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File No.: RBL-MD32221 Vol-I

Dated: 14.08.2025

**Sub:** Issue of specification No. MMDTS19041 Rev.03

Please find enclosed a copy of specification no. MMDTS19041 Rev.03 for Technical Specification For Bio Degradable, Oleophobic & Hydrophobic Organic Surface coating On Interior Surface for implementation.

**DA:** as above

  
(Shobhit Pratap Singh)  
Dy.CME/Design-II

Dy.CME/MP/Fur

Dy.CME/FP& Paint

Dy. CQM-II

Dy.CMM/M&P/Fur

Dy.CME/D-I

CCMT

WM/ Paint

ACMT

**Copy to:** for kind information please.


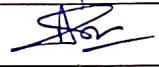


CDE

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Name	Designation	Signature	Date	Level
Harikesh Kumar	SSE / Design		14/8/25	Prepared
Sh. A. K. Agnihotri	SME /Design/Fur		14/8/25	Agreed
Sh. Shobhit Pratap Singh	Dy. CME / Design-II		14/8/25	Reviewed
Sh. D.K. Singh	CDE		14/8/25	Approved

Revision/Amendment	Details of Changes	Date
Amendment-1	Clause-5 (SN-20) of the specification deleted	01.06.2021
Rev-01	Eligibility criteria (Clause-3) deleted.	14.11.2022
Rev-02	<ol style="list-style-type: none"> <li>Exterior surface deleted from description of specification.</li> <li>All: Organic Surface coating was Organic Surface painting in description of specification, scope.</li> <li>Clause 1.1: application on "existing coaches" added and external part deleted from scope.</li> <li>Clause 1.2: application on "taps, sink" and 'It should be suitable for application by Spray/dipping roller/wipes' added and '&amp; reduce BOD below 100ppm' deleted from scope.</li> <li>Clause 3: COMPOSITION: b) Organic polysilazane Si-N-Si and Si-O-Si structure base coating added.</li> <li>Clause 4: <ul style="list-style-type: none"> <li>'100% invisible, 200% flexible' modified to 'transparent, colourless more flexible'.</li> <li>Temperatures ranging from -10<sup>0</sup> C to 60 <sup>0</sup>C was -90<sup>0</sup> C to 120 <sup>0</sup>C.</li> <li>Painting protects surface from, Dirt – Grim 'post complete curing time' added.</li> <li>Organic Quartz sand SiO<sub>2</sub> 'or Organic polysilazane Si-N-Si and Si-O-Si structure' added in clause 4.</li> </ul> </li> <li>Clause 4 (table-1): have following changes. <ul style="list-style-type: none"> <li>Finish (Sr. no.3): 'matt' deleted</li> <li>Colour (Sr. no.4): 'Colourless' added</li> <li>DFT (Sr. no.5): '(≥5) micron' was '(3-6) microns'.</li> <li>Textile Painting(Sr. no.6):</li> </ul> </li> </ol>	01.01.2024

