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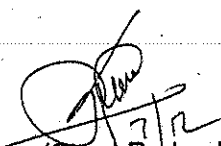
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Dated: 07-12-2016

Sub: Issue of specification no. MDTS-076 Rev-'03', Schedule of requirements of Sound/Dampening Insulation Paint for ALSTOM-LHB Design Coaches

Please find enclosed a copy of specification no. MDTS-076 Rev-'03' for schedule of requirements of Sound/Dampening Insulation Paint for ALSTOM-LHB Design Coaches, for information and necessary action at your end.

प्राप्तिका
रेल कोच कारखाना, कपूरथला
07 DEC 2016
प्राप्ती क्रमांक... 741602920


(Suraj Praksah)
Dy CME/D-2

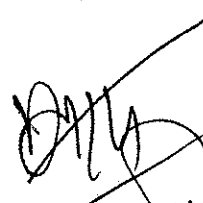
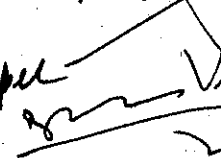
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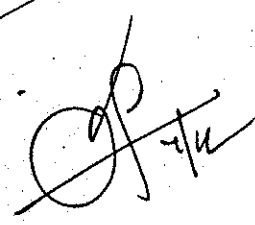
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CDE


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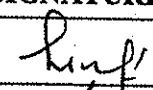
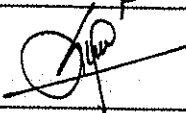
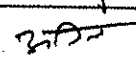
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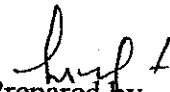
SPECIFICATION
MDTS 076
Rev-03


SCHEDULE OF TECHNICAL REQUIREMENTS
SOUND/DAMPENING INSULATING PAINT FOR
ALSTOM- LHB DESIGN COACHES

PAGE 1 OF 6
Dated: 02.12.2016

NAME	DESIGNATION	SIGNATURE	DATE	LEVEL
Harish Kumar	SSE		2/12/16	Prepared
Suraj Prakash	Dy CME/Design		5/12/16	Agreed & Reviewed
A.K. Kathpal	CDE		6/12/16	Approved

Issue/Rev	Details of Changes	Date
Rev.01	1. Specification modified	11/03/2005
Rev.02	1.0 Adhesion test and hardness test added to check that no foam or bubbles are formed after application of paint. 2.0 Forming of bubbles or foam prohibited. 3.0 Application of paint on one coach added in prototype approval. 4.0 Application and testing requirements parameters for supplier during bulk supplied added. 5.0 Scope and prototype approval para modified and more requirements added. 6.0 Thickness of Single component water based sound insulating Paint changed form 1.5-2 mm to 2-3 mm and parameters change 7.0 Drawing no. for thickness of paint to be achieved in the shell added. 8.0 All test certificates from NABL certified Labs added. 9.0 Specification revised.	13-06-2012
Rev.03	1.0 Fire properties modified as per EN-45545-2(Para 4.0). 2.0 Sound insulation/ dampening characteristic as per DIN EN ISO 6721 added and para 5 modified. 3.0 Test certificate from International Lab/NABL Accredited Labs as per ISO/IEC-17025 added. Para 1.b.6 to 1.b. 9 & 8.1 modified. 4.0 Specification revised including thickness & single component water based paint deleted.	02.12.2016


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1. SCOPE:


