

## Rail Coach Factory, Kapurthala

MD35131

Dated: as signed

**Sub:** Issue of corrigendum-1 to specification no. **MDTS-44387 Rev.- NIL** of “Technical Specification for Light Weight Composite Sound Insulating Floor Board Complying Fire Characteristics as per EN-45545-2”.

Please find the corrigendum-1 to MDTS-44387 Rev. Nil as below for information and necessary action at your end:

S. No.	Para	Earlier	Modified
1.	S. No. 1 of Table 3 (Para 5.12)	Total thickness <b>Outside layers:</b> R10 HL3 fire characteristics as per EN-45545-2 <b>Intermediate Layer-</b> Fire retardant rigid structural foam	Total thickness <b>Outside layers</b> <b>Intermediate Layer</b>
2.	S. No. 14 of Table 3 (Para 5.12)	Fire Characteristics (Individually skin materials, intermediate layer material and composite materials)	Fire Characteristics of light weight composite in end use condition
3.	Type Test of Para 6	These tests shall be done on a sampled lot of prototypes. Such Tests are required only on initial approval, change of design and change of manufacturing process or raw material.  These tests are to be repeated after every 36 months or as specified.  • Fire retardant characteristics as EN45545-2 of floor board and outer skin material.	These tests shall be done on a sampled lot of prototypes. Such Tests are required only on initial approval, change of design and change of manufacturing process or raw material.  These tests are to be repeated after every 36 months or as specified.  • Fire retardant characteristics as EN45545-2 of floor board in end use condition

This has approval of competent authority.

Jugal Kishor  
Dy. CME/Des/Fur

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Dy. CMM/Fur/LHB      Dy CMM/G      Dy.CPLE-III

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## रेल कोच फैक्ट्री, कपूरथला

पत्र संख्या- MD35131/2

जारी करने की तिथि - 08/06/2023

**विषय: विशिष्टता प्रकाशन संख्या MDTs-44387 Rev.- NIL ।**

**कृपया जानकारी और अन्य आवश्यक कार्रवाई के लिए निम्नलिखित विशिष्टताओं की संलग्न प्रति प्राप्त करें**

S. No	Description	Specification No.
1.	TECHNICAL SPECIFICATION FOR LIGHT WEIGHT COMPOSITE SOUND INSULATING FLOOR BOARD COMPLYING FIRE CHARACTERISTICS AS PER EN-45545-2	MDTS-44387 Rev -NIL

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स्थापित: 1986



**RCF**

KAPURTHALA

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ESTT: 1986

हल्के वजन वाले समग्र ध्वनि इन्सुलेट फ्लोर बोर्ड  
45545-2 अग्नि पात्रों का अनुपालन करने वाले

**LIGHT WEIGHT COMPOSITE SOUND  
INSULATING FLOOR BOARD COMPLYING  
FIRE CHARACTERISTICS AS PER EN-45545-2**



Specification Number	MDTS-44387		
Revision Number	Nil	Date of Issue	05/06/2023

**Brief Description**

Light Weight Composite Sound Insulating Floor Board complying fire characteristics as per EN-45545-2

## **FOREWORD**

This technical specification laid down general / technical, testing requirements of light weight composite sound insulating floor board complying fire characteristics as per EN-45545-2.

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Document No: MDTS-44387	Revision No: Nil	Date Issued: 05.06.2023
<b>TECHNICAL SPECIFICATION FOR LIGHT WEIGHT COMPOSITE SOUND INSULATING FLOOR BOARD COMPLYING FIRE CHARACTERSTICS AS PER EN-45545-2</b>		

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#### LIST OF AMENDMENTS

SN	Amendment Date	Revision	Details
1.	05/06/2023	Nil	Specification issued

## TECHNICAL SPECIFICATION FOR LIGHT WEIGHT COMPOSITE SOUND INSULATING FLOOR BOARD COMPLYING FIRE CHARACTERISTICS AS PER EN-45545-2

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**TECHNICAL SPECIFICATION FOR LIGHT WEIGHT COMPOSITE SOUND INSULATING FLOOR BOARD COMPLYING FIRE CHARACTERISTICS AS PER EN-45545-2****1 Introduction:**

This specification covers the general and technical requirements of light weight composite sound insulating floor board panels for flooring complying fire characteristics as per EN-45545-2 of all types of Indian Railway passenger coaches.

