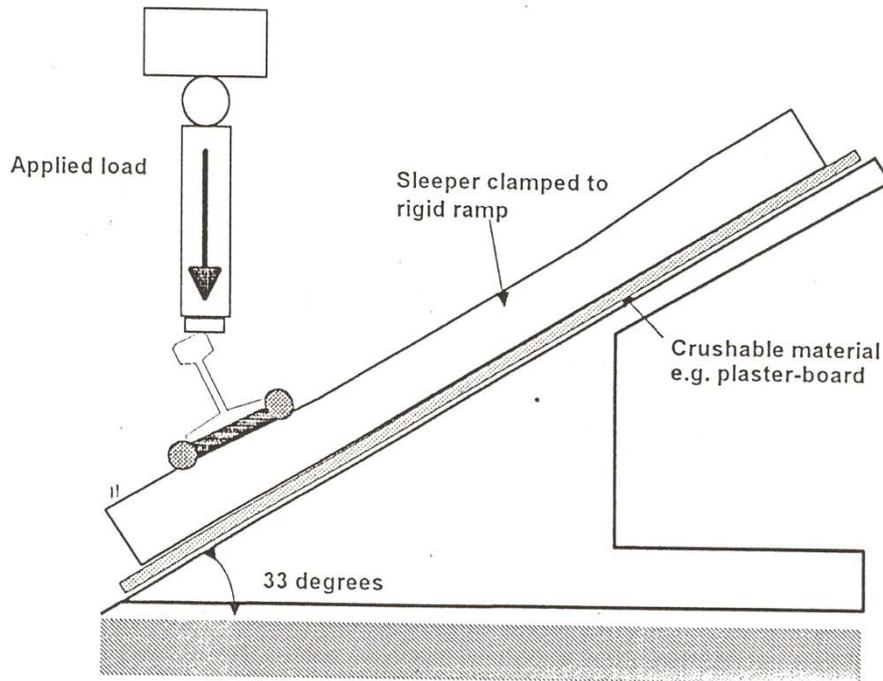


Figure 5

- J6. At the completion of the test, the rail fastening assembly should be dismantled and the test pad is to be subjected to the following tests after 24 hours (one pair of pad shall be used for each test):

Relaxed Modulus
Tensile Strength
Impact Attenuation

- J7. The change in values of impact attenuation, relaxed modulus and tensile strength, measured after 3 million cycles test should be within 25% of the values measured at the beginning of the test. There should be no significant tears or holes in the pad after completion of the test.
- J8. The test for relaxed modulus and tensile strength before and after the durability test to be done on the pad taken from the same manufacturing batch and the mid value of the three test specimens shall be taken into consideration prepared from the same pad.

Determination of Ash Content

Test shall be done by heating silica crucible in muffle furnace upto 600°C and cool it to about 70°C in air. Further cooling to room temperature should be done in desiccators filled with dry silica gel. Weigh the crucible as W₁. Take 2-5 grams sample and weigh as W₂. Heat the crucible with sample in muffle furnace at 600°C for 1 hour. Cool and weigh as stated above. Repeat heating and cooling till constant weight of ash and crucible as W₃. All weights are to be taken to nearest milligram.

$$\% \text{ Ash} = \frac{W_3 - W_1}{W_2 - W_1} \times 100$$

The test should be conducted on two samples and mean value should be reported.

GENERAL SCHEME OF TESTING FOR PRE-ACCEPTANCE/ACCEPTANCE TESTS FOR HIGH PERFORMANCE RAIL PAD

Property	No of samples to be tested	Criteria value for acceptance/rejection	No. of samples to be drawn
1.Hardness shore 'A'	5	Individual	5
2.Tensile strength (Kg/cm ²)			
(a) Before ageing	5	Third in the series of 5 measurements arranged in order of decreasing value in each case.	5
(b) After ageing at 100 ± 1°C for 96 + 0 hours - 2	5		
(c) Retention after ageing (%),			
3. Elongation at break (%)			
(a) Before ageing	5	- do -	-
(b) After ageing at 100 ± 1°C for 96+ 0 hours - 2	5		
(c) Retention after ageing (%)			
4. Modulus (relaxed) at 100% elongation			
(a) Before ageing (kg/cm ²)	3	Second in the series of 3 measurements arranged in order of decreasing value in each case.	3
b) Change after ageing at 100 ± 1°C for 96+ 0 hours - 2	3		
5. Compression set subjected to 50% compression at 100 ± 1°C for 24+ 0 hours. - 2	3	- do -	3
6. Tension set subjected to 50% stretch at 100 ± 1°C for 24 + 0 hours - 2	3	- do -	3
7. Load - Compression test	2	Individual	2

