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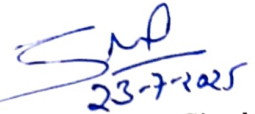
File No.: RBL-MD32221 Vol-I

Dated: 23.07.2025

Sub: Issue of specification No. MMDTS18034 Rev.05.

Please find enclosed a copy of specification no. MMDTS18034 Rev.05 for Technical specification for PU Based Wet-On-Wet applicable Exterior Painting System for LHB Type Coaches 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

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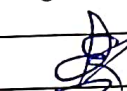



CDE

CPLE

CMM/Fur

CWE/Fur

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Name	Designation	Signature	Date	Level
Harikesh Kumar	SSE / Design		23/7/25	Prepared
A.K. Agnihotri	SME /Design/ Fur		23/7/25	Agreed
Shobhit Pratap Singh	Dy. CME / Design-II		23/7/25	Reviewed
D. K. Singh	CDE		23/7/25	Approved

Issue/Rev.	Details of changes	Date
01	a) 'Developmental specification' added in Description of specification. b) Para 5 (PO shall be placed on minimum three firms and the quantity of failing or defaulter firm shall be transferred to the remaining firms.) deleted.	18.01.2019
02	a) Para 2 added to include list of documents to be submitted with offer. b) Antigrffiti clear coating & Ant graffiti test added. Para 3(sr. no. III & X). c) Elastified application on "whole interior" of Non-AC coaches deleted. Para 7 (Sr. no. 4). d) Total Painting cycle time reduced from 38 hrs 30 min. to 30 hrs, Anti-graffiti coating added, activity time deleted. Para 7(sr. no.10). e) "Facility Paint drying with Oven" deleted. Para 7). f) Over all DFT change from 300 to 350 microns. Para 3 (sr. no. IV)	13.05.2019
03	a) "Developmental" deleted from description of specification. b) Para 7(sr. no. 2): specification for Adhesion promoting primer MDTs-48279 Rev01 may be read as MDTs48279 Rev-01 instead of rev-02. c) Para 7: Exterior letter to MDTs156 rev-5 deleted from.	29.05.2019
04	a) Point no. II modified and note no. II added a.(para-2). b) Unsaturated added in putty. c) test method and DFT Anti graffiti coating added, requirement of weathering modified(para.3) d) Para-7(Sr. no. 9) modified.	12.07.2019
05	1. Clause no. 2: 'Documents to be submitted along with offer/bid' updated. 2. Clause no.3: Sr.III, IV, V, VIII, IX, X, XI, XII, XIII, XIV, XV, XVI & XVII modified for application of PU clear coat & Anti-graffiti coating. 3. Clause no. 4: modified. 4. Clause no. 6: Prototype approval process elaborated. 5. Clause no. 7: Painting sequence and detailed activities involved elaborated. 6. New clause: Quality Assurance, test & documents (clause no. 8), Process audit requirement (in every 3 years)(Clause no. 9) and List of Machineries & plant and testing facilities(Clause no. 10) added.	23.07.2025


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1. Scope:

This specification covers the performance requirements of complete coach painting system based on Epoxy cum Polyurethane Painting System (Two Pack) for LHB coaches. Complete painting of coach as per this specification has to be completed in around 32 hours.

2. Documents to be submitted along with offer/bid:

- i. Supplier/OEM as per Rev.05 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 as per clause 3[Sr. no. III(b) to XIV, XVI to XVII] of specification from:
 - (a) Any NABL accredited lab (in-house or outside) having tests & test method mentioned in clause 3[Sr. no. III (b) to XIV, XVI to XVII] 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, report from any Government's lab/any Government recognized lab for such test in India 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 clause 3[sr. no. III(b) to XIV, XVI to XVII] 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 is not available as per (a) & (b) of 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 of 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.

- 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 of Epoxy Cum Polyurethane Painting system (Two Pack) for the Exterior Painting of Railway Coaches as per M&C/PCN/100/2018 Rev.02, amendment-1B or latest or an authorized dealer of the OEM. Authorized dealer 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.


