

**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 EOI/ HVN dated 12.07.2018)

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 Viscous Nylon Liner" (HVN Liner) 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. HVN Liner, 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 HVN liner meeting the technical criteria i.e. generic specification / performance parameters of HVN liner 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 14.09.2018.

Firms submitting proposals shall note that:

1. This 'RFP is only for the purpose of short-listing the product i.e. HVN Liner meeting the stipulated 'Generic Specification/Performance parameters of 'HVN Liner' as given in Annexure-C of this document for considering for undertaking field trial of HVN Liner in the Indian Railways.
2. The relevant values/properties of the proposed HVN Liner 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 HVN Liner but only for short- listing of product i.e. HVN Liner meeting the technical requirements i.e. generic specifications / performance parameters of HVN Liner 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. HVN Liner, for undertaking field trial and invite the proposals from firms who can supply the HVN Liner meeting technical parameters as per Annexure-C.

With above objective, Indian Railways seeks to establish proveness of effective HVN Liner through field trial over Indian Railway track, meeting the technical requirements i.e. generic specifications / performance parameters of HVN Liner for their possible use in future in Indian Railways. The generic specifications / performance parameters of HVN Liner 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 GFN-66 liner appearing in vendor directory issued by QA/Civil Dte.
 - b) Manufacturer / Supplier of HVN Liner or fastening system with HVN Liner 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.
 - c) Global manufacturer/supplier of raw material for HVN liner having Collaboration Agreement or Joint Venture partnership with existing manufacturer of GFN-66 liner appearing in vendor directory issued by QA/Civil Directorate.

However, the firm/JV who have past experience in use of HVN Liner and have done R&D on this subject will be preferred.
- ii) The HVN Liner offered by the Firm should meet the generic specifications / performance parameters mentioned in this document (Annexure – 'C').

3.2 The proposals of HVN Liner 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 HVN Liner 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 HVN Liner proposal as per 'Generic Specification/Performance parameters of 'HVN Liner' as given in Annexure-C. However, if the offered HVN Liner 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 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 HVN Liner 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/EOI HVN dated 09.07.2018.
- 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 The firm shall legally indemnify Ministry of Railways against any possible claims/legal/other disputes at present or which may arise in future from any other party in connection with the intellectual property rights of the drawings and design or any other documents submitted by the firm or any other patent rights.
- 3.11 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 HVN Liner as per the generic specification / performance parameters given in Annexure-C
2	Experience and expertise in the field of HVN Liner or other track improvements purpose
3 a)	Details of supplies made of HVN Liners or fastening with HVN Liners
b)	Performance of the HVN Liners or fastening with HVN Liners in track for 3 years duration

**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/EOI HVN dated 09.07.2018.
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 HVN Liner and the firms who can supply the HVN Liner 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 HVN Liner have been supplied by the firm including quantity during last 3 years. (Para 4)
 - 7.3 Details of supply and performance as detailed in Para 3.3 of Annexure-A.
 - 7.4 Specification / performance parameters of supplied HVN Liner or for other reasons as per para 3.3 of Annexure-A.
 - 7.5 Budgetary cost of HVN liners as per the all the drawings mentioned in 'Annexure-C' and enclosed.
 - 7.6 Complete details of the HVN Liner 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.
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 HVN Liner in Indian Railway.

World over, use of 'High Viscous Nylon-66 Liner' (HVN Liner) is gaining popularity for mainly, improvement in Durability and insulation purpose. However, Indian Railways is exploring the use of HVN Liner in Indian Railways. For this purpose, draft generic specifications for **“High Viscous Nylon-66 insulating liners”** have been framed for use on Indian Railways for conducting the field trials for evaluating the performance of HVN Liner. The product / system will be shortlisted for considering conducting of the field trial on the basis of information furnished by the applicants as per technical conditions of RFP. Presently, most commonly used GFN-66 liners in BG track are as per drawing no. RDSO/T-3706, & RDSO/T-6398 & 6939 Copy of drawings are enclosed for reference.

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 : (-) 5°C to 50°C.
- vii) Rail Temperature : (-) 15°C to (+) 76°C.
- viii) Humidity : Max. 100%

(A) Specification of the HVN Liner –**1.0 MANUFACTURE****1.1 Material**

1.1.1 The material used for the manufacture of Insulating Liners shall be “High Viscosity Nylon 66” as specified in RAL color standard as per Clause 1.1.3. of this document. Material shall conform to the properties specified in this schedule. Regenerated / reconstituted material shall not be used for the manufacture of liners.