Property	No of samples to be tested	Criteria value for acceptance/rejection	No. of samples to be drawn
8. Electrical resistance test a) On normal sole plate b) On sole pads after immersion in distilled water for 48 hours.	3	Individual	3
9. Impact attenuation test	3	Individual	3
10. Secant Stiffness test	3	Individual	3
11. Durability test (Before & after)	3 + 3	Individual	3 + 3
12. Ash content	3	Individual	3
13. Specific Gravity	3	Individual	3
14. Dimensional check	8	Individual as per relevant drawing	8

- Note:
1. In case of acceptance tests for dimensional check number of samples to be tested shall be as per clause 6.2.
 2. The tests shall be conducted as per relevant test method of the property as given in the specification.
 3. Specimens for tests before and after ageing are to be prepared from the same pads.
 4. Samples shall be signed by the firm's representative and the inspecting officer drawing the samples.
 5. All samples shall be free from surface defects and shall bear marking as per requirement of relevant drawing.
 6. Electrical resistance tests are to be conducted on same pads before and after immersion in water.
 7. Total no. of samples per lot required for physical tests shall be:
 - (i) 20 nos. of finished pads as per relevant drawing
 - (ii) 10 nos of flat pads (without studs or any other design feature)
 - (iii) 3 Nos for load-compression test of special size
 - (iv) 20 nos of plain dumbbell moulded test specimen for TPE Rail pads/Plastic as per relevant drawing

GUIDELINES FOR STORAGE OF RUBBER PADS

- M.1 The rubbers whether under storage or in use continue to deteriorate and ultimately may become unserviceable. The deterioration may be the result of one particular factor or a combination of factors viz., the action of oxygen, ozone, light, heat, humidity, etc. The deleterious effects of these factors may, however, be minimized by adopting appropriate conditions of storing and duration of storage.
- M.2 This guideline provides suitable conditions for the storage of rubbers in all forms
- (i) The rubber compound should be stored in a cool place as far as practicable, preferably below 30 deg. C.
 - (ii) They should be kept away from direct sunlight preferably in a dark place. Direct sunlight causes much faster degradation of the rubber components.
 - (iii) The humidity of the storage condition should not be such that condensation of moisture takes place on the surface of the components.
 - (iv) In the vicinity of these components, any loose electrical connections should be avoided, as these cause production of ozone, which adversely affects rubber.
 - (v) They should be stored away from contact with materials containing copper and manganese, which act as poisoning agents and resulting in their faster degradation.
 - (vi) Under no circumstances rubber components should be stressed during storage. The portions under stress undergo deformation with permanent set and leading to degradation. They should be stacked in such a way so that any super imposed stresses are substantially avoided.
 - (vii) Any contact with grease or oil should be avoided as these cause swelling, softening and deterioration of rubbers.
 - (viii) French chalk or soapstone or mica should be liberally be applied on the surface of rubber components.
 - (ix) Great care is to be exercised so that the material is used in the order of their receipt in the stores, i.e., first-come-first issue basis'. The rubbers whether under storage or in use continue to deteriorate. The only difference is that under service condition, deterioration is much faster. Every moment of storing is at the cost of useful life and prolonged storage of the material may render it unserviceable due to progressive deterioration.

