RAIL COACH FACTORY KAPURTHALA

MD35131

Dated : 13.09.2019

Sub: Issue of specification no. MDTS-28001 Rev-'03', Schedule of requirements of thermal insulation for under frame and sidewall of Railway Coaches

Please find enclosed a copy of specification no. MDTS-28001 Rev-'03' for schedule of requirements of thermal insulation for under frame and sidewall of Railway Coaches, for information and necessary action at your end.

13/09/2019

Dy CME/D-II

CQM, CPLE, CWE (FUR), CMM/HSQ, CMM/TKJ, Dy. CMM/Fur/LHB, Dy CCMT, DY.CPLE-III, Dy CMM/Q

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Copy for kind information to:

CDE

SPECIFICATION	SCHEDULE OF REQUIREMENTS OF THERMAL INSULATION FOR UNDER FRAME AND SIDEWALL OF RAILWAY COACHES	MDTS-28001 Rev 03 Page 1 of 5 Date: 12.09.2019

NAME	DESIGNATION	SIGNATURE	DATE	LEVEL
Harish Kumar	SSE/Dev		12/9/19	Prepared
Abhey Dogra	Dy CME/D-2		12/09/19	Agreed & Reviewed
Manish Bhimte	CDE		13.9.19	Approved

Issue / Rev.	Details of changes	Date
01	1.0 Para 3.2, 3.3 & 7 Modified. Thickness changed from 30 & 60 mm to 25 & 50 mm respectively in para 4.v. 2.0 For fire & smoke characteristics, test method changed as per EN 45545-2 in para 4 of Table-1. 3.0 Water vapour transmission rate added in place of water vapour permeability & vapour transmission factor 4.0 Thermal insulation (Para-2), sound absorption/noise reduction coefficient(Para 3) & water absorption (Para 5) requirement of Table-I modified. Tensile strength & compression stress strain deflection requirements deleted.	22-01-2015
02	1. Eligibility criteria in Para 3.2 & 3.3 modified. 2. Hydrophobic melamine foam & single side foil added in para 4.i. Density & % water absorption , modified in Table I accordingly. 3. Total volatile organic emission requirements in Table-I deleted.	21-03-2016
03	1. Classification of Tests (Para 8.0) and warranty (Para 9.0) added. 2. Eligibility Criteria (Para 3.0) and prototype approval (Para 7.0) modified. 3. Tolerance on density for polyolefin foam core changed from ± 5 kg/m^3 to ± 3 kg/m^3.	12-09-2019

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1.0 Introduction :

a. This schedule covers the technical requirements / provision relating to material & tests and does not include all the necessary provisions of contract.
b. This schedule draws reference to some of the relevant ASTM, DIN, BS, AS , ISO, UIC, JIS and other Indian Standard specification. The latest version of the relevant specifications should be taken as reference.

2.0 Scope:

This schedule covers requirements and methods of tests of thermal insulation for under frame and sidewall of Railway Coaches.

3.0 Eligibility Criteria:

3.1. Tenderer shall be either OEM or an authorized dealer of OEM and shall submit the proof of authorisation certificate and contact details (address, phone no., fax no., e-mail) of OEM along with the offer.

3.2. The OEM of thermal insulation material shall be imanufacturer of offered (Part no./ Brand Name) material to International Railways and/or automotive industries or similar HVAC application and shall submit proof of supply along with the offer.

3.3. While quoting, the tenderer shall submit the following details along with the offer:

- Part no./ Brand Name and OEM of offered product.
- Technical and safety data-sheets of offered Part no./ Brand Name
- Clause-wise comments on the specification.
- Test certificate for fire and smoke characteristics as per requirements laid down at S.No.4 of Table-II conducted by International Lab. certified by "Certifier" Railway Certification agency and the testing lab should be accredited as per ISO/IEC-17025 to perform/conduct fire test as per EN45545-2 (Proof of same shall be submitted).
- For other parameters of Table-I & II, test certificates from NABL/Internationally Accredited Labs shall be submitted.
- Authorized dealer is required to submit test certificates from OEM only. Test certificates submitted by authorized dealer after conducting test at their end/ any outside agency shall not be accepted.

In absence of above details for the offered product, offer shall not be considered.