1.1.2 The manufacturer shall have a valid tie-up in the form of a written Memorandum of Understanding (MOU)/contract with primary raw material manufacturer for “Nylon 66 (HVN-66)” or other equivalent “Nylon 66 (HVN-66)”, covering raw

material supplies and technical support including quality control. The manufacturer of the insulating liners shall not change the constituents of the copolymer and shall only mould the liners out of the material supplied to them by the primary manufacturer.

- 1.1.3 Respective RAL color should be UV stabilized. Liner supplier has to submit the certificate of conformity for UV resistant property of the product material as well as the RAL color as obtained from the primary raw material and RAL color manufacturer.

SR No.	Color	RAL	Liner Drg. No.
1	Brown Beige	6001	RT-3702
2	Traffic Red	5005	RT-3706
3	Heather Violet	1017	RT-3707
4	Grey Beige	3020	RT-3708
5	Emerald Green	1011	RT-6937
6	Signal Blue	1019	RT-6938
7	Saffron Yellow	4003	RT-6939

- 1.1.4 The physical properties of high viscous nylon-66 used for the manufacture of nylon mouldings shall conform to the requirements given against Sl. No. 1, 2, 3 & 10 of Table 1. Other properties as given in Table 1 refer to the as moulded test specimen of high viscous nylon material.

TABLE-1

SN	Property	Units	Values	Test method
1	Melting point	°C	258-265	BS 2782 pt.1. 1976 Method 123B or 123 A
2.	Specific gravity	-	1.14-1.16	BS 2782 pt.6-1980 Method 620A
3	Ash content	%	0.5 max	Appendix III
4	Hardness Rockwell	R	100 (min)	ASTM D-785 – Part-8 - 2015
5	Tensile strength, Yield	Kg/mm ²	7.0(min)	ASTM D-638-1984
6	Elongation at break	%	35 (min)	-do-
7	Flexural Modulus	Kg/mm ²	250.0 (min)	IS:1998-1962
8	Dielectric strength	KV/mm	11(min)	ASTM D-149-09 – 2013
9	Volume resistivity	Ohm.cm	10 ¹⁴ (min)	BS 2782 pt.2-1982 Method 230A
10	Viscosity Number of raw material	cm ³ /g	270 (min)	ISO 307

1.2 MANUFACTURING PROCESS

- 1.2.1 The high viscous nylon-66 liners shall be manufactured by automatic screw type injection moulding machine.

1.2.2 Raw Material must be preheated in Dehumidifier Chamber (with dew point - 30). Before molding moisture content should not be more than 0.2%.

1.2.3 The liner shall be conditioned by immersing in boiling water for adequate time to ensure minimum 1.6% absorption of water as provided in para 4.9(iii)

1.3 MARKING

Each nylon moulding shall be legibly embossed in 3 mm letters and figures with manufacturers initials, last two digits of year of manufacture and number as shown in RDSO drawing.

1.4 FREEDOM FROM DEFECTS:

The surface of the high viscous nylon-66 liners shall be smooth, sound and free from moulding defects such as bubbles, splash marks, burn marks, voids, surface sinking, crazing and blistering of the surface, windows, weld lines, laminations, jotting and cracks. All edges shall be neatly finished and free from flash.

2.0 TEST FOR SHORT-LISTING OF THE PRODUCT THROUGH RFP:

2.1 For short listing of high viscous nylon-66 liners through RFP, the firm has to submit adequate number of samples of high viscous nylon-66 liners for testing at RDSO as per the scheme laid down in this specification. No testing charges shall be levied in case of testing at RDSO. However, for outside testing the firm has to pay the testing charges as applicable. The firms will be short listed on the basis of satisfactory test results obtained. The decision of RDSO in this regard will be final.

2.2 Liners after conditioning shall be submitted by the offering firms for testing in RDSO as per test scheme of testing laid down in Appendix-I of this generic specification. For selection of product, the sample liners shall meet the requirements given in Table-1.

2.3 The cross breaking load test shall be conducted on annealed liners as per the test method given in Appendix II. As per existing specification of GFN-66 liner T-44-1995, each test value shall conform to the requirement as given in Appendix II. For high viscous nylon material, the values of cross breaking load for annealed liners are expected to be at least 25% higher than existing values as given in Appendix II.

2.4 The liners shall be checked for the dimensions through inspection gauges as per RDSO drawings, and shall meet the requirement of dimensions and tolerance as given in relevant gauges drawing.