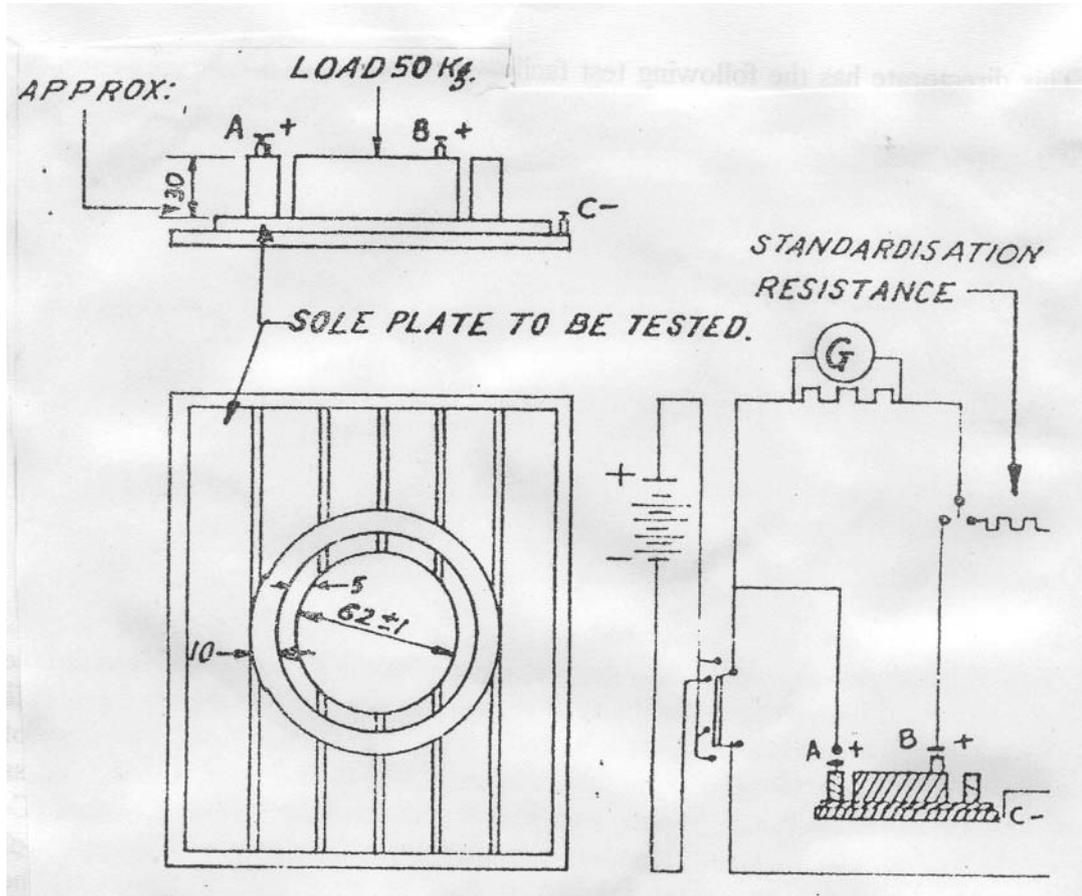


FIGURE 6

(To be given on non-judicial stamp paper of appropriate value, duly notarized)

**UNDERTAKING FOR UNCONDITIONAL TRANSFER OF
DRAWINGS/SPECIFICATIONS/STR & OTHER DOCUMENTS TO RDSO/IR AND
INDEMNITY**

I.....son of.....aged about.....resident of
.....the deponent do hereby solemnly affirm and undertake as
under:

1. The deponent is the authorized signatory of the (.....name of firm/company.....) as per the documents enclosed.
2. The deponent declares on behalf of the firm/company that it has developed the.....(product description) hereinafter referred to as “the product” and approached the Indian Railway /RDSO for field trial and use of these products on Indian Railways.
3. The deponent declares that the aforesaid product developed by them is not a patented product and not protected under any copyright, brand, IPR etc. and currently there are no pending legal or any other disputes pertaining to the product. It is also declared that the offered product does not infringe IPR of any other firm / body etc. and has not been developed by some other firm.
4. On behalf of the firm/company, the deponent hereby indemnifies RDSO/IR and its authorized agents/vendors (which interalia includes the Zonal Railways, Public Sector Undertakings under Ministry of Railways and Vendors developed by RDSO/Indian Railways) fully at all times from any possible litigation, claims, its cost and expenses/financial liability arising out of any violation/infringement of patent/registered design/trademark/IPR of any product/item of any other firm/company/vendor/organization located both in India and abroad for the duration of use of the said product on the Indian Railways/its units.
5. The deponent declares that firm has agree for unconditional transfer of drawings/specifications/STR and other documents of the product to RDSO/IR with consent for further issuing them by RDSO/IR as their own drawings/documents, without claiming any preferential treatment/incentive for the same and understands that for this, they are not entitled for any incentive in future. Firm, has also authorized RDSO to make any changes/improvisation therein.
6. The deponent further declares that they shall not have any objection if RDSO/IR develops vendors for supply or aforesaid product and the product is used in what so ever manner and quantity by Indian Railways without deponent having any claim in any form.

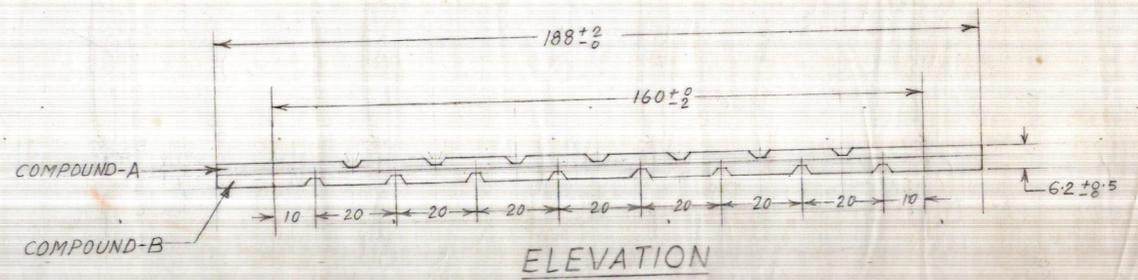
7. The deponent further declares that the firm/company is willing to unconditionally provide all logistic support and technical knowhow for development and production of the product to RDSO/IR and its vendors as and when required.