- a. This specification covers the general & technical requirements for polyurethane based two-component sound insulating/dampening paint. This paint shall be coated on the interior of ALSTOM-LHB design coach shell to provide noise insulation and to prevent corrosion of the shell. The supplier will apply the paint on the interior of coach shell at RCF premises.
- b. While quoting, the supplier shall submit the following details :
1. Past performance of the offered material in Indian Railway Passenger Coaches/ International Railway or any other Railway OEM for similar applications..
 2. Credentials and performance of OEM
 3. Technical data sheet of the offered product.
 4. Clause-wise comments on the specification.
 5. Deviation statements with respect to specification, if any.
 6. Test certificate for Fire properties as per Table-1 conducted by International Lab. as per ISO/IEC-17025 (e.g. LAPI, Crepim, Exova Warringtonfire, BRE, AITEX, BASF, RST, Currenta, LNE).
 7. Test certificate for sound dampening as per Table-2 from International Lab./ NABL accredited Lab. as per standard ISO/IEC-17025.
 8. Test certificates from NABL Accredited Labs as per ISO/IEC-17025 for painting thickness without foam/bubble, adhesion strength, thixotropic, drying time, coverage , density/ specific gravity, volume solid, viscosity, over painting time, shore hardness, in service temperature, flash point temperature, ignition temperature, residue on ignition & corrosion prevention properties, indicating compliance to all the test parameters laid down in the spec. below.
 9. Accreditation Certificate of testing Lab. as per ISO/IEC -17025 for conducting each specific test (Para 1.b.6 to 1.b.8) is to be submitted at the time of offer. In case of failure of submission of the same, the test report submitted shall be considered void.

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

2. Material Base:

- 2.1 **Two-component polyurethane based Paint :** The material must be two-component polyurethane based paint of proven formulation with the first or component A being a polyurethane based paint and the second or component B being a compatible hardener. The final coat will be produced by mixing of the two components in a OEM recommended ratio & subsequent application on a prepared substrate. On mixing of two components of the system, hardening should occur by means of exothermic reaction at ambient temperatures. The reaction time of this hardening should be adjustable between 1 and 30 min and the supplier must accordingly advise the mixing ratio. No solvent is to be used for either component.

- 3.0 **Technical Requirements** (All required parameters, except for which testing methods has been specified in this specification, are to be tested as per the methods outlined in IS: 101-as applicable):


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3.1 Two-component polyurethane based Paint

- 3.1.1 **Spray coating:** A coating thickness of 1.5 to 2mm is required in single coating (wet on wet) with airless equipment at 100-200 bar pressure with suitable nozzle sizes. Formation of bubbles or foam on the paint surface after application of paint is not permitted.
- 3.1.2 **Adhesion:** The paint coating shall have excellent adhesion to stainless steel substrate sand-blasted to Sa 2 ½ and shall have adhesion strength of 4 N/Sq mm (minimum) when tested as per ASTM -D-4541.
- 3.1.3 **Thixotropic :** The paint coating must not sag when sprayed in coating thickness of 1.5 to 2 mm on a vertical surface.
- 3.1.4 **Drying time:** The paint coating must be tack dry within 3 hours and hard dry within 48 hours of application at room temperature.
- 3.1.5 **Coverage:** The paint formulation must give a minimum of 0.38 sq. m/kg for coverage of 2 mm coating on flat surface.
- 3.1.6 **In service Temperature Range up to 110 ° C**

		Component A	Component-B	Mixture
3.1.7	Viscosity	Viscous fluid	Liquid	Liquid
3.1.8	Density (g/cm ³)	1.3 ± 0.1	1.2± 0.1	1.25± 0.15
3.1.9	Flashpoint	above 100 ° C	above 200 ° C	--
3.1.10	Ignition temperature	above 350° C	above 400 ° C	--
3.1.11	Residue on ignition 1 hour 600 ° C	33%±3	<1%	25%±3

3.1.12 The surface shore hardness (shore A) of the paint coating shall be greater than 50.

4.0 Fire properties:

The paint coat shall confirm to R2, HL2 category when tested by EN 45545 as tabulated below:

Table-1


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Fire & Smoke characteristics	R2, HL2	EN 45545-2 (Table 5)
a) Lateral spread flame CFE (Minimum)	13 kW/m ²	ISO-5658-2
b) Smoke generation D _s (4) (Max)	300 Dimensionless	EN ISO:5659-2 : 50 kW/m ²
c) Smoke generation VOF ₄ (Max)	600 min	EN ISO:5659-2 : 50 kW/m ²
d) Gas analysis in smoke chamber using FTIR technique CIT _G (4) (Max)	0.9 dimensionless	EN ISO:5659-2 : 50 kW/m ²

5.0 Sound insulation/dampening:

The sound insulation measure of uniformly sprayed 1.5 to 2mm layer of paint on 2mm steel plate must be minimum 31dB as per DIN52210 Part-1/ ISO 10140-2/ ASTM- E-90.