3.0 ACCEPTANCE TESTS (for acceptance of the trial quantity)

All tests given under Clause 7 shall be conducted on conditioned liners. For water

absorption test 10 nos. of 'as moulded' liners produced from all cavities used for production shall be preserved by the manufacturer for determination of dry weight of liners.

3.1 LOT SIZE

For purpose of inspection of the liners 10000 nos. of liners or part thereof duly conditioned shall form a lot.

3.2 SAMPLE SIZE

The sample size for tests shall be as given in each test. The samples for different tests shall be drawn at random from each lot.

4.0 TESTS

Tests as given clause 4.1 to 4.4 shall be conducted on any three of the five sample liners as drawn for internal cavity test under clause 4.5. Tests mentioned at clause 4.6 and 4.7 shall be done on three liners for each test.

4.1 Melting point

Three sample liners per lot shall be checked for melting point of the material of the liners. For acceptance of lot, each individual sample shall pass the requirement of the test value given in Table-1 when tested in accordance with the relevant standard given in Table-1

4.2 Specific gravity

Three sample liners per lot shall be checked for specific gravity of the material of the liners. Specimen for specific gravity shall be taken from middle portion of the liners. For acceptance of the lot, each individual sample shall pass the requirement of the test value given in Table-1 when tested in accordance with the relevant standard given in Table-1

4.3 Ash Content

Three sample liners per lot shall be checked for ash content (percent) of the material of the liners. For acceptance of the lot each individual sample shall pass the requirement of test value given in Table-1 when tested and calculated in accordance with the method given in Appendix III.

4.4 Hardness Test (Method of testing as per ASTM D-785- Part-8 - 2015)

Tests sample liners per lot shall be checked for hardness (Rockwell) of the liners at three different locations on the surface of the liners. For acceptance of the lot each individual value on the three sample liners shall not be less than 90 Rockwell.

4.5 Internal cavity test

Five sample liners per lot shall be checked for internal cavities. On sectioning along "y-y" shown in the PLAN of the liner in Appendix-IX, no sample liner shall reveal any internal cavities when examined visually or with the help of a magnifying

glass, for acceptance of the lot.

4.6 Viscosity Number

Three sample liners per lot shall be checked for viscosity number. For acceptance of the lot each individual value on the three sample liners shall not be less than 230cm³/g.

4.7 Surface roughness

Three sample liners per lot shall be checked for surface roughness. For acceptance of the lot each individual value on the three sample liners shall be within 0.1-0.2 Ra.

4.8 Dimensional check:

- 4.8.1 (i) The liners shall be checked for the dimensions through inspection gauges as per RDSO drawings, and shall meet the requirement of dimensions and tolerance as given in relevant gauges drawing. For acceptance, each sample liner should pass the requirement of the gauges. Sampling shall be done as per 4.8.1 (ii).

(ii) Sampling:

- (a) 2% liners per lot shall be checked for dimensions in the first 1, 00,000 liners of one design manufactured by a firm.
- (b) 0.5% liners per lot shall be checked for dimensions consequent to 1,00,000 liners of one design being found satisfactory. In case, any lot is rejected for dimensions, 2% liners per lot shall be checked from next lot onwards till 1, 00,000 liners (in one or more lots) are found satisfactory, and thereafter the sampling rate shall be 0.5% per lot again.

4.9 Percent water absorption test:

- (i) Three sets, each set consisting of 10 liners, shall form the sample for this test. Average weight of each set shall be considered individually as weight of liner after conditioning.
- (ii) For calculation of percent water absorption of liners, the dry weight of liners shall be the average weight of 10 liners, as in para 6 and retained by the manufacturer before conditioning.
- (iii) For acceptance of the lot, the percent water absorption for the three sets considered individually shall not be less than 1.6 % when calculated in the manner given in Appendix-IV

4.10 Cross- breaking load test:

Three samples of liners per lot shall be tested and accepted as explained in clause 2.3 above.

5.0 RE-TEST

- 5.1 Should any of the test specimens fail in either melting point or specific gravity or Ash content percent, no re-testing shall be undertaken and lot shall stand rejected.
- 5.2 Should only one test sample fail in Hardness or internal cavity or cross breaking load or viscosity number or surface roughness, twice the number of samples drawn earlier for testing, shall be tested for that particular test in which the earlier sampled failed. In this re-testing all the samples should pass the test value for acceptance of the lot represented by these samples and lot shall stand rejected.
- 5.3 Should any one test sample fail in dimensions the manufacturer may re-offer the liners lot wise after sorting out the defectives. The re-offered lot shall be inspected for all tests in terms of acceptance test clause 4.
- 5.4 Should the liners fail in percent water absorption, the liners may be re-conditioned and re-offered for inspection. The re-offered lot shall be inspected for all tests in terms of acceptance test clause 4.