Deponent

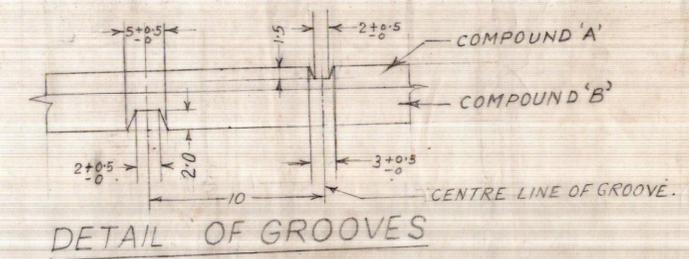
Verification

I declare that the contents of aforesaid Para 1 to 7 are true to my knowledge and belief, and nothing has been concealed. I understand that furnishing of any false information in above undertaking or concealing information will lead to legal and administrative action against the firm/company.

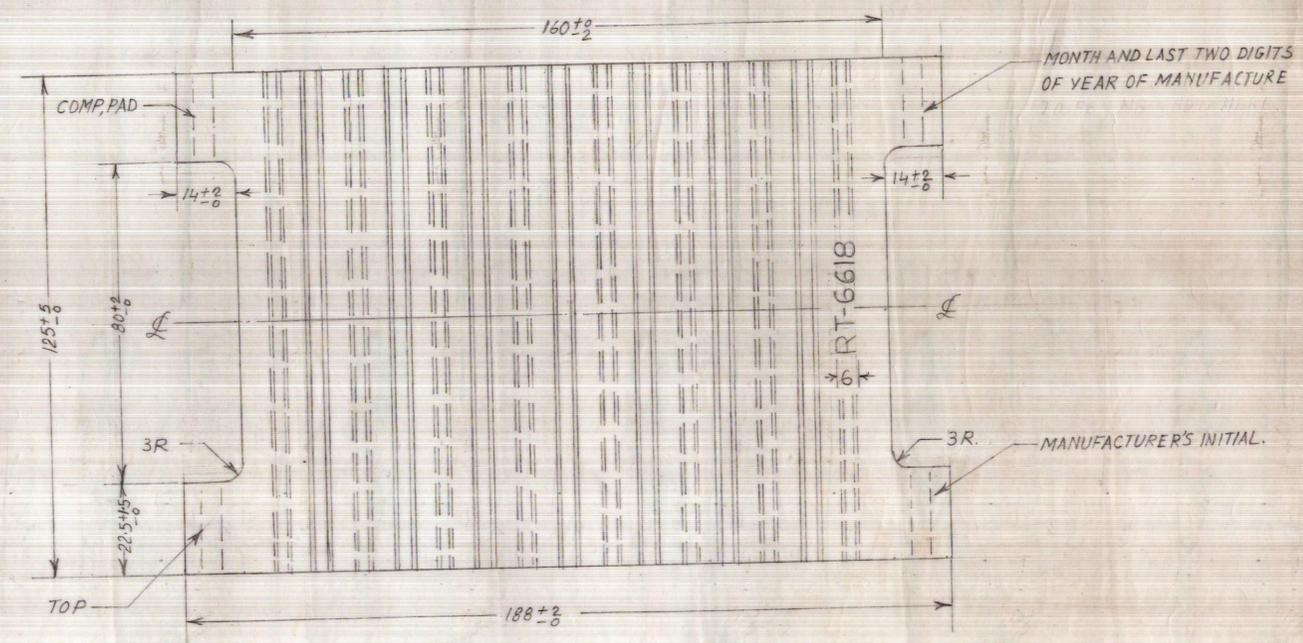
Deponent



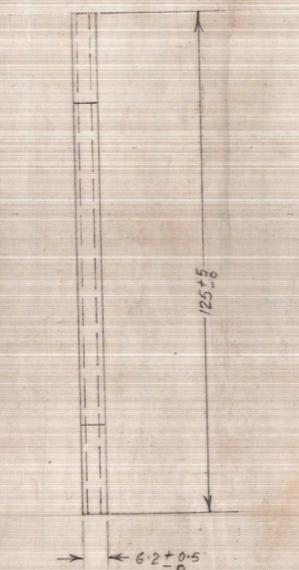
ELEVATION



DETAIL OF GROOVES



PLAN



SIDE ELEVATION

FILE CTIGRIPTENDER C.R.N. -
 COMPOSITE. PAGES -
 PAGE 14-15

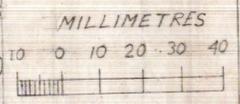
DRG: CH: -
 APPD: CDA: -

TRC: CH: -

CAL: CH: -

- NOTE
1. ALL DIMENSIONS ARE IN MILLIMETRES.