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	<p>b) Oleo phobic (Oil Repellence) test (on fabric &amp; Rexine) as per AATCC 118 added.</p> <ul style="list-style-type: none"> <li>Scratch hardness (at 1.5 Kg. load)(sr. no.7): 'No such scratch so as to show base metal' as per 'IS: 101-88 (Part 5/ Sec. 2), Reaffirmed 2019' added as optional test requirement.</li> <li>'Keeping Properties' modified as 'Keeping Properties/Shelf life' (Sr.12): method of test changed to 'Appendix-II of RDSO specification no. M&amp;C/PCN/127/2020'.</li> <li>Spreading &amp; Covering surface area Capacity, min.(Sr. no.13): <math>\geq 5</math> microns, 60 sq. m /litre</li> <li>Storage Life at <math>27 \pm 2^\circ\text{C}</math> min. (Sr.15): Storage Life property deleted.</li> <li>Abrasion Resistance test (Sr. 18): Typographical error '1000 hours' changed to '1000 cycle'.</li> <li>Gloss at <math>60^\circ</math> angle of incidence (Sr. no.20): Gloss value "even after 36 months from date of application" deleted.</li> <li>Anti-graffiti properties (Sr. no.21): Graffiti completely removed, and no marks of Edding 3000 should be left behind.</li> <li>Durability Test(Sr. no. 22) – Accelerated weathering test: QUV 4 hours and 4 hours Condensation alternatively, (750 hrs), Temp. 50 O C as per ASTM G154 Or Xenon Test for 2000 hrs), Temp. 50 O C, as per DIN53387 modified.</li> </ul> <p>8. Fire properties (Sr. no.23): Fire resistance test added</p> <p>9. Clause 5: Documents to be submitted along with offer added.</p> <p>10. Clause 6: have following changes: <b>Clause 6(i)</b> : 'Tenderer shall submit test certificate of parameters( Table -1 of clause 4) of specification from: (a) Any NABL accredited lab (in-house or outside) having tests &amp; test method mentioned in Table-1 of clause 4 in its scope of accreditation from NABL or NTH/NPL. Test report must contain NABL logo/seal, in case reports are submitted from NABL accredited lab. (b) In case, there is no NABL accredited lab is</p>	
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	<p>available in India or NTH/NPL, for some of the tests (with test method mentioned in the specification), in such cases, any government's lab in India report will be acceptable for those tests.</p> <p>These tests shall be done during initial approval, change of design and change of manufacturing process or raw material. The submitted test reports submitted during prototype approval shall not be more than Two (02) years old from the date of tender opening. In absence of any of above details for offered product, the offer would not be considered' modified.</p> <p>Clause 6(v): 'Hydrophobic and Oleophobic properties to be checked visually during application of coating at MCF' added.</p> <ol style="list-style-type: none"> <li>11. Clause 6: (v) Hydrophobic and Oleophobic properties to be checked visually during application of coating at MCF added.</li> <li>12. Clause (7): type tests and acceptance test added in clause 7.</li> <li>13. Clause (9): List of Machineries &amp; plant and Material storage area added in clause 9.</li> <li>14. Field trial requirement added as clause 10: Performance test plan added as Annexure-I.</li> <li>15. All Clause numbering updated accordingly.</li> </ol>	
Rev-03	<ol style="list-style-type: none"> <li>1. <b>Clause no.4:</b> Sr. 1, 5, 9, 13 &amp; 19 of table-1 modified.</li> <li>2. <b>Clause no.5:</b> Documents to be submitted along with offer/bid updated &amp; elaborated.</li> <li>3. <b>Clause no.6:</b> Prototype approval updated &amp; elaborated.</li> <li>4. <b>Clause no.8:</b> Testing facilities added and list of Machineries and plant updated.</li> <li>5. <b>Clause no.9:</b> Clause for Quality assurance, test &amp; documents updated &amp; elaborated.</li> <li>6. <b>New clause:</b> Clause no.10 added.</li> </ol>	14.08.2025

  
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## 1. SCOPE:

- 1.1 This specification provides the general and technical requirement for supply and application of the Organic Surface Coating on Painted surface, Glass, non-painted surfaces, toilets, floors, walls and common areas including seats & berths for newly build & existing coaches (internal areas) in Indian Railways.
- 1.2 This specification covers requirements of Organic surface coating to be used on interior painted, non-painted surfaces (window glass, door, doors handle), internally on Toilets (wall panels, hand basin, mirrors, and floor area), sidewall panels, floor, partition wall, Gangway area, taps, sink and Seats & berths. The Organic surface coating provides an impermeable, hydrophobic & oleophobic barriers to prevent the coach structure from loss of Gloss, food safe protection, dust, corrosion, abrasion, paint fading, avoid accumulation of water dampness, assets saving, avoid water hardness damage. And at the same time provides aesthetically pleasing surface contributing to improve easy to clean property with huge water saving. Cleaning agent to be used for cleaning shall be pH neutral. The application of the organic surface coating in coaches is to be carried out by the supplier. It should be suitable for application by Spray/dipping roller/wipes.

## 2. PURPOSE:

Organic Surface Painting is to be used as anti-graffiti property & a protective hydrophobic & oleo phobic layers on all the interior coach surfaces. Also, while application there is no harm to the applicator and environments as the Organic Surface coating is human safe, inhalation safe, skin safe, Biodegradable, environment friendly.