6.0 FINAL INSPECTION/TESTING AND DOCUMENTATION

The manufacturer shall carry out the final inspection and testing internally in accordance with the plan of testing given under the acceptance test clause and shall maintain the records as per Appendix V to Appendix VII, to ensure that the liners have passed the inspection criteria.

7.0 PACKING

- 7.1 The liner shall be packed in multiple of 100 nos., in black color polybags / gunny bags so as to avoid loss or damage during transit and 3 to 5 nos. of these polybags / gunny bags shall be put in sturdy corrugated box as per IS:7151-91 and sealed.
- 7.2 For transportation by road, the sealed bags containing the liners shall be transported in a vehicle exclusively for the liners and no other consignments shall be loaded with the liners in the same vehicle.

8.0 TEST FACILITIES

The liner manufacturer shall be required to install all the necessary test facilities for inspection of liners in a separate well lit, clean and properly ventilated laboratory room provided with easily maintainable floor and platform.

9.0 INSPECTION GAUGES

The inspection gauges for dimensional check shall conform to RDSO drawings. The manufacturer shall submit two sets of inspection gauges for the approval of

inspecting authority. One set shall be used as 'Master gauge' and shall be preserved safely by the liner manufacturer. The second set shall be for use by the inspecting official. For internal quality control, the firm should use an additional set of gauges as per drawing.

10.0 DISPOSAL OF REJECTED LINERS

The rejected liners shall be cut out into pieces and made un-usable.

11.0 REPORT

The inspection official shall report the test observations in the format of Appendix V to VII.

12.0 GENERAL

12.1 The liner manufacturer shall furnish at his cost, the liners required for all tests and shall provide necessary manpower and facilities for carrying out tests at his cost.

12.2 Purchaser/inspecting officer or his representative shall be at liberty to inspect the manufacture at any stage and to call for records, pertaining to manufacture which shall be made available to him within reasonable time.

12.3 The material shall be offered for inspection as per call letter given in Appendix VIII.

13.0 MONITORING OF PERFORMANCE DURING FIELD TRIAL:

The performance of HVN-66 insulating liners during field trial shall be monitored for assessing the overall suitability HVN-66 insulating liners under Indian climatic conditions for a period of 12 months during limited field trial so that the performance is judged during all the seasons of the year. For the purpose of measuring toe load every seventh sleeper shall be paint marked along with ERC so that toe-load is measured at the same sleeper/ERC at different time. For the purpose of evaluation of HVN-66 insulating liners, the following important parameters will be checked:

- i) Toe load of clip
 - ii) Corrosion on rail foot below liners
 - iii) Breakage / de-shaping / shifting of liners
 - iv) Any other observations w.r.t. liner e.g. track circuiting etc.
- i) Toe load is to be measured at every three months for all the four clips at every seventh sleeper. The loss of toe load after first 3 months and at the end of one year should not be more than 10%.The measurements are to be reported in the following format:-

Sleeper	Toe Load (Kg) at the end of
---------	-----------------------------

No.	Initial laying	3 rd month	6 th month	9 th month	12 th month

Note: During performance monitoring of HVN liner, more than one year old ERCs shall be used.

Comparison of corrosion of Rail foot below HVN / GFN-66 / Metal Liners: Any observations regarding extent of corrosion on rail foot below HVN liners as compared to corrosion on rail foot below existing GFN-66 /Metal liner, which may be available in nearby / contiguous section. While laying the HVN Liners for trial, GFN-66 / Metal liners shall also be laid simultaneously in contiguous section only after cleaning the rust on the rail section under liner area for reasonable comparison of corrosion w.r.t HVN liners. The corrosion of rail foot below liners is to be measured in 6/12 month period for every six months for all the four liners locations at every seventh sleeper.

Item	Sleeper no.	Depth of Corrosion observed (in mm) on Left Rail foot (after 6 months)		Depth of Corrosion observed (in mm) on Right Rail foot (after 6 months)	
		GS	NGS	GS	NGS
1	2	3	4	5	6
HVN Liner					
GFN Liner / Metal Liner					

Depth of Corrosion observed (in mm) on Left Rail foot (after 12 months)		Depth of Corrosion observed (in mm) on Right Rail foot (after 12 months)	
GS	NGS	GS	NGS
7	8	9	10

Note:

1. Rail fracture/failure on account of corrosion, to be reported.
 2. Corrosion beyond 1.5mm in the rail flange of foot shall be taken as the criterion for wear due to corrosion, Wear shall be measured by callipers (8 no. clamp). The wear is the difference between the thickness of the new rail flange and the thickness of the worn-out rail flange. An average of three measurements of rail flange thickness below the liner shall be reported.
- ii) Breakage / de-shaping / shifting of liners: All liners shall be checked for breakage / de-shaping / shifting every 3rd month and results recorded in the following format:

Description	upto 3 Months	Between 3-6 Months	Between 6-9 Months	Between 9-12 Months
Breakage / de-shaping of HVN -66 liners in any form (in nos.)				
Worked out HVN-66 liners (in nos.)				
Deep indentation marks (more than 1mm deep) on HVN-66 liner (in nos.)				

Note: Replaced liners during 3 months period to be mentioned

- iii) Condition of other fastening components: Any other observations w.r.t. liner e.g. unsatisfactory observations on the components of fastening system, track circuiting etc.

Performance of HVN Liner shall be monitored jointly normally upto 1 year by zonal railways with representative of supplying firms. RDSO will also associate during joint monitoring of the trial as per the need. However, the monitoring period can be extended further by the Railway Administration, if required to obtain conclusive data.

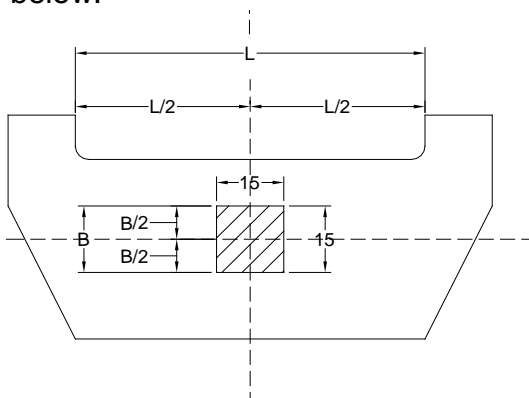
After successful field trial of HVN Liner, the adoption of HVN Liner will be dealt as per Railway Board letter no. 2013/Tk-II/22/7/4(General Policy) dated 08.03.2016 regarding "New Policy on development and adoption of new product / technologies for track/bridge related items".

PRODUCT TESTING (On conditioned Samples)

S. No.	Property	No of samples to be tested	Criteria value for acceptance/rejection	No of samples to be drawn
1	Cross-breaking load	10	Individual	12
2	Melting point	3	-do-	
3	Specific gravity	3	-do-	
4	Ash content	3	-do-	
5	%water absorption	8	Average	8
6	Hardness	3	Individual	3
7	Internal cavity test	5	-do-	5
8	Dimensions	8	-do-	8
9	Viscosity no.	3	-do-	3
10	Surface roughness	3	-do-	3

Note:

- (i) Tests at S.No.2,3,4 & 9 shall be done on cut pieces of samples after internal cavity test (S.No.7). Test at S. No. 10 shall be done on the same samples before hardness test (S.No. 6).
- (ii) Test at S.No.5 shall be done as per Appendix-IV.
- (iii) %water absorption test shall be ensured at firm's premises by the sample drawing authority before collection of samples.
- (iv) Samples shall be signed by the firm's representative and the inspecting official drawing the samples.
- (v) For cross-breaking load test, 2 extra samples have been shown to be drawn. These shall be used for setting the test equipment before final testing.
- (vi) Test piece for specific gravity shall be taken from middle portion of the liner as shown in the sketch below.



TEST FOR CROSS BREAKING LOAD OF LINER**1. METHOD**

1.1 The test shall be carried out as per IS:1998 with the following changes:

- i) The HVN-66liner will be tested in a manner as shown in Appendix-IX
- ii) The radius of support points and of loading point shall be 1.5mm
- iii) The distance between the support points, rate of traverse of jaws of the testing machine and the acceptable value of cross-breaking load shall be as given in the table below:

S.No	Drawing No	Distance between support points	Rate traverse of jaws	Cross breaking load (min)
1.	RDSO/T-2505	45mm	50 mm/min	360 kg
2.	RDSO/T-3516	45mm	50 mm/min	420 kg
3	RDSO/T-3702	60mm	5 mm/min	480 kg
4	RDSO/T-3706	60mm	5 mm/min	390 kg
5	RDSO/T-3707	60mm	5 mm/min	720 kg
6	RDSO/T-3708	60mm	5 mm/min	960kg
7	RDSO/T-3723	45mm	5 mm/min	600kg

N.B: For high viscous nylon material, the above values of cross breaking load for annealed liners are expected to at least 25% higher than existing values of GFN liner.