 2. THICKNESS OF SHEET FOR COMPOUND 'A' & COMPOUND 'B' SHALL BE TAKEN AS 3mm & 3.5mm RESPECTIVELY FOR MANUFACTURE OF COMPOSITE GROOVED RUBBER SOLE PLATE.
 3. MARKING AS SHOWN SHALL BE EMBOSSED ACCORDING TO THE SPECIFICATION.

IR'S SPECIFICATION FOR
 COMPOSITE GROOVED
 RUBBER SOLE PLATES
 FOR PLACING BENEATH
 RAILS (PROVISIONAL-2006)
 RDSO/M&C/RP-198/2006



SCALE

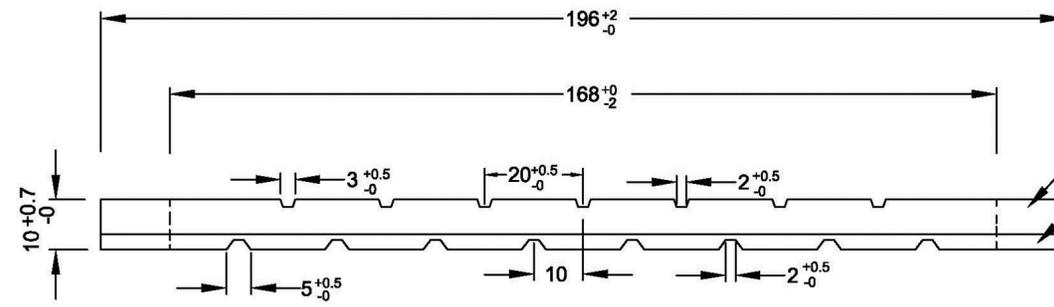
THIS DRAWING IS THE PROPERTY OF
 RESEARCH DESIGNS AND STANDARDS ORGANISATION
 (MINISTRY OF RAILWAYS)
 LUCKNOW-226011, INDIA
 AND SHALL NOT BE USED, COPIED, REPRODUCED IN
 PART OR WHOLE, WITHOUT PRIOR CONSENT IN WRITING.

R. D. S. O.

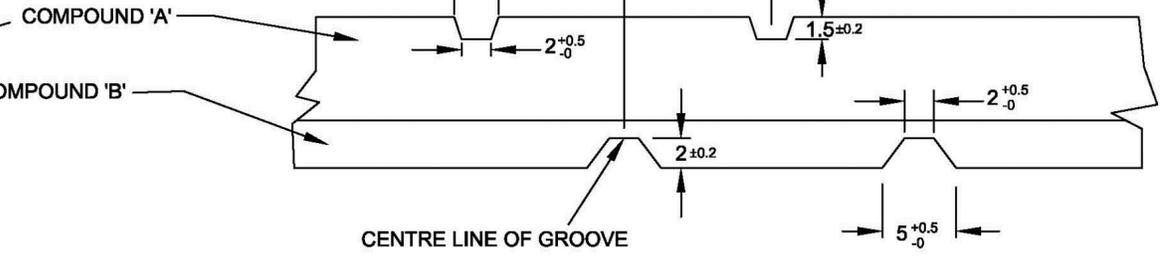
COMPOSITE GROOVED
 RUBBER SOLE PLATE FOR
 60 kg UIC RAIL.

STAMP CANCELLED REV. 16-6-2006 ADVANCE (T)

