

RAIL COACH FACTORY, KAPURTHALA


MD46111

Date: 11.07.2016

Sub: Schedule of Technical Requirements of Two part solvent free Epoxy Resin Coating for flooring material of IR Passenger coaches to MDTS-44289 Rev-00.

Please find enclosed a copy of Schedule of Technical Requirements of Two part solvent free Epoxy Resin Coating for flooring material of IR Passenger coaches to MDTS-44289 Rev-00.

Encl. MDTS-44289 Rev-00.


11.7.16
Dy CME/D-2

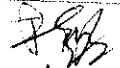

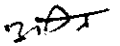
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Designation	Name	Signature	Date	Level
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Dy.CME/D-2	Suraj Prakash		07-4-16	Agreed & Reviewed
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Issue/Rev	Details of Changes	Date


Prepared by


Agreed by 07-7-16

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1. SCOPE:

- 1.1 This specification provides the general & technical requirements for supply and application of two part fire safe solvent free epoxy resin coating for flooring in Indian Railways coaches including the toilets.
- 1.2 This specification covers requirement of two part Fire Safe solvent free modified Aliphatic Polyamine Epoxy Resin Coating to be used as flooring material for all type of Railways coaches. The subject flooring provides an impermeable barrier to prevent coach structure from corrosion, helps noise dampening and at the same time provides aesthetically pleasing surface contributing to improved habitability conditions onboard. The criteria for selection & acceptance of the material, application process, technical requirements and warranty are covered under this specification. The application of the coating in coaches is to be carried out by the supplier.

2. PURPOSE:

Polyamine Epoxy resin coating is to be used as a floor covering material for all type of coaches. The material is indented to prevent the covered surface from corrosion, water & moisture ingress and create a slip resistance, anti graffiti, aesthetically pleasing finish.

3. ELIGIBILITY CRITERIA:

While quoting, the Tenderer shall submit the following details for technical scrutiny of the offers:

- i) Past performance of the offered material in Indian Railway Passenger Coaches/ International Railways or Aircraft or Ships in similar applications. Credentials and performance of the product is required through OEM.
- ii) Technical and safety data sheet of the offered product.
- iii) Clause-wise comments on the specification including test certificates for the parameters specified.
- iv) Test certificates for Fire properties shall be required from the reputed labs like LAPI, Crexim, Exova, DNV, TUV, NORD, Warringtonfire or any other lab of International reputation having requisite accreditation for carrying out these tests according to EN ISO/IEC 17025.

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

4. COMPOSITION :

Polyamine Epoxy resin coating flooring schemes comprises of 3 sub-systems:

- a) Two part Epoxy Resin Primer.
- b) Two part Epoxy Resin main coat with decorative Flex and
- c) Two part Polyurethane Sealer Coat.


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5. APPLICATION & PROPERTIES:

Floor coating shall be applied in four stages as mentioned below:-

5.1 Surface Preparation

Adequate surface preparation of the coach floors, receiving the Epoxy resin coating, forms an important component of the entire scheme. Proper surface preparation is essential from adhesion point of view and bonding of the coating may get loosened up and chipped out, if applied on insufficiently prepared surface. Prepared Surface should be clean & dry and free from any oil, grease, dirt or foreign contaminants.

5.2 Primer

5.2.1 Application:


Post surface preparation, the surface is to be applied with one coat of two part Epoxy Resin Zinc Oxide Primer with a DFT of 100-150 microns by means of brush/trowel/roller. The specified primer is to be used for the better adhesion to the surface and epoxy resin coating. Primer is to be prepared by mixing Part A and Part B in ratio defined by the manufacturer. Full curing time for primer should be approximately one hour.

5.2.2 Technical Specification of Primer:

Table-I

S.No.	Property	Test Method	Specified Value
i.	Moisture Absorption	As per Appendix-II of NCD 1471 Issue 1, Part 2	<0.5%
ii.	Pull off test for adhesion	EN ISO 4624:2016	Pass
iii.	Adhesion strength	Minimum strength adhesion- 4A when tested as per ASTM D 3359 or 4 N/mm ² when tested with ASTM D-4541	
iv.	Accelerated Corrosion Test	IS: 101-88 (Part 6/Sec.1)	No signs of corrosion on steel plate upto 500 hrs.
v.	Flexibility	As per section 5.6 of NCD 1471 Issue 1, Part 2	Should not crack or detach
vi.	Flow Time	ISO 2431	100/6s


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5.3 Two part epoxy Resin main coat with decorative flex application.

5.3.1 Application

The epoxy resin main coat is a compound laid on properly on primed surface to cover the floor undulations and provides aesthetically pleasing, hard and even surface. The recommended thickness of this coating is between 2-3mm. Colour of epoxy resin main coat and flex should be as per approved shades.