**2 Foreword & Scope:**

- 2.1 This schedule is intended to cover the technical requirements/provisions relating to materials, constructions and tests and does not include all the necessary provisions of the contracts. This schedule draws references to some of the relevant ASTM, UIC and other Indian Standard specifications. Unless otherwise specified, the latest version of the relevant specifications shall be taken as reference.
- 2.2 The material shall be used for flooring in order to impart acoustic, dampening and smooth surface to the flooring system. These are required to meet the following objectives:
- Excellent Fire retardant characteristics complies to EN45545-2
  - Light weight material composite material approximately 60% lighter than sound insulation wooden panel
  - Water/moisture proof
  - Longer life without danger of termite
  - Better thermal & acoustic insulations
  - Higher strength and impact resistant
  - Performs well in continuous higher temperature

**3 List of standards Referred:**

SN	Standard	Title
1	DIN-52210	Determination of sound absorption coefficient and impedance in a tube
2	EN45545-2	European Railway standard for fire safety
3	ISO 845	Determination of apparent density
4	ASTM D 1621	Standard Test Method for Compressive Properties of Rigid Cellular Plastics
5	ISO-844	Rigid cellular plastics — Determination of compression properties
6	ASTM C 365	Sandwich Core Compression Testing
7	ASTM C518	Standard Test Method for Steady-State Thermal

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		Transmission Properties by Means of the Heat Flow Meter Apparatus.
8	IS 3346	Method of the determination of thermal conductivity of thermal insulation materials (two slab guarded hot plate method)
9	EN 12667	Determination of thermal resistance by means of guarded hot plate and heat flow meter method
10	IS : 11239	Methods of Test for Rigid Cellular Thermal Insulation Materials - Part 2 : Apparent Density
11	IS:12937-2005	Methods of Testing Straightness, Flatness and Perpendicularity
12	RDSO-C-K-514	Decorative thermosetting synthetic resin bonded laminated sheets for use in coaching stock
13	IS:1734-2003	Methods of Test for Plywood
14	C-9407	Wood based impregnated compressed laminates

**Table 1: List of referred standards**
**4 Abbreviation/Terminology:**

S.No.	Abbreviation /Terminology	Expansion/Explanation
1	QAP	Quality Assurance Plan
2	FAI	First Article Inspection
3	RCF	Rail Coach Factory
4	KXH	Indian Railways station code for Kapurthala
5	LHB	Linke-Hofmann-Busch the transfer of technology partner for RCF/KXH.

**Table 2: Abbreviations & Terminology**
**5 Technical Requirements:**

- 5.1. **Material Construction:** The material shall be light weight composite board having single inner layer of continuous rigid structural material without any concavity, sandwiched between two outer layers of rigid material with moisture resistance, chemical resistance and corrosion resistance, non-pours material having uniform thickness throughout and long lasting proven material.
- 5.2. The Composite Floor Board should be designed with an interlocking mechanism in the width of composite floor, to maintain uniform floor level.
- 5.3. To avoid water seepage, requisite sealant cum adhesive to be filled in joints.
- 5.4. Colour: White or as specified in PO.



**TECHNICAL SPECIFICATION FOR LIGHT WEIGHT COMPOSITE SOUND INSULATING FLOOR BOARD COMPLYING FIRE CHARACTERISTICS AS PER EN-45545-2**

- 5.5. The outer layer materials shall be pasted with sandwich with color high structural adhesive.
- 5.6. While laying the flooring assembly, the corners and joints shall be filled with adhesive cum sealant to avoid water seepage.
- 5.7. Thickness: 16 mm or as specified.
- 5.8. Standard Dimensions: 1500x3000/ 2000/3000 mm or as specified.
- 5.9. Appearance: No surface defect.
- 5.10. Unless otherwise specified, the following tolerances on the nominal sizes of finished board shall be permissible:
- |    |                                |   |                   |
|----|--------------------------------|---|-------------------|
| a. | Length                         | : | +6.0 mm           |
|    |                                | : | -0.0 mm           |
| b. | Width                          | : | 3.0 mm            |
|    |                                | : | -0.0 mm           |
| c. | Thickness                      | : | ± 0.15mm          |
| d. | Diagonally                     | : | less than 1.5mm/m |
| e. | Squarness of rectangular part: |   | less than 1.5mm/m |
- 5.11. Material shall be easily cut with circular saw.
- 5.12. The light weight composite board shall meets following parameters:

SN	Characteristics	Requirements	Method of test
1	<b>Total thickness</b> <b>Outside layers:</b> R10 HL3 fire characteristics as per EN-45545-2 <b>Intermediate Layer-</b> Fire retardant rigid structural foam	<b>16 mm</b> 1.0 mm each  Remainder thickness	
2	Weight for 16 mm thick (max)	6.2 Kg/m <sup>2</sup>	ISO-845/IS:11239
3	Flexural Rigidity (Min)	700 Kgf/m <sup>2</sup>	IS :11239(Part-10)/1734-1983 (Part - 15)
4	Compressive strength (Min)	1.4 Mpa	ASTM D 1621/ ISO-844/ASTM C-365 / IS :11239

**TECHNICAL SPECIFICATION FOR LIGHT WEIGHT COMPOSITE SOUND INSULATING FLOOR BOARD COMPLYING FIRE CHARACTERISTICS AS PER EN-45545-2**

5	Compressive Modulus (min)	70 Mpa	ASTM D 1621/ ISO-844/ ASTM C-365 / IS :11239
6	Resistance to impact	To pass the test	C-9407 Appendix - D / RDSO-C-K-514
7	Resistance to chemicals	To pass the test	C-9407 Appendix – E
8	Resistance to ageing	To pass the test	C-9407 Appendix - F
9	Sound Insulation factor R (Min)	31 db	DIN-52210 Part-III/ ISO- 10140-2
10	Water Absorption, Maximum	2.0%	IS:13411/ IS:11239/ C-9407 Appendix - B
11	Thermal conductivity at 23°C	0.05 W/mK ( Max)	EN 12667/ ASTM C518/ IS:3346
12	Tolerance Flatness	1.5 to 2mm/m	IS:12937-2005
13	Bending Strength (Min)	1200 kg/cm <sup>2</sup>	IS: 1734-2003 (Part-11)
14	Fire Characteristics(Individually skin materials, intermediate layer material and composite materials)	R10 HL3	EN-45545-2

**Table 3 –Technical Properties**
**6 Quality Assurance, Tests & Documents:**

The following table provides the overview of the system for quality assurance.

Requirement Description	Requirement Detail	Remarks
Quality Assurance plan	The manufacturer shall have the detailed quality assurance plan. The Plan shall be submitted for the approval by RCF/KXH. The QAP document shall clearly document the following and control the test record formats. 1. Control over outsourced products and processes	The QAP shall be submitted in PDF soft copy digitally signed by the head of Quality department of the

**TECHNICAL SPECIFICATION FOR LIGHT WEIGHT COMPOSITE SOUND INSULATING FLOOR BOARD COMPLYING FIRE CHARACTERISTICS AS PER EN-45545-2**

	2. Testing of raw material and establishing its traceability 3. Sampling Plan 4. Type Tests 5. Routine Tests 6. Acceptance tests 7. Raw Materials	manufacturer for approval.
Type Tests	<p>These tests shall be done on a sampled lot of prototype. Such Tests are required only on initial approval, change of design and change of manufacturing process or raw material.</p> <p>These tests are to be repeated after every 36 months or as specified.</p> <ul style="list-style-type: none"> <li>Fire retardant characteristics as EN45545-2 of floor board and outer skin material.</li> </ul>	<p>The records of the type tests shall be maintained by the manufacturer and shall be made available upon demand.</p> <p>These records shall be traceable and verifiable.</p>
Routine Tests	<p>These tests are required to verify the functional working of the system. These may require simulated in-puts for testing the operation under full range of inputs. These tests shall be done by the manufacturer during manufacturing and record maintained for inspection.</p> <p>These tests are to be repeated after every 12 months or as specified.</p> <ul style="list-style-type: none"> <li>Thermal Conductivity</li> <li>Noise Reduction coefficient</li> <li>Resistance to chemicals</li> <li>Resistance to ageing</li> <li>Water Absorption, Maximum</li> <li>Resistance to impact</li> <li>Flexural strength</li> <li>Shear Strength</li> <li>Shear strain parallel to plane</li> <li>Tolerance Flatness</li> </ul>	<p>The records of the type tests shall be maintained by the manufacturer and shall be made available upon demand.</p> <p>These records shall be traceable and verifiable.</p>
Acceptance tests	<p>These tests shall be done on all or samples of lot for bulk supply. Sampling shall be done as per IS:2500</p> <p>These tests shall normally consist of routine tests and additionally specified in the contract.</p>	<p>The records of the acceptance tests shall be enclosed along with the supply consignment.</p>