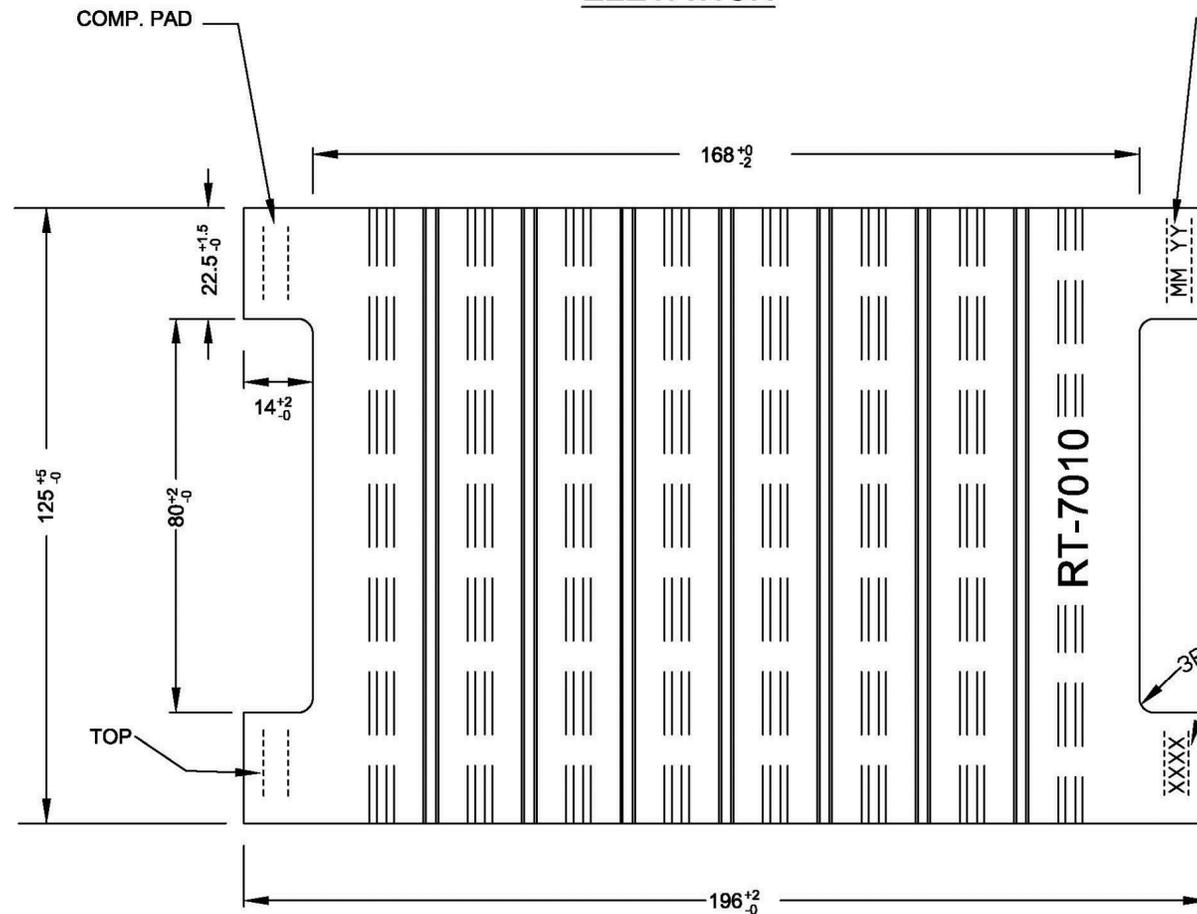
SPECIFICATION ALT: DESCRIPTION DATE RDSO/T-6618



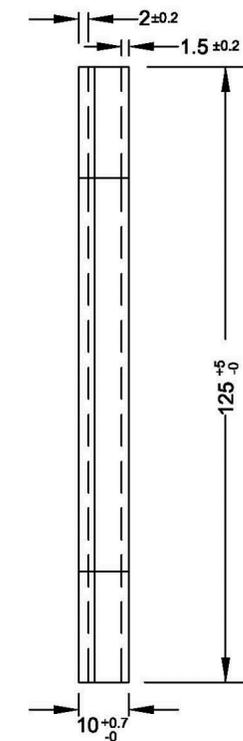
ELEVATION



DETAILS OF GROOVE



PLAN



SIDE ELEVATION

10 MM THICK COMPOSITE GROOVED RUBBER SOLE PLATE FOR CONCRETE SLEEPER WITH 136 RE & 60KG (UIC) RAIL.

THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS AND STANDARDS ORGANISATION (MINISTRY OF RAILWAY) LUCKNOW-226011,INDIA AND SHALL NOT BE USED, COPIED REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING

R. D. S. O.
10 MM THICK COMPOSITE GROOVED RUBBER SOLE PLATE FOR CONCRETE SLEEPER SUITABLE TO 136 RE RAIL.

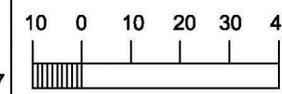
STAND: _____ ADVANCE (T)
CANCLD: _____ 20/05/2009
REV: _____