## 3. COMPOSITION:

- a) Organic Surface Painting schemes comprises of 3 sub system:
  - ii. Quartz Sand Based Organic Hard Surface Painting
  - iii. Quartz Sand Based Organic Painted Surface Painting
  - iv. Organic Textile/Soft Surface Painting

Or
- b) Organic polysilazane Si-N-Si and Si-O-Si structure

## 4. Technical Specification of Organic Surface Painting (Interior):

General properties of the organic surface painting are that it should be transparent & colourless, more flexible, Water or any oil-based liquid is unable to penetrate the coated surface, should resists acid and alkali, withstand extreme temperatures ranging from  $-10^{\circ}\text{C}$  to  $60^{\circ}\text{C}$ , abrasion resistant.

- Liquid layering is perfected for painting any surface: Hard, Soft, Absorbent & Non-absorbent.
- Painting protects surface from, Dirt – Grim post complete curing time.
- Organic Quartz sand  $\text{SiO}_2$  or Organic polysilazane Si-N-Si and Si-O-Si structure forms the main basis.
- It should be 100% eco-friendly.
- It is human safe.
- It should be suitable for painting almost any surface like Plastics, Stone / Brick / Cement, Wood, Metal, Trains, Engine, Automobiles / Marine etc.

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**Table-1**

SN	Characteristics	Requirements	Method of test
1.	Drying time at 25±2°C a. Surface dry, max b. Curing time, max.	1 hrs 12 hrs.	IS: 101-86 (Part 3/ Sec. 1), Reaffirmed 2017 or latest
2.	Consistency	Smooth, uniform and suitable for sponge/air-less spray / spray/dipping roller /wipes.	IS: 101-89 (Part 1/ Sec.5), Reaffirmed 2019 or latest
3.	Finish	Smooth and glossy, free from sagging & wrinkling	IS: 101-87 (Part 3/ Sec. 4), Reaffirmed 2019 or latest
4.	Colour	Transparent & Colourless	IS: 101-89 (Part 4/ Sec. 2), Reaffirmed 2021 or latest
5.	Dry film thickness per coat, min., by Spray /dipping roller/wipes	3-6 microns	IS: 101-89 (Part 3/ Sec. 2) Reaffirmed 2019 or latest/ ASTM D7091/ by DFT gauge
6.	Textile Painting a)Hydrophobic test  b) Oleo phobic (Oil Repellence) test (on PVC and REXINE)	Pass  Pass	a)ASTM D7017 (latest version)  b) AATCC 118 (latest version) (PVC Sheet to be as per RDSO/2006/CG-12 ,latest version and REXINE to be as per RDSO/2008/CG-07, latest version)
7.	Scratch hardness (at 1.5 Kg. load)	No such scratch so as to show base metal AND 6-9H	IS: 101-88 (Part 5/ Sec. 2), Reaffirmed 2014 or latest AND Pencil hardness as per ASTM D3363 (latest version)
8.	Flexibility & Adhesion (6.25 mm mandrel)	No visible damage or detachment of film	IS: 101-88 (Part 5/ Sec. 2), Reaffirmed 2014 or latest/ ASTM D522
9.	Flash Point	Above 25 °C	IS: 101-87 (Part 1/ Sec. 6), Reaffirmed 2019 or latest
10.	Resistance to salt spray	No sign of corrosion & no sign of deterioration up to 3000 hours	ASTM B -117/2019 or (latest version)
11.	Protection against	No sign of corrosion & no	IS: 101-88 (Part 6 /Sec. 1).