4.0 General Requirements:

i) The thermal insulation should be made from cross linked closed cells made of polyolefin foam or hydrophobic melamine foam. The foam should have factory applied

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reinforced heat bonded fused 9 µm aluminium foil. The material shall conform to the properties mentioned in theTable-I & II.

ii) The thermal insulation shall reduce the transmission of structural born noise and vibration. It shall have excellent chemical, biological and ozone resistance.

iii) The thermal insulation should be odourless with no fibrous emission and shall be in-soluble in water and organic solvents.

iv) The thermal insulation should not contain and should not be produced with any of the substances mentioned as Class-I and Class-II in the "Montreal Protocol" of ozone depleting substances.

v) Required thickness should be 15mm, 25mm and 50mm or as specified by the purchaser. Lamination process, if required, to achieve the desired thickness is to be carried out by OEM and it should not affect the desired properties of end product.

vi) Material shall be available in sheet size of 2300mm x1200mm or supplier's product size range, if acceptable to the consignee.

vii) Material shall be easily cut with an ordinary knife.

viii) The Schedule of Requirements for aluminium foil shall be below

Table-I

S.No.	*Physical Properties*	*Specified Value*	*Test Method*
i.	Aluminium Foil thickness (Min)	9.0 Microns	By dial gauge.

ix) The Schedule of Requirements for thermal insulation shall be below:

Table-II

S.No	Properties	Values	Test Method
1.	Density	25 ± 3 kg/m^3 (for polyolefin foam core only) 15 kg/m^3 (Max) (for melamine foam core only)	IS:7888 1976 Cl-4/ISO-845
2.	Thermal Insulation	Max 0.036 W/m^{0}K at 23^{0}C	ASTM C-518/ IS:3346
3.	Sound absorption/Noise	>0.20 (for 25 mm)	AS 1045 /

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	reduction Coefficient		ISO 354/ EN ISO 11654
4.	Fire & Smoke characteristics	R1, HL3	EN 45545-2 (Table 5)
	a) Lateral spread flame CFE (Minimum)	20 kW/m^2	ISO-5658-2
	b) Heat release rate (Cone calorimeter method) *MARHE* (Max.)	60 kW/m^2	ISO:5660-1 : 50 kW/m^2
	c) Smoke generation $D_s(4)$ (Max)	150 dimensionless	EN ISO:5659-2 : 50 kW/m^2
	d) Smoke generation VOF_4(Max)	300 min	EN ISO:5659-2 : 50 kW/m^2
	e) Gas analysis in smoke chamber using FTIR technique $CIT_G(4)$ (Max)	0.75 dimensionless	EN ISO:5659-2 : 50 kW/m^2
5.	Water absorption (%) (Max)	1.0 mg/cm^2 (For 10 mm thickness)	JIS K6767
6.	Water vapour transmission rate (Max)	0.042 g/m^2/24 hrs (For 25 mm thickness)	ASTM E 96 (Foil face towards desiccant)
7.	Resistance to Fungi	Zero growth	ASTM G 21

5.0 **Packing:** The material shall be packed in neat and dry condition. The material shall be securely packed so as to avoid damage in transportation.

6.0 **Marking:**Before dispatch, each pack shall be legibly marked with indelible marking ink/paint showing the following details:

- Lot and serial number.
- Month and year of packing.
- Name and trade mark of the OEM.

7.0 **Prototype approval:** The firm who has not got their prototype sample approved earlier, shall submit following documents for prototype approval from CDE/RCF for PO placed by RCF or user railways for PO placed by them respectively, before bulk supply:

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- Authorisation certificate from OEM in case the supplier is a autorised dealer of the OEM
- Technical and safety data-sheet **offered Part no./ Brand Name .**
- Test certificate for fire and smoke characteristics(latest report or of last two years) as per requirements laid down at S.No.4 of Table-II I conducted by International Lab. certified by "Certifier" Railway Certification agency and the testing lab should be accredited as per ISO/IEC-17025 to perform/conduct fire test as per EN45545-2(Proof of same has to be submitted).
- For other parameters of Table-I & II , test certificates from NABL/Internationally Accredited shall be submitted.
- Authorized dealer is required to submit test certificates from OEM only. *Test certificates submitted by authorized dealer after conducting test at their end/ any outside agency shall not be accepted.*

The prototype approval is applicable on the first supply of material as per this specification from a supplier.

8.0 Classification of Tests:

a. Testing of following parameters as mentioned in this specification shall be treated as type tests and shall be repeated every 12 months:

- Fire & Smoke characteristics (S. No. 4 of table-II)
- Thermal Insulation
- Sound absorption/Noise reduction Coefficient
- Water vapour transmission rate (Max)
- Resistance to Fungi

However, if the consignee or inspecting agency desires to do the type tests, before 12 months, the supplier should not deny the same. There are various circumstances when type tests may be needed on next supply before one year of last supply/ last type tests e.g.:

- In case of doubt in type test certificate(previous)
- Complaint regarding type test certificates
- Failure of material attributable to any of the parameters covered in type tests, etc.

b. Testing of Water absorption (%), density and parameters in Table-I as mentioned above shall be acceptance test.

9.0 Warranty:

The supplier shall give warranty for failing or proving unsatisfactory in service due to defective deign, material or workmanship within 84 months from date of supply or 72 months from date of fitment whichever is earlier and shall replace the same at his own cost and risk.

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