**TECHNICAL SPECIFICATION FOR LIGHT WEIGHT COMPOSITE SOUND INSULATING FLOOR BOARD COMPLYING FIRE CHARACTERISTICS AS PER EN-45545-2**

	These tests are to be carried out on each lot or as specified: <ul style="list-style-type: none"> <li>• Colour</li> <li>• Thickness</li> <li>• Dimension (Length, Width, Thickness, Diagonally, Squareness of rectangular)</li> <li>• Surface</li> <li>• Weight</li> </ul>	These records shall be traceable and verifiable.
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**Table 4: Quality Assurance, Tests & Documents**

- 6.1 The fire retardant tests as per EN 45545 -2 shall be conducted by either NABL accredited Lab for these testes or Testing lab accredited as per ISO/IEC-17025 to perform/conduct fire test as per EN45545-2 (Proof of same shall be submitted).

**7 Marking & packing:**

Before dispatch, each packing shall bear following information:

- Nomenclature of the store
- Quantity packed (total metrage).
- Lot and serial number.
- Month and year of packing.
- Name and trade mark of the manufacturer.
- Name and address of the consignee.

In order to prevent damage and deterioration in quality during storage, handling and transportation, the supplier should supply material with suitable packing.

**8 Information to be provided by bidder / supplier:**

The following information shall be provided by the bidder / supplier.

**8.1 Information to be provided at the time of the bid:**

The following information shall be included with the bid. These documents shall be used to determine suitability for placement of purchase orders.

S. No.	Information to be provided	Important Note
1.	Tender Specific authorisation letter of MOU with manufacturer of the light weight composite sound insulating floor board . The document must have unambiguous authorization and address the warranty requirements specified in this specification.	This document is required in case the manufacturer is authorizing another entity to bid on their behalf.
2.	WTC, Technical data-sheet and safety data-sheet from OEM of light weight composite	

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	sound insulating floor board along-with outer, inner skin materials & high strength adhesive & sealant.	
3.	Test certificates for parameters mentioned in para 6.0	
4.	ISO9001 / IRIS Certification as available.	

**Table 5: Information to be provided with the bid**
**8.2 Information to be supplied upon release of letter of acceptance / purchase order:**

The following information shall be supplied prior to the supply of the ordered material:

S. No.	Information to be provided	Important Note
1.	Copy of the detailed QAP for the self adhesive insulation material ordered.	The document must contain the details as specified in the clause on quality assurance in this specification.
2.	Test Certificates and technical data sheet of all parameters of light weight composite sound insulating floor board mentioned in the spec.	The test certificates shall be traceable and verifiable.

**Table 6: Information to be provided upon release of letter of acceptance / purchase order**
**8.3 Information to be supplied with the material consignment:**

S. No.	Information to be provided	Important Note
1.	Copy of the detailed QAP for light weight composite sound insulating floor board ordered.	The document must contain the details as specified in the clause on quality assurance in this specification.
2.	Test Certificates for type & routine tests (as detailed in the QAP) conducted by the manufacturer or third-party agencies as specified in para 6.0.	The test certificates shall be traceable and verifiable.
3.	Test Certificates for acceptance tests (as detailed in the QAP) conducted by the manufacturer or third-party agencies as specified in para 6.0.	
4.	WTC, Technical data-sheet and safety data-sheet from OEM of light weight composite sound insulating floor board along-with outer, inner skin materials & high strength adhesive & sealant.	

**Table 7: Information to be provided with material consignment**