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	corrosion under condition of condensation	sign of deterioration up to 2500 hours	Reaffirmed 2015 or latest
12.	Keeping Properties/Shelf Life	Not less than 36 months	Appendix-II of RDSO specification no. M&C/PCN/127/2020
13.	Spreading & Covering surface area Capacity, Min. 3-6 microns	60 sq. m /litre(Min.)	Appendix-I of RDSO specification no. M&C/PCN100/2018.
14.	Resistance to chemicals On 1) 25% caustic soda solution (w/v) 2) 30% (V/V) H <sub>2</sub> SO <sub>4</sub>	Shall not show any sign of cracking, dislocation, blistering, wrinkling and peeling or softening of paint film	For 24 hours, IS: 101-89 (Part 7 /Sec. 2) Reaffirmed -2020 or latest
15.	Mass in kg/10 litres, min.	10.9	IS: 101-87 (Part 1/ Sec. 7) Reaffirmed -2020 or latest
16.	Impact resistance test,	height 31 Inch, load 6.45 pound = (200 Inch pound load)- shall be free from cracking in the deformed painting by dropping the indenter on coated side of test panel	ASTM 2794-93
17.	Resistance to distilled Water	Shall not show any sign of blistering, wrinkling and peeling or softening of paint film	Resistance to tap or raw water for 3000 hrs, IS: 101-90 (Part 7/ Sec.2) Reaffirmed -2005 or latest
18.	Abrasion Resistance test	Shall be "Max. Loss=0.050 gms" with 1000 cycle with CS-17 wheel & 1 kg load shall be max. loss=0.050gms) As per ASTM D-4060	ASTM D-4060 (latest version)
19.	Gloss at 60° angle of incidence	70 unit (Min.) on painted metals/ maintained original gloss	IS: 101-88 (Part 4/ Sec.4) Reaffirmed -2020 or latest version
20.	Anti-graffiti properties	Graffiti completely removed, and no marks of Edding 3000 should be left behind.	ASTM D-6578/13 (latest version)
21.	Durability Test – Accelerated	Rating scale Chalking	(0-10) 10

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	weathering test: QUV 4 hours and 4 hours Condensation alternatively, (750 hrs), Temp. 50 °C as per ASTM G154- (latest version) Or Xenon Test for 2000 hrs), Temp. 50 °C, as per DIN53387 (latest version)	Checking Cracking Flaking Blistering Peeling Spotting	10 10 10 10 10 10
22.	Fire properties	R1, HL3	ISO: EN45545 part-II (latest version)

**5. Documents to be submitted along with offer/bid:**

- i. Supplier/OEM as per Rev.02 or latest of this specification shall submit clause wise comments on the specification for compliance and deviation (if any).
- ii. Supplier/OEM shall submit test certificate of parameters( Table -1) of specification of MMDTS19041 Rev.1, 2 or latest from:
  - a) Any NABL accredited lab (in-house or outside) having tests & test method mentioned in Table-1 of clause 4 in its scope of accreditation from NABL or report from NTH/NPL. Test report must contain NABL logo/seal, in case reports are submitted from NABL accredited lab.
  - b) In case, there is no NABL accredited lab is available in India for some tests (with test method mentioned in the specification) and the test facility for same tests (with test method mentioned in the specification) are also not available with NTH/NPL, then for those tests, any government's lab/ Government recognized lab for such test in India report will be acceptable.
  - c) In rare case, when test facilities are not available as per (a) & (b) of this Para above, test certificate from NABL accredited lab not having tests &/ or test method mentioned in Table-1 of clause 4 in its scope of accreditation from NABL shall be acceptable, subject to prior approval of the purchaser for such specific tests. However, such labs must have NABL accreditation for ISO/IEC 17025. For such rare cases, self declaration shall be submitted by the supplier/bidder to the effect that test facilities for such specific test not available as per (a) & (b) of this para above. The self declaration in this regard, if found false/fake/forged/manipulated at any stage during evaluation of offers then purchaser reserves the right to summarily reject the offer or if found false/fake/forged/manipulated after placement of PO then action as per provision of contract regarding submission of false/fake/forged/manipulated documents will be taken.

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

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- iii. The submitted test reports along with offer shall not be more than three (03) years old from the date of tender opening.

**Note:** Tenderer should be either OEM or an authorized dealer of the OEM and should submit tender specific authorization certificate as proof along with contact details (address, phone no., fax no., e-mail) of OEM along with the offer.