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3. Performance of the offered painting system shall be gauged based on the following parameters:

S. No.	Parameters	Requirements	Test method
I.	Painting system Configuration	<ul style="list-style-type: none"> Painting system shall be wet on wet type with respect to surfacer and two coat top coats of specified colour schemes. Top Coat: Two component System <ul style="list-style-type: none"> Component-A: Enamel consisting of Oil free Polyacrylate Polyol + Pigments, solvents, additives. Component-B: Hardener consisting of Aliphatic Polyisocyanate + solvent. Surfacer: <ul style="list-style-type: none"> Component-A: As Base consist of polyol may be polyacrylate polyol + appropriate pigments, extenders, solvents and additives. Component-B: Hardener consisting of Aliphatic Polyisocyanate + solvent and additives. Putty: <ul style="list-style-type: none"> Component-A: An appropriate unsaturated polyester resin + pigments, extender, solvent and additives. Component-B: Hardener, organic peroxide + additives. 	Nil
II.	Top coat application	Top coat to be applied as wet on wet application basis after Surfacer coat. Without allowing dry time.	Nil
III.	a) PU clear coating (two pack)	DFT of PU clear coating shall be minimum 30 microns (single coat).	Nil
	b) Anti-graffiti	• Anti graffiti clear coat should be as	Nil

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	clear coating	<p>per M&C/PCN/127/2020, Rev.02.</p> <ul style="list-style-type: none"> Duly inspected Anti graffiti clear coat as per M&C/PCN/127/2020, Rev.02 shall be procured from regular supplier of this item to Indian Railways. Anti graffiti clear coat (as per M&C/PCN/127/2020, Rev.02) application to be done after completion of all furnishing activities including lettering, preferably under controlled atmosphere for better finish. 	
IV.	Dry Film thickness (DFT)	<ul style="list-style-type: none"> Adhesion Promoting Primer: 35 to 45 microns. Putty: As per requirement. Surfacer: Minimum 60 microns. Top coat: Minimum 70 microns in two coats. PU clear coat: Min. 30 microns (single coat) Anti-graffiti clear coating: 1-4 micron (Single coat) <p>Over-all DFT should not minimum 200 microns.</p>	<p>IS : 101-89(part.3/sec.-2) by Elcometer,</p> <p>DFT gauge</p>
V.	Weathering resistance	<p>QUV Weathering resistance OR</p> <p>Xenon Arc-ASTM D 6695- 2500 hrs on full system. Observations shall be as per Sr. no. 21 of Table 1 (M&C/PCN/100/2018) (on full system painted sample panel)</p>	<p>As per ASTM - G-154 Cycle2 for 1500 Hrs</p> <p>Xenon Arc-ASTM D 6695- 2500hrs</p>
VI.	Corrosion resistance	Corrosion resistance 500 Hrs shall be done on APP as per RCF specification MDTs 48279 Rev.04	ASTM-B-117-
VII.	Humidity resistance	1000 Hrs Humidity resistance shall be done on APP as per RCF specification MDTs 48279 Rev.04	ASTM D-2247-1000 hrs
VIII.	Cyclic Corrosion	Cyclic Corrosion shall be conducted (on full system painted sample panel)	ISO:11997-1 Cycle-A for 1000 Hrs
IX.	Distinctness of Image	Min. 85 unit ,measure by BKY wave scan (after application of PU clear coat & before anti graffiti clear coat)	ASTM D5767-17
X.	Anti-graffiti test	After application of anti graffiti clear coat, Passes scale level-5 with permanent marker when tested as per	ASTM D 6578