OR

The following sound insulation parameter shall be fulfilled when test sample is prepared as per EN ISO 6721-1 on steel panel.

Table-2

Description	Test Frequency	Loss Factor (min)	Test
Dampening Loss factor at 20°C	200 Hz	0.19	DIN EN ISO 6721-3 (thickness ratio coating to steel 2:1)

6.0 Corrosion prevention: There shall be no sign of corrosion/ deterioration for 7 days when tested as per IS: 101-88 (Part 6 Sec-1).

7.0 Storage life: Minimum One year

8.0 Testing & prototype approval:

8.1 Tenderer shall submit following documents along with two test samples of minimum size 300X300 mm steel plate coated with paint (prepared in front of RCF representative) & 20 Liters paints for approval by CDE/RCF:

- Technical and material safety data sheet of the offered product.

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SPECIFICATION MDTs 076 Rev-03	SCHEDULE OF TECHNICAL REQUIREMENTS SOUND/DAMPENING INSULATING PAINT FOR ALSTOM- LHB DESIGN COACHES	PAGE 5 OF 6 Dated: 02.12.2016
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- Test certificate for Fire properties as per Table-1 conducted by International Lab. as per ISO/IEC-17025 (e.g. LAPI, Crepim, Exova Warringtonfire, BRE, AITEX, BASF, RST, Currenta, LNE).
 - Test certificate for sound dampening as per Table-2 from International Lab. / NABL accredited Lab. as per standard ISO/IEC-17025.
 - Test certificates from NABL Accredited Labs as per ISO/IEC-17025 each parameter described above.
 - Accreditation Certificate of testing Lab. as per ISO/IEC -17025.
 - Test certificates from NABL certified Labs for fire properties, sound insulation, coating thickness of paint without foam/bubble formation, adhesion strength, thixotropic , drying time, coverage area , density/ specific gravity, volume solid , viscosity, over coating time, shore hardness, in service temperature, flash point temperature(if applicable) , ignition temperature (if applicable) , residue on ignition (if applicable) & corrosion prevention properties , indicating compliance to all the test parameters.
- 8.2 After getting approval of above from RCF, the supplier must demonstrate conformity of the paint formulation to the application process on interior of one coach shell; within RCF premises using standard airless equipment, prior to bulk supply of the paint.
- 8.3 The bulk supply shall be undertaken only after the approval of application of paint on interior of prototype coach shell.
- 8.4 This clause is applicable for first supply of a supplier. However, RCF shall have the right to repeat prototype approval process in subsequent order also; in this regard RCF decision shall be final.
- 8.5 Quality audit inspection including paint application on coach shell, shall be done in every six months.
- 9.0 **Application process & testing requirement for supplier during Bulk Supply :**
- After getting the prototype approval of paint on the coach, the supplier shall install following application and testing facilities at RCF for bulk supply and un-interrupted application of paint:
- 9.1 The supplier shall install at least two no. each of portable air compressor and portable two-component airless spray equipments with all accessories suitable for application in working condition.
 - 9.2 The supplier shall have calibrated testing equipment available with the application team to check parameters e.g. coating thickness, adhesion strength, thixotropic , drying time, coverage area & shore hardness to check these values on coach painted surface.
 - 9.3 **Identification Marking :** The supplier shall fix metallic sticker on each interior coach shell painted mentioning name of supplier, PO no and it's date, lot no. and

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month & year of painting. These stickers shall not be visible to passengers and shall be easily traceable during POH.

9.4 The supplier shall clearly mark single/two components, supplier name , PO no and date, lot no, container serial no , container capacity, date of manufacture of paint and storage instruction on each containers. The supplier must keep of following records for traceability for al least six years:

- Name of supplier
- PO no and date
- Date of coach painting
- Coach shell number painted .
- Type of coach
- Qty of paint used
- No of container used and their capacity
- Lot no. and date of supply to RCF


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