**6. PROTOTYPE APPROVAL:**

The Firm shall supply a sample along with the following details at the time of prototype testing as per PO or as per applicable guideline:

- Supplier shall submit test certificate of parameters( Table -1 of clause 4) of this specification from:
  - Any NABL accredited lab (in-house or outside) having tests & test method mentioned in Table-1 of clause 4 in its scope of accreditation from NABL or report from NTH/NPL. Test report must contain NABL logo/seal, in case reports are submitted from NABL accredited lab.
  - In case, there is no NABL accredited lab is available in India for some tests (with test method mentioned in the specification) and the test facility for same tests (with test method mentioned in the specification) are also not available with NTH/NPL, then for those tests, report from any Government's lab/any Government recognized lab for such test in India will be acceptable.
  - In rare case, when test facilities are not available as per (a) & (b) of this Para above, test certificate from NABL accredited lab not having tests & test method mentioned in Table-1 of clause 4 in its scope of accreditation from NABL shall be acceptable, subject to prior approval of the purchaser for such specific tests. However, such labs must have NABL accreditation for ISO/IEC 17025. For such rare cases; self declaration shall be submitted by the supplier/bidder to the effect that test facilities for such specific test not available as per (a) & (b) of this para above. The self declaration in this regard, if found false/fake/forged/manipulated at any stage after placement of PO then action as per provision of contract regarding submission of false/fake/forged/manipulated documents will be taken.
- Material and Safety date sheets.
- The samples supplied to be coated by Organic Surface coating and shall be visible to naked eye to determine the actual process of application.
- The bulk manufacturing shall be undertaken only after approval of Prototype. This clause of Prototype approval is applicable for the first supply by new firm as well as in case of change of design and change of manufacturing process or raw material.
- Hydrophobic and Oleophobic properties to be checked visually during application of coating at MCF.

**7. WARRANTY:**

Coaches applied with Organic Surface Painting shall be deemed to bear warranty against defective material and painting shall withstand minimum period of 36 months (thirty-six months) from the date of application. Any sign of chalking, checking, cracking, flaking, blistering, peeling off, spotting etc would be considered as warranty failure.

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## 8. List of Machineries and plant:

### A. Machinery and Equipments :

1. Reaction Vessel (at least 01 no.)
2. Intermediate vessel (at least 01 no.)
3. Isolation equipment (at least 01 no.)
4. Finished goods vessel (at least 01 no.)
5. Filling & Packaging machine (at least 01 no.)
6. Air Handling and filtering unit with humidity control (at least 01 no.)
7. Heating & cooling media for reaction & intermediate vessels (at least 01 no.)
8. Inert gases storage tank and cylinder (at least 01 no.).

### B. Material storage area

1. Raw material storage area = Well ventilated & covered.
2. Intermediate WIP (Work in Process) material storage area = Well ventilated, temperature controlled with HVAC.
3. Finished goods storage area = Well ventilated, temperature controlled with HVAC.
4. Inspection & Quality control well ventilated, temperature controlled with HVAC.

### C. Testing facilities:

1. Dry time recorder (at least 01 no.)
2. DFT gauge (at least 01 no.)
3. Gloss meter (at least 01 no.)
4. Weighing machine (at least 01 no.)
5. Electronic balance (at least 01 no.)
6. Automatic scratch hardness testers (at least 01 no.)
7. Flexibility & Adhesion apparatus (at least 01 no.)
8. Salt spray chamber (at least 01 no.)
9. Corrosion chamber (at least 01 no.)
10. Impact tester (at least 01 no.)
11. Abel flash point apparatus (at least 01 no.)
12. Taber type abrasion tester (at least 01 no.)
13. QAV/Xenon arc chamber (at least 01 no.)

Note: This clause no. 8 of this specification shall be effective for tender opening date after (9) month from the date of issue of this specification MMDTS 19041 Rev-03.

## 9. Quality Assurance, test & document:

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 respective PU. The QAP document shall clearly document the following and control the test record formats.	The QAP shall be submitted in PDF as per MCF format (Annexure-A)