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		M&C/PCN/127/ 2020, Rev.02., table-1 (Sr. no. 14)(on full system painted sample panel)	
XI.	Chemical Resistance	30% H ₂ SO ₄ , 20% NaOH(on full system painted sample panel)	Test as per APPENDIX-V of RDSO specification no. M&C/PCN/ 100/2018
XII.	Abrasion Resistance	Max., 100 mg loss, 1000 cycle with CS-17 wheels, 1 Kg load. (on full system painted sample panel)	ASTM D4060
XIII.	Smoke & fire resistance	ISO EN 45545-2:2020, R7, HL3 (on full system painted sample panel)	ISO: EN45545-2:2020
XIV.	Gloss	<ul style="list-style-type: none"> Minimum 85 units at 60 degree, before application of PU clear coat. Minimum 95 units at 60 degree, immediately after being painting and drying of 72 hrs, after application of PU clear coat. After application of anti graffiti clear coat as per M&C/PCN/127/2020, Rev.02, Gloss value of PU top coat shall again be measured after drying of 8 hrs & it is to be 80 unit (Min.)(on Sidewall). Minimum 60 units at 60 degree after service life of 6 years. 	IS:101-88(Part-4/Sec.-4
XV.	Natural weathering (on full system painted sample panel)	<ul style="list-style-type: none"> Minimum 75 unit after 18month (SS-I) Minimum 70 unit after 36month ((SS-II)) Minimum 65 unit after 54 months Minimum 60 unit after 72 months (SS-III) 	Nil
XVI.	Total Painting Time allowed	32 Hrs (Max.)	Nil
XVII.	Allowed Time margin	Coach painting should be completed in specified time of 32 hrs. However, time limit of Max 6 hours extra is permitted in rare cases with valid reasons, and time taken beyond this extra time limit shall be calculated for penalty as per terms of PO.	Nil
XVIII.	Warranty on Paint life and gloss value	6 years minimum from the date of dispatch from MCF*	Nil

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(*) The gloss value should be measured maximum three months in advance to the service life of six years and it should not be less than 60 units.

Note: Testing shall be done on on full system painted sample panel means after application Adhesion promoting primer, Unsaturated Polyester putty, PU surface, PU full gloss top coat, PU clear coat and anti-graffiti clear coating.

4. In case of failure of the Paint with respect to gloss retention, premature failure in colour retention (colour fading) or patches/peel-off and blistering etc., the firm executing the supply and apply contract shall rectify the complaint free of cost, at the base depot of the affected coach as per convenience and requirement of the user Railway. This shall be carried out without affecting the exterior aesthetics of the coach. This repair shall be permitted only once in warranty period. If there is a repair requirement after this, the paint shall be treated as rejected during warranty period.
However, if reason for defacement of paint is on account of wrong maintenance/handling by depot or workshop of Indian railways, warranty obligation will not be acceptable.

5. The successful tenderer, executing supply and apply contract as per this specification, shall submit the process and sequence of various painting activities for approval from MCF/ICF/RCF before starting execution of the contract.

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:

- i. Supplier shall submit test certificate of parameters as per clause 3[Sr. no. III(b) to XIV, XVI to XVII] of specification from:

(a) Any NABL accredited lab (in-house or outside) having tests & test method mentioned in clause 3 [Sr. no. III (b) to XIV, XVI to XVII] 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.

(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, report from any Government's lab/any Government recognized lab for such test in India 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 clause 3[Sr. no. III (b) to XIV, XVI to XVII] 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 is not available as per (a) & (b) of 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.

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ii. Material and Safety data sheets.

iii. 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.

7. Painting Sequence and detailed activities involved:

S. No.	Activity
1.	Cleaning and De-greasing as per work instructions no. PLW0010-2016 dated 07.12.2016.
2.	Application of APP on complete interior and exterior as per specification no. MDTs 48279 Rev-04.
3.	Body Filler application as per MDTs 176 Rev-4 + Putty application in single coat.
4.	Elastified paint as per MDTs 094 Rev-01, amendment no. 1: i. AC coach: On bottom side of entire under frame & top side of front parts of under frame. ii. Non-AC coaches: Bottom side of under frame and whole interior of shell.
5.	Putty rub down and cleaning
6.	Surfacer application with 1st shade of PU top coat i.e. Signal Red to IS:5 shade 537 or as specified on both sides of sidewall
7.	Rub down for surface roughness and cleaning with masking
8.	Application of PU top coat Grey to RAL 7001 as specified
9.	PU clear coat (with minimum 30 micron/per coat, two packs) compatible to above painting scheme will be applied after application of PU top coat. Quality parameters shall be ensured as per MMDTS 18034 REV 05. Gloss value shall be minimum 95 at 60 degree on PU top coat.
10.	Anti-graffiti clear coating (with minimum 1-4 micron/per coat, single pack) as per M&C/PCN/127/2020, Rev.02 shall be applied after application of PU top coat & PU Clear coat.
Total Timing allowed for painting of coach for sequence 1 to 9 of paint as per this specification is around 32 hrs.	