B. ASH PERCENT

1. METHOD

- 1.1. Take a crucible and heat it by keeping in a muffle furnace till a constant weight is obtained of the crucible. Let its weight be $= W_1$
- 1.2. Take approximately 2gms of the test specimen of the liner in the above crucible and find the weight of the crucible and test specimen.

Let combined weight $= W_2$
- 1.3. Then burn the test specimen by keeping the crucible in the muffle furnace at $550 \pm 50^\circ\text{C}$. Allow it to cool to the room temperature.
- 1.4. Then weigh the above crucible and ash after cooling. Let its combined weight be $= W_3$

2 ASH % CALCULATION

Weight of nylon test specimen $= W_2 - W_1$

Weight of Ash content $= W_3 - W_1$

Therefore, % Ash content $= \frac{W_3 - W_1}{W_2 - W_1}$

**PERCENT WATER ABSORPTION
(CONDITIONING)**

1. PROCESS:

1.1 The HVN-66 liners shall be immersed in boiling water in a water tank for 20 hours or as necessary after which the amount of water absorbed shall be checked.

1.2 The amount of water absorption may be checked by taking the weight (W_b) of 10 liners before and (W_a) after immersion in boiling water.

1.3 Water absorption % =
$$\frac{W_a - W_b}{W_b}$$

Appendix-V

Name of the firm: M/s.

HVN-66 Liner to Drg No.:

.....Railway's P.O No.:

Test results of

1. Internal Cavity
2. Cross Breaking Load
3. % Water absorption
4. Viscosity no.

Lot No	Qty. in Nos	Internal cavity test		Cross breaking load test		Water absorption test		Viscosity no. test	
		Sample No	Free from internal cavity yes/No	Sample No.	Cross breaking (Load) (kg)	Sample Set No	% water absorption	Sample No	Viscosity No.
1	10000	1		1		1		1	
		2		2		2		2	
		3		3		3		3	
		4							
		5							
2	10000	1		1		1		1	
		2		2		2		2	
		3		3		3		3	
		4							
		5							

& so on

Name of the firm:

M/s

- TEST RESULTS OF
- (1) Melting point
 - (2) Specific gravity
 - (3) Ash content&
 - (4) Hardness
 - (5) Surface Roughness

- (1) HVN-66 Liner to drg. No.
- (2) Qty. on order
- (3)Railway's P.O. No

Lot No	Qty. in Nos.	Sample No.	Melting point 258-265 °C	Specific gravity 1.14-1.16	Ash content 0.5 % (max)	Hardness 90 R(min)	Surface Roughness (0.1-0.2) Ra
1	10000	1					
		2					
		3					
2	10000	1					
		2					
		3					

Name of the firms:

M/s

TEST RESULTS OF DIMENSIONS BY GAUGES

(1) HVN-66 Liner to drg. No.

(2) Qty. on order:

(3) ...Railway's P.O. No.

Lot No	Qty in nos.	Sample size	Dimensions	
			As gauges to drg. No	Failing in dimension
1	10000	50	Satisfactory	-

Letter of offer from the firm

(Address of inspecting agency)

Sub: Call letter for inspection of High Viscous Nylon-66 Insulating
Liner to Drg. No. RDSO/T.....

Ref: Railway P.O No.....
dtdfor High Viscous Nylon -66 Liner to Drg No.
RDSO/T.....

High Viscous Nylon-66 insulating liners as per following details are offered for inspection in terms of the above referred purchase order. These have been internally checked and found satisfactory as per drawing No. RDSO/T..... .. and relevant IRS Specification.

The test results are mentioned in the proforma as prescribed in the IRS Specification.

0. Lot No.
1. Quantity on order
 - (a) Against original order
 - (b) Against extension
2. Quantity previously inspected and passed
3. Quantity now offered for inspection
 - (a) Against original order
 - (b) Against extension
4. Rate per liner
5. Marking on liner
6. Delivery period
 - (a) Original
 - (b) Extended
 - (c) Letter No. (for extension)
7. Consignee
8. Consignee letter of authority No.
9. Packing
10. Test certificate of raw material

Thanking you.