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	<ol style="list-style-type: none"> <li>1. Control over outsourced products and processes</li> <li>2. Testing of raw material and establishing its traceability</li> <li>3. Sampling Plan</li> <li>4. Type Tests</li> <li>5. Acceptance tests</li> <li>6. Raw Materials</li> </ol>	
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. These tests are to be repeated as detailed in prototype approval process after every 36 months or as specified as quality control measure.</p> <ul style="list-style-type: none"> <li>• Resistance to salt spray</li> <li>• Protection against corrosion under condition of condensation</li> <li>• Resistance to distilled Water</li> <li>• Durability Test</li> <li>• Textile painting</li> <li>• Fire and smoke characteristics as per EN 45545-2, R1, HL3 (item no. 22 of table-1 of Para 4).</li> </ul> <p>However, if the consignee or inspecting agency desires to do the type tests, before 36 months, the supplier should not deny the same. There are various circumstances when type tests may be needed before three (03) year of last type tests.eg:</p> <ul style="list-style-type: none"> <li>• In case of doubt in type test certificate. (Previous)</li> <li>• Complaint regarding type test certificates.</li> <li>• Failure of material attributable to any of the parameters covered in type tests, etc.</li> </ul> <p>Moreover, during type test, all tests, listed in acceptance tests shall also be conducted.</p>	<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>Following tests shall be considered as acceptance tests:</p> <ul style="list-style-type: none"> <li>• Drying time</li> <li>• Consistency</li> <li>• Finish</li> <li>• colour</li> <li>• Dry film thickness</li> </ul>	<p>These shall be conducted by the consignee or their authorized agency prior to dispatch.</p> <p>All infrastructures required to enable acceptance tests shall be provided by the bidder / OEM.</p>

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	<ul style="list-style-type: none"> <li>• Scratch hardness</li> <li>• Flexibility &amp; Adhesion</li> <li>• Flash Point</li> <li>• Spreading &amp; Covering surface area Capacity</li> <li>• Resistance to chemicals</li> <li>• Mass in Kg/10 litre</li> <li>• Impact resistance test,</li> <li>• Abrasion resistance</li> <li>• Gloss at 60° angle of incidence</li> <li>• Anti graffiti test</li> </ul> <p>Documents for satisfactory Type test with above detailed periodicity &amp; validity shall also be checked during acceptance test &amp; enclosed with acceptance test documents.</p> <p>Documents for satisfactory audit report as per para no. 10 of this specification shall be checked &amp; enclosed as part of acceptance test. This audit report should be valid as per periodicity of audit required in para no. 10 of this specification.</p>	<p>The records of the acceptance tests shall be enclosed along with the supply consignment. These records shall be traceable and verifiable.</p>
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**Note:** Supplier shall submit test certificate of parameters (Table-1 of clause 4) of specification for Type Tests and Acceptance tests from:

- Any NABL accredited lab (in-house or outside) having tests & test method mentioned in Table-1 of clause 4 of specification in its scope of accreditation from NABL or report from NTH/NPL. Test report must contain NABL logo/seal, in case reports are submitted from NABL accredited lab.
- In case, there is no NABL accredited lab is available in India for some tests (with test method mentioned in the specification) and the test facility for same tests (with test method mentioned in the specification) are also not available with NTH/NPL, then for those tests, report from any Government's lab/any Government recognized lab for such test in India will be acceptable.
- In rare case, when test facilities are not available as per (a) & (b) of this Para above, test certificate from NABL accredited lab not having tests & test method mentioned in Table-1 of clause 4 in its scope of accreditation from NABL shall be acceptable, subject to prior approval of the purchaser for such specific tests.

However, such labs must have NABL accreditation for ISO/IEC 17025. For such rare cases; self declaration shall be submitted by the supplier/bidder to the effect that test facilities for such specific test not available as per (a) & (b) of this para above. The self declaration in this regard, if found false/fake/forged/manipulated at any stage after placement of PO then action as per provision of contract regarding submission of false/fake/forged/manipulated documents will be taken.

#### 10. Process audit requirement(in every 3 years):

Audit of OEMs for manufacturing & testing activities of material will be done by M/s RITES or any agency authorized by concerned PU in every 3 years.

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It shall be responsibility of OEM to get audit done by M/s RITES or any agency authorized by concerned PU at its own cost.

Auditor will audit manufacturing & testing process at premises of the supplier. During audit, all tests (facilities which are available in premises of supplier) shall be conducted as per specification & shall be made part of the report. However, auditor shall pick & send sealed sample to labs as detailed in Note of Para 9 of this specification for testing of all parameters in Table-1. Reports of tests from labs shall also be made part of audit report.