Note:

- Mixing ratio of all the components like putty, surfacer and top coat should be as recommended by manufacturer.
- Surfacer colour should be of similar colour to major top coat colour.
- Second colour coat for LHB coaches to be applied by properly masking the first colour coat after touch dry.
- Approx requirement of PU clear coat is 10 litres per coach.
- Gloss value & DOI of PU top coat also to be checked after application of PU clear coat and before anti graffiti clear coating.
- After application of PU clear coat (after Dry time-4 hrs Min.), anti graffiti clear coating as per M&C/PCN/127/2020, Rev.02 will be applied.
- After application of anti graffiti clear coating as per M&C/PCN/127/2020, Rev.02, Gloss value of PU top coat shall again be measured & it is to be 80 unit (Min).
- Anti-graffiti clear coating will be applied after application of Marking diagram/lettering outside/ Sticker on exterior of sidewall.

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8. Quality Assurance, test & documents:

Requirement description	Requirement detail	Remarks
Quality Assurance plan	<p>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.</p> <ol style="list-style-type: none"> 1. Control over outsourced products and processes 2. Testing of raw material and establishing its traceability 3. Sampling Plan 4. Type Tests 5. Routine tests 6. Acceptance tests 7. Raw Materials 	<p>The QAP shall be submitted in PDF as per MCF format (Annexure-A)</p> <p>Quality control requirement will be done as per clause no. 8 of RDSO STR no. M&C/PCN/040/2020 (Rev.02) (Annexure-B)</p>
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 of approval process after every 36 months or as specified as quality control measure.</p> <ul style="list-style-type: none"> • Fire and smoke characteristics as per EN 45545-2, R7, HL3 (Sr. XIII of Para 3). <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"> • 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. <p><i>Moreover, during type test, all tests, listed in routine tests & acceptance tests shall also be conducted.</i></p>	<p>The records of the type tests shall be maintained by the manufacturer and shall be made available upon demand. 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</p>	<p>The records of the routine tests shall be maintained by the manufacturer shall</p>

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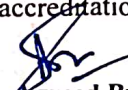
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	<p>full range of inputs. These tests shall be done and record to be maintained for inspection. These tests are to be repeated after every 12 months or as specified.</p> <ul style="list-style-type: none"> • Weathering resistance (Sr. V of Para 3) • Corrosion resistance (Sr. VI of Para 3) • Humidity resistance (Sr. VII of Para 3) • Cyclic corrosion (Sr. VIII of Para 3) • Durability test of Elastified paint as per MDTs 094 Rev 01 amendment 1 <p><i>Moreover, during routine tests, all tests, listed in acceptance tests shall also be conducted.</i></p>	<p>be made available upon demand. 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>Following tests shall be considered as acceptance tests:</p> <ul style="list-style-type: none"> • Dry film thickness (Sr. IV of Para 3) • Distinctness of image (Sr. IX of Para 3) • Anti graffiti test (Sr. X of Para 3) • Chemical resistance (Sr. XI of Para 3) • Abrasion resistance (Sr. XII of Para 3) • Gloss (Sr. XIV of Para 3) <p>Documents for satisfactory Routine test & Type test with above detailed periodicity & validity shall also be checked during acceptance test & enclosed with acceptance test documents.</p> <p>Documents for satisfactory audit report as per para no. 9 of this specification shall be checked & enclosed as part of acceptance test. This audit report should be valid as per periodicity of audit required in para no. 9 of this specification.</p>	<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 supplier / OEM.</p> <p>The records of the acceptance tests shall be enclosed along with the supply consignment. These records shall be traceable and verifiable.</p>

Note:

1. For Natural weathering test, firm will give guarantee certificate along with the supply of 6 years.
2. Supplier shall submit test certificate of parameters as per clause 3[sr. no. III(b) to XIV, XVI to XVII] of specification for Type Tests, Routine Tests & Acceptance tests from :
 - (a) Any NABL accredited lab (in-house or outside) having tests & test method mentioned in clause 3[(sr. no. III(b) to XIV, XVI to XVII] of specification in its scope of accreditation

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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, report from any Government's lab/any Government recognized lab for such test in India 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 clause 3 (sr. no. III (b) to XIV, XVI to XVII) 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 is not available as per (a) & (b) of 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.

9. 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.