RDSO / T-7010

- NOTE
- THIS COMPOSITE GROOVED RUBBER SOLE PLATES CAN BE USED WITH CONCRETE SLEEPER (RT-7008) UPTO 25T AXLE LOAD AT MAXIMUM SPEED 100KMPH & FOR PASSENGER TRAFFIC UPTO FULL SECTIONAL SPEED.
 - MARKING AS SHOWN SHALL BE EMBOSSED ACCORDING TO THE SPECIFICATION.
 - THICKNESS OF SHEET FOR COMPOUND 'A' & COMPOUND 'B' SHALL BE TAKEN AS 7 ± 0.5 mm & 3 ± 0.5 mm RESPECTIVELY FOR MANUFACTURE OF COMPOSITE GROOVED RUBBER SOLE PLATE OF THICKNESS $10 \pm 0.7 / -0.0$ mm.
 - ALL DIMENSIONS ARE IN MILLIMETRES.

SPECIFICATION

IRS SPECIFICATION FOR 10MM THICK COMPOSITE GROOVED RUBBER SOLE PLATES FOR PLACING BENEATH RAILS PROVISIONAL-2007 NO. RDSO/M&C/RP-200/2007



SCALE

ALT

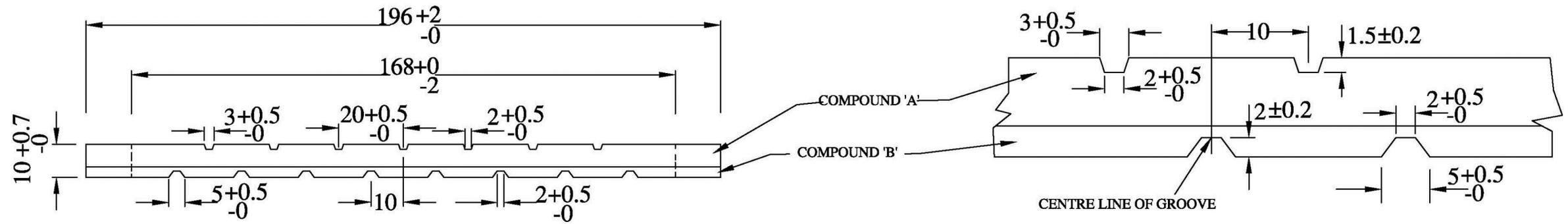
DESCRIPTION

NOTE NO. 4 ADDED & TITLE ALTERED REVISED & REDRAWN

DATE

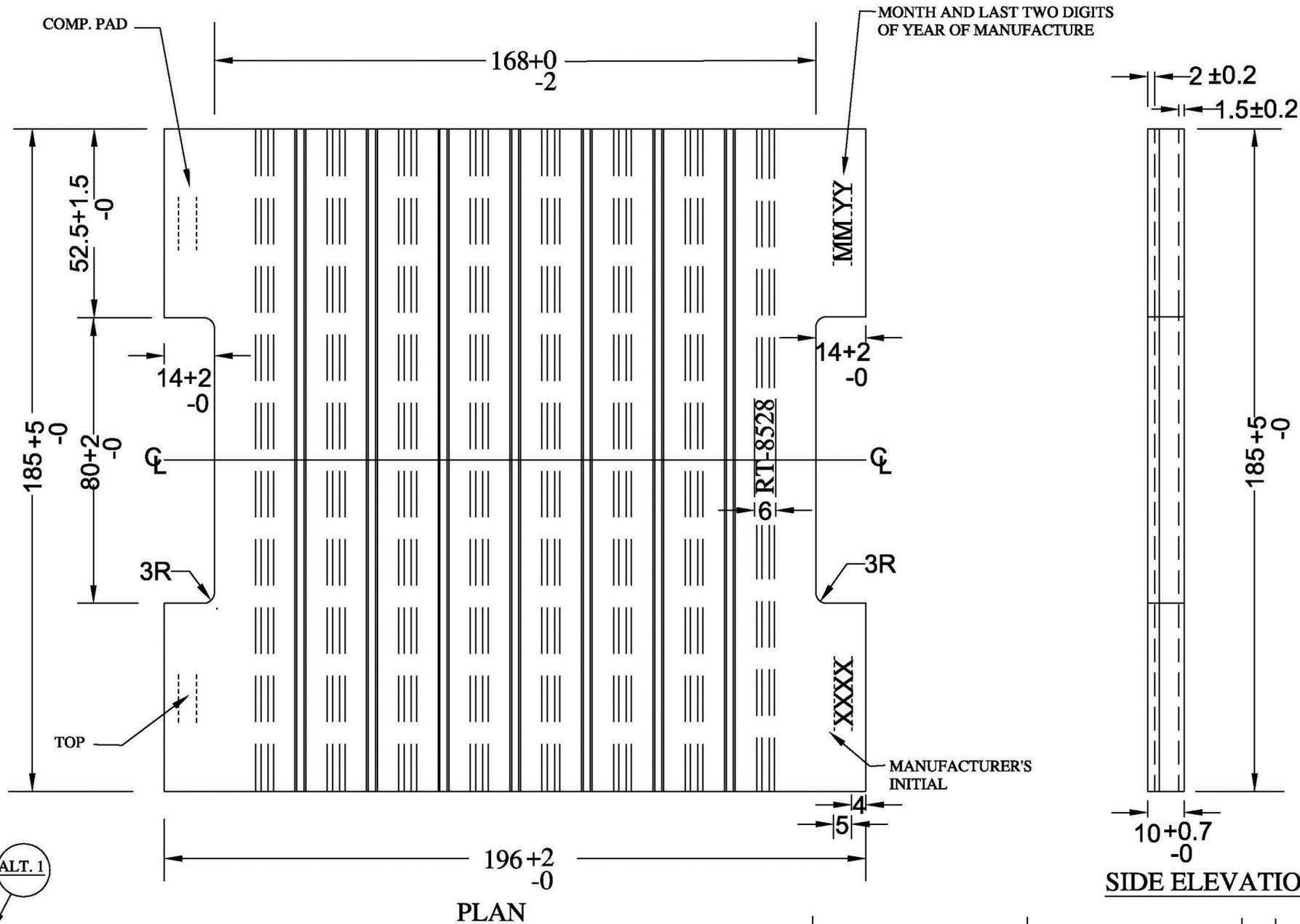
03.07.2018
18.01.2012

DD/T-C/S
APPD
DRG: S. KUMAR CH:
CT/EF/MISC. (Sr. No. 397 To - -) FILE PAGE
SD/- SD/-
ISSE DDST-IV
DRG: CH:
CAL: CH:
CR.N.: PAGES
CT/GRP/Tender/ Composite (Sr. No. 398 To - -) JNP- 50-51 FILE PAGE



ELEVATION

DETAILS OF GROOVE



PLAN

SIDE ELEVATION

For Trial only.

THIS DRAWING IS THE PROPERTY OF RESEARCH DESIGNS AND STANDARDS ORGANISATION (MINISTRY OF RAILWAY) LUCKNOW-226011,INDIA AND SHALL NOT BE USED, COPIED REPRODUCED IN PART OR WHOLE WITHOUT PRIOR CONSENT IN WRITING