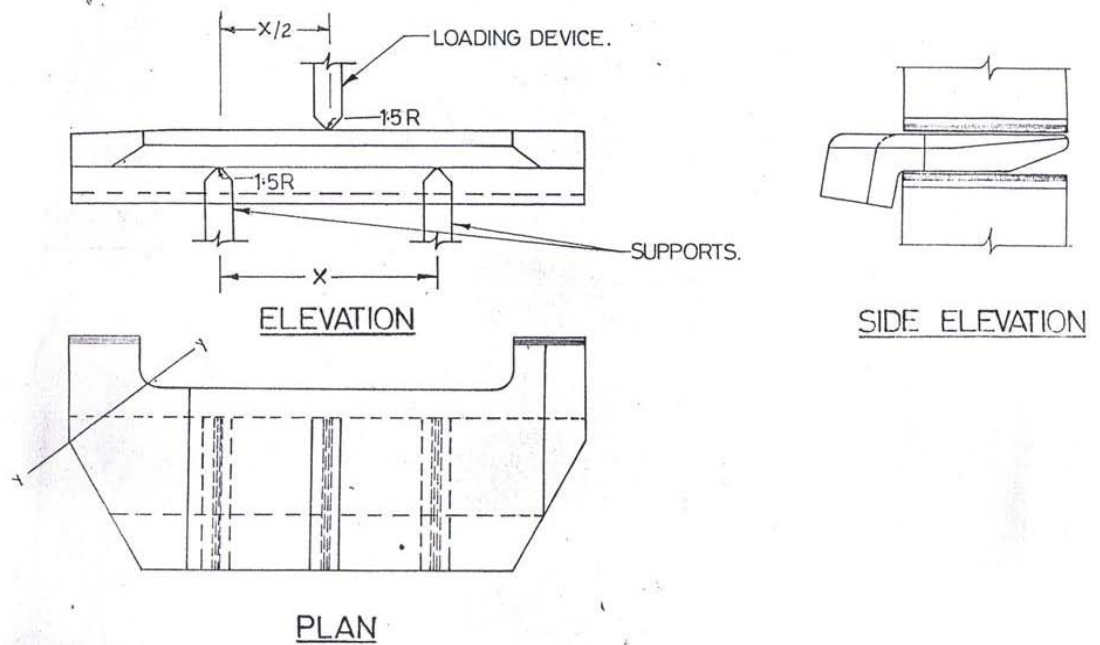
Name

Status in the firm

Yours faithfully,

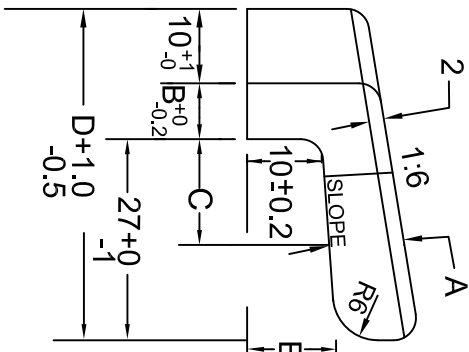
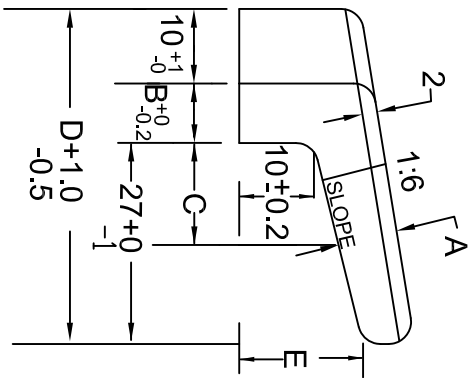
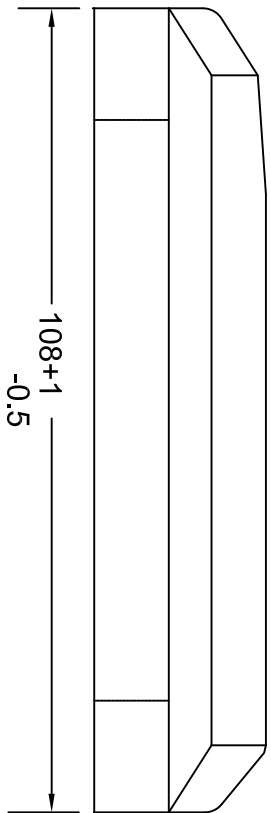
(Signature with date of the
firm's authorized person)