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 for 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 of this specification for testing of all parameters in clause 3 [(sr. no. III (b) to XIV, XVI to XVII)]. 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: CCA/ Audit report for PU paints as per M&C/PCN/100/2018 Rev.02, amend-1B or latest will also be considered as acceptable CCA/Audit report for compliance of para 9 of the specification.

10. List of Machineries & plant and testing facilities :

RDSO STR no. M&C/PCN/040/2020 (Rev.02) for "Schedule of technical requirement for Infrastructure, manufacturing, testing facilities & Quality control requirement" will be followed for this specification (Annexure-B).

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Note: Clause no. 11 of above mentioned RDSO STR no. M&C/PCN/040/2020 (Rev.02) shall be read as:

The list of wet on wet paints based on epoxy and polyurethane resins which may be used for exterior painting system for LHB type coaches as per MCF Specification no.MMDTS18034 Rev 05 etc. is furnished below:

S. No.	Activity
1.	Application of APP on complete interior and exterior as per specification no. MDTS 48279 Rev-04.
2.	Body Filler application as per MDTS 176 Rev-4 + Putty application in single coat.
3.	Elastified paint as per MDTS 094 Rev-01, amendment no. 1: i. AC coach: On bottom side of entire under frame & top side of front parts of under frame. ii. Non-AC coaches: Bottom side of under frame and whole interior of shell.
4.	Surfacer application with Ist shade of PU top coat i.e. Signal Red to IS:5 shade 537 or as specified on both sides of sidewall
5.	Application of PU top coat Grey to RAL 7001 as specified
6.	PU clear coat (with minimum 30 micron/per coat, two packs) compatible to above painting scheme will be applied after application of PU top coat. Quality parameters shall be ensured as per MMDTS 18034 Rev. 05.
7.	Anti-graffiti clear coating (with minimum 1-4 micron/per coat, single pack) as per M&C/PCN/127/2020, Rev.02 shall be applied after application of PU top coat & PU Clear coat.


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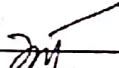
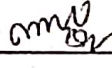
MCF QAP format (Annexure-A)

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

Approved by 	Issued by 	Page Number
Signature with date and stamp	Signature with date and stamp	1 of X


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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
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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

- A. Process flow chart indicating various stages/activities of manufacturing process for an individual product, with quality control points
- B. 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

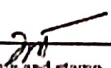

Note

- (i) 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.
- (ii) 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	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
	Raw material or Incoming product/ Assembly or Stage/Final dispatch of the item to consignee					

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 Dec. 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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ANNEURE-B

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Government of India
Ministry of Railways

**SCHEDULE OF TECHNICAL REQUIREMENTS FOR INFRASTRUCTURE,
MANUFACTURING, TESTING FACILITIES & QUALITY CONTROL
REQUIREMENTS**

FOR

**PAINTS BASED ON EPOXY AND POLYURETHANE RESIN
FOR PAINTING OF COACHES, DIESEL AND ELECTRIC
LOCOMOTIVES**

STR No. M&C/PCN/040/2020

(Revision 2.0)

2020

Issued By

METALLURGICAL & CHEMICAL DIRECTORATE
RESEARCH DESIGNS & STANDARDS
ORGANISATION LUCKNOW-226 011


Prepared By


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7.	TESTING FACILITIES
8.	QUALITY CONTROL REQUIREMENTS
9.	REPAIR/SERVICE CENTRE
10.	MAJOR STEPS INVOLVED IN GETTING THE FIRMS APPROVED/ REGISTERED
11.	LIST OF PAINTS TO BE APPROVED
12.	ANNEXURE-I & II

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**Schedule of Technical Requirements
of Epoxy & Polyurethane based Paints
in Two Packs for Painting of Coaches, Diesel & Electric locomotives**

1. FOREWORD

- 1.1 This document has been prepared [(Earlier reference STR No.M&C/040/2011 (Revision 1)] to lay down the eligibility and capability of suppliers seeking approval for manufacturing & supply Epoxy/Polyurethane based Paints in Two Packs for Painting of Coaches, Diesel & Electric locomotives as per the recommendation of design directorate.

2. SCOPE

- 2.1 This document covers the infrastructure facilities at works, procurement of raw materials, manufacturing of paints, quality control etc. These paints will be used for painting of Coaches, diesel and electric locomotives.