However, provisional audit report, if required, may be issued meanwhile, once, with validity period of maximum of 3 months, before receiving reports from labs. In case of issuance of provisional report, final report must be issued as soon as lab reports are received, as provisional audit reports can be valid maximum up to 3 months only. CCA /Audit report from any of PUs (RCF/ICF/MCF) will be considered for the purpose of compliance of this clause.

**Note:** This clause no. 10 of this specification shall be effective for tender opening date after (9) month from the date of issue of this specification MMDTS 19041 Rev-03.

## 11. Field Trial

1. Performance report from field is required as per annexure-I.

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#### Annexure-I

**Performance test plan for Biodegradable, Oleo phobic & Hydrophobic Organic Surface coating on Interior Surface of LHB coach.**

Test parameters during the warranty period after coating (after 3 months, 12 months, 24 months basis) and location for testing is wash basin outside, wash basin & pan of lavatory in lavatory(both side), partition pillar, Floor, Mirror of sidewall , seat & berth (middle cabin) , Floor of doorway & Gangway(Both side):

S.N	Properties	Observation
1.	<b>Method of coating the surface(at time of 1<sup>st</sup> application):</b> <ol style="list-style-type: none"> <li>The Coating must be spread evenly and smoothly, to get the layer of coating to settle accordingly.</li> <li>The layer of coating may be colourless and transparent appears on the surface which shows, that coating is stick to the surface and its curing.</li> <li>Test to be made immediately after 1 hour of the coating spread. The curing time is 24 hours after the coating and coach can move out.</li> <li><b>Hydrophobic</b> test can be done by dropping the water droplets on the coated surface, if the water droplets start running without leaving any mark behind, means the coating is start giving the required effect as claimed</li> <li><b>Oleo phobic</b> test can be done by dropping the oil &amp; grease on the coated surface, if the oil &amp; grease cleaning with wet cloth without leaving any mark behind, Means the coating is Oleo phobic</li> <li><b>Colour Test:-</b> The applied coating should be Transparent and colourless (i.e. it should not acquire colour upon application on the surface)</li> </ol>	
2.	<b>Test to be done after 3/12/24 months:</b>	<b>Observation (3/12/24months)</b>
I.	<b>Easy to clean test:</b> The dirt doesn't stick to the coated surface.	
II.	<b>Abrasion Test:</b> The coating should not crack or shrink.	
III.	<b>Anti-graffiti properties:</b> Graffiti completely removed and no marks left behind. <ul style="list-style-type: none"> <li><b>Graffiti test shall be done with EDDING 3000.</b></li> </ul>	
IV.	<b>Durability test:</b> <ol style="list-style-type: none"> <li>No cracking</li> <li>No blistering</li> <li>No spotting</li> <li>No peel off</li> </ol>	
V.	<b>Hydrophobic</b> test can be done by dropping the water droplets on the coated surface, if the water droplets start running without leaving any mark behind, means the coating is start giving the required effect as claimed	
VI.	<b>Oleo phobic</b> test can be done by dropping the oil & grease on the coated	

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surface, if the oil & grease cleaning with wet cloth without leaving any mark behind, Means the coating is Oleo phobic	
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MCF QAP format (Annexure-A)

## Name of the firm

Head Office Address	Manufacturing Unit Addresses	Add more columns if more required
ABC XYZ STATE with PIN  Telephone: Mobile: Email:	ABC XYZ STATE with PIN  Telephone: Mobile: Email:	

PL Number of the item	
Description of the item	
Specification/Drawing number of the item	
Purchase order number with date	

Date of submission of QAP: DD.MM.YYYY

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
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# ANNEXURE-I

QAP	PL Number & Item Description	Internal Doc. No.	Revision
Name of the firm		ABCD-1234	XX

## Index of QAP

1	Company Profile	3
2	Certificates and Essential Documents	3
3	Process Flow Chart/Installation Flow Chart	3
4	Details of Procurement - Raw material/Components/Sub-assemblies	3
5	Inspection Procedure	4
6	Rejection Handling Plan	4
7	Tool and Machine Calibration Plan	4
8	Requirement of Qualified/Experienced Personnel as per Specification	5

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#### ANNEXURE-I

QAP	PL Number & Item Description	Internal Doc. No.	Revision
Name of the firm		ABCD-1234	XX

#### 1. Company Profile (Maximum 250 words)

May include brief history, date of setup, founders, products/services, organization chart, article of association of the company as per companies act, 1956.