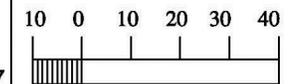
R. D. S. O.

10mm THICK COMPOSITE GROOVED RUBBER SOLE PLATE FOR WIDER PSC SLEEPER (RT-8527) WITH 136RE & 60Kg. (UIC) RAIL

STAND: _____ CANCLD: _____ REV: _____ ADVANCE (T) 20/01/2016

5. THIS COMPOSITE GROOVED RUBBER SOLE PLATES CAN BE USED WITH CONCRETE SLEEPER (RT-8527) UPTO 25T AXLE LOAD AT MAXIMUM SPEED 100 KMPH & FOR PASSANGER TRAFFIC UPTO FULL SECTIONAL SPEED.
 4. LATEST ALTERATION NUMBER SHALL BE CHECKED BEFORE PLACING ORDER.
 3. MARKING AS SHOWN SHALL BE EMBOSSED ACCORDING TO THE SPECIFICATION.
 2. THICKNESS OF SHEET FOR COMPOUND 'A' & COMPOUND 'B' SHALL BE TAKEN AS 7±0.5mm & 3±0.5mm RESPECTIVELY FOR MANUFACTURE OF COMPOSITE GROOVED RUBBER SOLE PLATE OF THICKNESS 10+0.7/-0.0mm.
 1. ALL DIMENSIONS ARE IN MILLIMETRES.

IRS SPECIFICATION FOR 10MM THICK COMPOSITE GROOVED RUBBER SOLE PLATES FOR PLACING BENEATH RAILS PROVISIONAL-2007 NO. RDSO/M&C/RP-200/2007



1. NOTE NO. 5 ADDED 03.07.18

NOTE	SPECIFICATION	SCALE	ALT	DESCRIPTION	DATE
				RDSO / T-8528	

FILE PAGE	CR.NO. PAGES	CAL:	sd/- S. K. GUPTA	DRG:	S. KUMAR	APPD	RITU RAJ DD/TK/EF	sd/- S. KUMAR	DRG:	S. KUMAR	APPD	S. K. AWASTHI DD/TK/EF
-----------	--------------	------	------------------	------	----------	------	-------------------	---------------	------	----------	------	------------------------