3. APPLICABLE/REFERENCE DOCUMENTS

- (i) IS: 101
- (ii) ASTM B117
- (iii) ASTM D3359
- (iv) ASTM G-154
- (v) ASTM 4060

4. TERMINOLOGY

- STR – Schedule of Technical Requirements
- NTH – National Test House
- ISO – International Standards Organisation
- M&P – Machinery & Plant
- NABL – National Accredited Board of Laboratories
- NSIC – National Small Industries Corporation Limited
- MSME – Micro Small and Medium Enterprises- Testing Centre


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5. General Requirements

5.1 Any firm seeking approval of this organisation:

- (i) shall possess valid ISO 9001 : 2015 or latest & ISO: 14000 Environmental maintenance system installation certificate for the products for which approval is sought.
- (ii) shall have minimum manufacturing experience of these paints for 2 years.
- (iii) shall procure these resins from national or international sources and shall produce bill of material.
- (iv) shall have valid clearance from Pollution Control Board.
- (v) Shall have the record of supplying the products to the reputed national and international organisation like defence, heavy & earthmover industries like BEML, BHEL, railway and major automotive industries.
- (vi) Shall have minimum turnover of Rs. 1 Crore per annum for last 2 years.
- (vii) Shall have ERP/SAP supported multimodule application software for managing the important parts of business
- (viii) Firm should have their own R&D facilities approved by Govt. Agency or the firm should have tie up with Govt. R&D Laboratory/Deemed/Govt. University. Valid certificate with clear date of validity on it should be available with the firm and same need to be submitted to RDSO/Lucknow.
- (ix) The firm should have valid capacity certificate issued by NSIC /Other approved agency for small scale industries.
- (x) In case of medium & large scale industries, if capacity certification is not possible by any approved agency, capacity shall be declared by the firm itself detailing the points to arrive at the capacity and subsequently assessing officer will verify the capacity during the assessment of the firm.

The above information should be furnished by the firm in registration form.

- 5.2 The firm should have covered area with adequate space for the storage of raw material, intermediate and finish products like pigments, extenders, resins, hardeners, varnish, thinners, additives, paints etc. with the firm which is free from dampness and humidity and all manufacturing facilities should be available in same campus of factory. One bond room with lock and key facility for keeping finished products should also be available.

- 5.3 Approval of a firm will be given as per laid down procedure given in ISO apex document only after Inspection of the factory premises to assess the capacity/capability of the firm and samples of paints drawn during inspection

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(comprising of a full system of painting) meets the norms and requirements of the relevant RDSO specifications on testing at RDSO. The initial approval shall be given in "List of RDSO Vendors for developmental orders" and further upgradation to "List of approved vendors" will be given after meeting the requirement given in ISO apex document and supply of minimum 20,000 litres after initial approval.

- 5.4 The firm should submit the Brand Names of the applied products.
- 5.5 The Approval to the firm will be given for full paint system . The list of paint items is furnished at Clause 11.0
- 5.6 The firms approved as "List of RDSO Vendors for developmental orders"/"List of approved vendors" shall submit statement of supplies during the duration between two periodic quality audits to RDSO, about the details of the supplies of the relevant paint systems to Zonal Railways/PUs and Wagon Builders in the format as Annexure-II.

6. Manufacturing Machines & Plants

Firm should possess the following minimum machines and plants for manufacture paints based on Epoxy & Polyurethane resins with valid calibration certificates of balances at S.No.7 & 8.

Table-I

Sl. No.	Equipments	Quantity (min.)
1.	High Speed Disburer/Pug mixer, min. capacity 500 kgs -3 nos. or the total capacity shall be 1500 Kgs/day min. may be considered irrespective of no. of machines.	3 Nos.
2.	Sand Mill/LMZ Sand mill,(min.chamber capacity 10 lts.) (in case of higher capacity of the mill , total capacity shall be 2000 ltrs./day irrespective of kind of machine and no. of machines)	2 Nos.
3.	Bead Mill/ Dyno mill/ LMZ Sand mill,(min. capacity1000 lts./day), (total capacity of the mill shall be 3000 ltrs./day irrespective of no.of machines)	3 Nos.
4.	Paint Mixer, min. capacity 2 K ltr.(in case of higher capacity of the mill ,total capacity shall be 10000 ltrs./day irrespective of no.of machines)	5 Nos.