#### 2. Certificates and Essential Documents

Clear images/scans of factory license and ISO certifications (9001, 14001, others). Please ensure that the text is legible.

#### 3. Process Flow chart/Installation Flow Chart

Description of manufacturing process

- Process flow chart indicating various stages/activities of manufacturing process for an individual product, with quality control points
- Details of manufacturing & testing processes to comply specification(s)

Sl. No.	Clause	Requirement of manufacturing process as per specification	Process details to comply the specification requirements



#### Note

- Process flow chart shall indicate all the operations involving procurement, handling, manufacturing, & testing of the product from raw material to finished product, including RDSO/RITES/Consignee inspection/dispatch.
- There should be a separate flow chart for each item.

#### 4. Details of Procurement - Raw material/Components/Sub-assemblies

##### A. Details of components/sub-assemblies manufactured in-house

Sl. No.	Item Name	Drawing No	Material Grade	Source of Raw Material

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#### ANNEXURE-I

QAP	PL Number & Item Description	Internal Doc. No.	Revision
Name of the firm		ABCD-1234	XX

#### B. Details of components/sub-assemblies purchased from approved sources of ICF/MCF/RCF/RDSO

Sl. No.	Item Name	Drawing No	Material Grade	Source (Firm name & Address)

#### C. Details of outsourced/imported items

Sl. No.	Item Name	Drawing No	Material Grade	Source (Firm name & Address)

#### 5. Inspection Procedure



Provide the inspection process followed at the firm for subject item(s). It may include stage inspections where critical parameters are inspected before sending to the next stage, material composition test when the material is received from an outside agency, inspection of material properties and critical dimensions at the time of final dispatch to Indian Railways units. Kindly provide details in the following format.

Sl. No.	Type of inspection Raw material or Incoming product/ Assembly or Stage/Final dispatch of the item to consignee	Sample Size & its Frequency of inspection	Inspection parameter	Mode of inspection/ Test equipment used	Criteria or limits of acceptance	Record of inspection maintained at Register No./Computer file name & address

**Note:** Provide internal inspection dimensional/material checklists for raw material, stage assembly, final assembly, as annexure.

#### 6. Rejection Handling Plan

Rejections are part and parcel of any manufacturing process and can occur at any stage. It is essential to have a clear plan to handle the rejections due to various reasons. In a few situations, rework may be done to correct the workpieces. In others it might not be feasible and/or recommendable. A rejection handling plan clarifies the rejection criteria and further required processing for rework or scrapping. Analyzing rejects is a key component to improve the efficiency and quality of the output.

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#### ANNEXURE-I

QAP	PL Number & Item Description	Internal Doc. No.	Revision
Name of the firm		ABCD-1234	XX

Kindly provide the details of handling rejection of work-in-process (WIP) and recording such incidents.

#### 7. Tool and machine calibration plan

The machines, tools, fixtures, jigs, gauges, and instruments used for manufacturing, testing, and inspection should be regularly calibrated to ensure that they are accurate for their intended use. A schedule of calibration for all the essential machines, tools, gauges, and instruments may be planned by taking into account both usage rate and that machine's particular maintenance needs. Kindly provide details in the following format.

Sl. No.	Name and ID of Tool/Machine/Gauge/Instrument	Make and Model Number	Range/Capacity	Frequency of calibration	Due date of calibration	Record of calibration maintained at Register No./Computer file name & address

#### 8. Requirement of Qualified/Experienced Personnel as per Specification(s)

Details of qualification/experience of the quality control personnel specified in the relevant STR/MDTS/Specification for the items to be manufactured may be provided in the following format.

Sl. No.	Specified Requirements		Details of Personnel Employed			
	Clause number with specification details	Qualification/Experience	Name	Designation	Technical Qualification	Experience

**Note:** Welding procedure specification (WPS), Welding Procedure Qualification Record (WPQR) and Welder Qualification Test Certificate (WTC) to be submitted wherever applicable.

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Note: "This QAP does not have any deviation from Purchase order" will be written on front page of QAP.

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