Contents of Pack A with Pack B should be blended in the ratio defined by the manufacturer by mechanical blender. However, it should also be able to mix manually also. The blended material should be self-levelling free flow material, which can be spread evenly by masonry/ notched trowel to the desired thickness. Spiked roller should be used to release any entrapped air. The coating should be hard touch dry in 08-10 hours.

5.3.2 Technical Specification of Resin Main coat:

Table-II

S.No.	Parameters	Test Method	Values
i.	Density	DIN EN ISO 2811-1:2011-06	1600-1800 kg/m ³
ii.	Hardness (Shore D)	DIN 53505	60 – 80
iii.	Peel off Strength on the primed surface	DIN EN ISO 4624	>11 MPa
iv.	Tensile strength	DIN EN ISO 527	60-70 N/mm ²
v.	Elongation of Break	DIN EN ISO 527	30-40 N/mm ²
vi.	Water absorption	DIN 53475	Max 0.1%
vii.	Adhesion test	Minimum strength adhesion- 4A when tested as per ASTM D 3359 or 4 N/mm ² when tested with ASTM D-4541	
viii.	Accelerated Corrosion test	IS: 101-88 (Part 6/Sec.1)	No signs corrosion on steel plate upto 500 hrs.
ix.	Moisture Absorption	DIN 53475	<0.1 %
x.	Electrical conductivity	DIN EN 61340-4-1 DIN EN 1081	>5x10 ⁻¹³ Ω (Measuring Voltage 100 V)
xi.	Thermal conductivity	DIN 52612	0.3 W/mK +10%
xii.	Flexural Strength	EN 196-1	45-55 N/mm ²


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5.4 Two part Solvent free Sealer Coat:

5.4.1 Application

Polyurethane two part sealer coat shall be applied over epoxy resin main coat to close the porosity in epoxy resin main coat. The sealer coat imparts aesthetics finish and provides abrasion resistance, anti stain, anti graffiti seamless surface. The sealer should be UV resistance and solvent free. The sealer must prevent any foreign material such as dust, dirt, mud, cleaning chemicals and water to get penetrated in the floor surface. The sealer coat coverage area shall be minimum 100g/m² and the adhesion strength shall be >5 N/mm².

5.4.2 Technical Specification of Two part solvent free sealer coat:

Table-III

S.No.	Parameters	Test Method	Values
i.	Density	DIN EN ISO 1183	< 1.2 g/m ³
ii.	Coverage area		Min.100g/m ²
iii.	Moisture absorption	DIN 53475	<0.2%
iv.	Water absorption	DIN 53475	Max 0.1%
v.	Accelerated corrosion test	Appendix IV of NCD 1471 issue 1- part1	No signs of rusting or corrosion on steel plate
vi.	Slip Resistance	DIN 51130	R 10
vii.	Electrical conductivity	DIN EN 61340-4-1 DIN EN 1081	>10 ¹² Ω (Measuring Voltage 100 V)
viii.	Thermal conductivity	DIN 52612	0.25 W/mK
ix.	Flexibility	EN 196-1	40-50N/mm ²
x.	Compressive Strength	EN 196-1	40 -50N/mm ²
xi.	Impact resistance	EN ISO 6272-2	45-55 KJ/mm ²

6. FIRE PROPERTIES

The complete floor coating comprising of Primer, Epoxy coat and sealer coat should confirm to R10, HL2 category when tested by EN 45545 as tabulated below

Table-IV

S.No.	Test Method	Parameter, Unit	Maximum or minimum	Value
i.	EN ISO 9239-1	CHF, kWm ⁻²	Minimum	6
ii.	EN ISO 5659-2: 25 kWm ⁻²	D _s max. dimensionless	Maximum	300
iii.	EN ISO 5659-2: 25 kWm ⁻²	CH _G dimensionless	Maximum	0.9

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7. PROTOTYPE APPROVAL

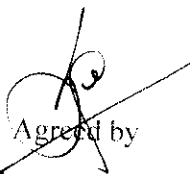
The supplier shall supply a sample along with the following details at the time of prototype approval.

- i. Test certificates from OEM of the Primer, Epoxy resin coating and Sealer coating indicating compliance to specified parameters as above.
- ii. Material and safety data sheets
- iii. 3 nos. of steel sheets of size 300mm x 600mm should be submitted after application of these coatings. The sample must be coated with three layers (primer, epoxy resin and decorative flex with sealer) and all three layers shall be visible to eye to determine the actual process of installation.
- iv. Test certificates for Fire Properties as mentioned in para 6.
- v. Suppliers shall incorporate changes suggested by Railway in the prototype as well as in the bulk supply.
- vi. The bulk manufacturing shall be undertaken only after approval of prototype. This clause of prototype approval is applicable for the first supply from a new supplier.

8. WARRANTY:

The Flooring duly installed with Epoxy resin material shall be deemed to bear warranty against defective material and performance for a minimum period of 36 months form date of application. Loss of any of the specified properties would be considered as warranty failure.


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