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5.	Thinning Pump	6 Nos.
6.	Automatic Filling Machine	3 Nos.
7.	Weighing Machine, 300 Kg., Least count 0.100 Kg.	2 Nos.
	Weighing Machine, 60 Kg., Least count 0.050 Kg.	2 Nos.
	Weighing Machine, 10 Kg., Least count 25.00 gm	2 Nos.
8.	Electronic Balance, 1.00 Kg., Least count 10.00 gm.	3 Nos.
9.	Industrial Vibrator or agitator	3 Nos.
10.	Solvent Pump	3 Nos.
11.	Unloading Pump	5 Nos.
12.	Slow Speed Premixer and High Speed Premixer / variable speed premixer with gear design	3 Nos. each
13.	Resin Transfer Pump	2 Nos.
14.	Diesel Generator of adequate capacity	1 Nos.
15.	Hoist 2 ton / suitable plant design to fulfil the requirement	2 Nos.
16.	Filter press with variable mesh size filter	2 Nos.

7. Testing facilities

- 7.1 The firm should have proper air conditioned laboratory to maintain lab test conditions at $27 \pm 2^\circ\text{C}$ and $65 \pm 5\%$ relative humidity, for which suitable indicating/measuring instruments will be available in the lab.
- 7.2 There should be full testing facilities with equipments which are covered as per requirements of IS: 101 latest version or as per ASTM. Other equipments not covered in IS /ASTM shall be of reputed make and these should have valid calibration certificate. It is mandatory for a firm seeking approval of RDSO to have equipments listed in table -II at their end.

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Table-II

Sl No.	Name of the Equipment	Quantity (min.)
1.	Humidity Chamber as per IS : 101	1 No.
2.	Salt Fog Test Cabinet as per ASTM B117 or equivalent	1 No.
3.	Gas Liquid Chromatograph	1 No.
4.	Cross cut adhesion tester as per ASTM D3359	1 No.
5.	Sagging index as per IS : 101	1 No.
6.	Gloss-O-Meter of 60° angle of incidence as per IS : 101	1 No.
7.	Abel's Flash Point Apparatus as per IS : 101	1 No.
8.	Cryptometer or Black & White Charts as per IS : 101	1 No. or Black and White Charts in adequate quantity
9.	Flexibility & Adhesion Apparatus as per IS : 101	1 No.
10.	Scratch Hardness Tester as per IS : 101	1 No.
11.	Flow Cup (Ford Cup No. 4) as per IS : 101	1 No.
12.	Stormer/Brooke Field Viscometer as per IS : 101	1 No.
13.	Weight/10 Litre Cup as per IS : 101	1 No.
14.	Hegman Gauge as per IS : 101	1 No.
15.	Centrifuge as per IS : 101	1 No.
16.	Dry Film Thickness Measuring Equipment as per IS :101	1 No.
17.	Dean & Stark Apparatus as per IS : 101 / Carl Fischer apparatus	1 No.
18.	Lovibond Tintometer as per IS : 101	1 No.
19.	Accelerated Weathering Tester viz QUV to ASTM G-53	1 No.
20.	Taber Abrasion tester as per ASTM D 4060	1 No.
21.	Color Spectrophotometer as per IS:101/ASTM	1 No.
22.	Chemical Balance upto 4 decimal places (in gms.)	1 No.
23.	Physical Balance upto 2 decimal places (in gms.)	1 No.
24.	Hot Air Electric Oven	1 No.
25.	Distillation Plant	1 No.
26.	Hydrometer of different ranges	1No.of each range
27.	Hygrometer	1 No.
28.	Drying time recorder as per ASTM D 5895	1 No
29.	Air & Air less spray gun	1 No each
30.	Hot Plates	3 Nos.

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31.	Set of Sieves, Thermometers, Glass Wares, Crucibles, Reagents & Chemicals for Testing of Raw Materials, Intermediate and Finished Products as per relevant specifications	In adequate Qty./Nos.
32.	Heating Mantles	3 Nos.
33.	Water Bath	2Nos.
34.	Muffle Furnace	1 No.
35.	Mild Steel, Tinned and Glass Panels and Test Racks	In adequate number

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