CROSS BREAKING LOAD TEST ARRANGEMENT



1. ALL DIMENSIONS ARE IN MM.

TF	RDSO/T-3706 TO RDSO/T-3708
----	----------------------------



ELEVATION

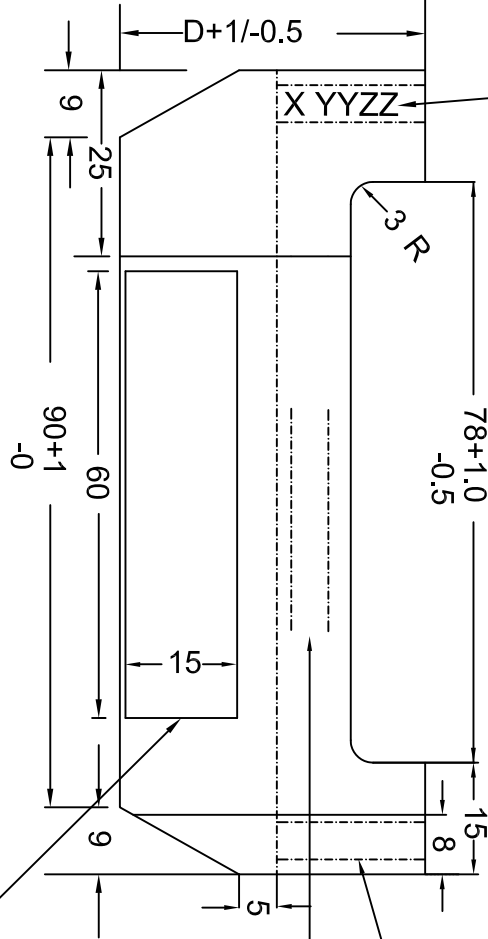
SIDE ELEVATION

GFN LINER FOR 136RE RAIL

SIDE ELEVATION

GFN LINER FOR 60kg UIC RAIL

FOLLOWING TO BE EMBOSSED HERE
X - CAVITY No OF MOULD
YY - FIRM INITIAL/TRADE MARK
ZZ - LAST TWO DIGITS OF YEAR
OF MANUFACTURE



PLAN

S.No.	RAIL SECTION	DRG: NO./ PART NO.	IDENTIFICATION	A	B	C	D	E	SLOPE
1	141/136 RE	RDSO/T-6937	141/136RE	8.0	8.0	13.7	45.0	16.7	1 IN 4
2	60kg UIC	RDSO/T-6938	60kg GS	10.0	7.5	14.2	44.5	11.9	1 IN 14
3	60kg UIC	RDSO/T-6939	60kg NGS	10.3	10.9	10.8	47.9	11.9	1 IN 14

S.No.	LINER DRG. No.	COLOUR BAND	PRINT ON COLOUR BAND
1	RDSO/T-6937	SKY BLUE	LOT No. XYZ, 141/136RE RAIL ON 141RE SLEEPER
2	RDSO/T-6938	LIGHT BROWN	LOT No. XYZ, 60kg RAIL ON 141RE SLEEPER(GS)
3	RDSO/T-6939	GRAY	LOT No. XYZ, 60kg RAIL ON 141RE SLEEPER(NGS)

SCHEME FOR SCREEN PRINTING

- THIS GFN LINER CAN BE USED WITH CONCRETE SLEEPER (RT-7008 & RT-8527) UPTO 25T AXLE LOAD AT MAXIMUM SPEED 100KM/H & FOR PASSENGER TRAFFIC UPTO FULL SECTIONAL SPEED.
- THE LINER SHALL BE SCREEN PRINTED WITH LOT NO. XYZ FOR EACH YEAR FOR EACH DRAWING.
- THE LINER SHALL BE SCREEN PRINTED WITH COLOUR BANDS IN DIFFERENT COLOURS AS PER TABLE TITLE "SCHEME FOR SCREEN PRINTING" WITH CHARACTERS SIZE 3MM APPEARING IN THE NATURAL COLOUR OF THE LINER. THE LOCATION OF COLOUR BAND IS SHOWN IN THE PLAN.
- (a) G.S. STANDS FOR GAUGE SIDE OF 60KG UIC RAIL.
(b) N.G.S STANDS FOR NON GAUGE SIDE OF 60KG UIC RAIL.
- ALL SHARP EDGES TO BE ROUNDED OFF TO ABOUT 2R EXCEPT WHERE OTHERWISE MENTIONED.
- TOLERANCES ON DIAMENSIONS WHERE NOT MENTIONED, SHALL BE +/-0.2mm
- ALL DIMENSIONS ARE IN MM.

NOTE

SPECIFICATION

SCALE

ALT:

DESCRIPTION

DATE

RDSO/T-6937 TO RDSO/T-6939



1.

REVISED & REDRAWN

11.07.18

STANDARD CANCELLED ADVANCE (T)

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.

GLASS FILLED NYLON -66
INSULATING LINER FOR USE
WITH ERC Mk-V ON CONCRETE
SLEEPER SUITABLE TO
60KG(UIC) /136RE RAIL.