Government of India
Ministry of Railways

Schedule of Technical Requirements for Infrastructural, Manufacturing, Testing Facilities & Quality Control Requirements

For

R/M PAINT SYNTHETIC FOR THE SYSTEM OF EXTERIOR PAINTING OF COACHES

STR No: M&C/ PCN/050/2020
(Revision 2.0)

2020

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

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1. FOREWORD

1.1 This document has been revised {earlier reference STR No. M&C/PCN/050/2011 (Revision 1)} and prepared to lay down the eligibility and capability of suppliers seeking approval for manufacturing & supply of paints for Ready Mixed Synthetic Paints for the painting of exterior of the coaches of Indian Railways.

2. SCOPE

2.1 This schedule of technical requirements covers the norms for manufacturing of Ready Mixed Synthetic Paints for the painting of exterior of the coaches of Indian Railways.

3. APPLICABLE/REFERENCE DOCUMENTS

(i) IS: 101 Methods of Test for Ready Mixed Paints and Enamels
(ii) IS : 1303 Glossary of Terms Relating to Paints (*Revised*)
(iii) IS:8662-2004, (Second Revision) (Reaffirmed 2019) or latest Enamel, Synthetic, Exterior: (a)Undercoating,(b)Finishing, for railway coaches RDSO Amendment No. 1 (Rev.0) for pigment content.
(iv) IS: 2074 (Part-I)/2015 or latest Ready Mixed Paint, Air Drying, Red Oxide Zinc Chrome Priming
(v) IS: 5083 – 1988, Second Revision (Reaffirmed 2019) or latest Knifing stopper putty
(vi) IS: 110-2017, Third Revision, or latest Filler Grey
(vii) IS: 1745-1978 (Third Revision) (Reaffirmed 2018) or latest Specification for Petroleum Hydrocarbon solvents (Third Revision) Low Aromatic Grade Solvent 145/205
(viii) ICF/MD/SPEC-045 Issue status: 02, Rev. No.03, dated 14/06/2007.

4. TERMINOLOGY

- STR – Schedule for 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

5. GENERAL REQUIREMENTS

The vendor seeking approval shall comply all the below mentioned requirements from para 5.1 to 12.2 , Annexure I and also meet the requirements of the specification issued by ICF, ICF/MD/Spec-045 Rev. No. 03, dated 14/06/2007 (Given in Brief at Annexure II).

5.1 The firm should have covered area with adequate space for the storage of raw material, intermediate and finish products like pigments, resin, oils, varnish, 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.

5.2 ~~Should have minimum 2 years manufacturing and supplying experience for the product for which the approval is sought to the related national organisations like Railway, Defence or other similar sector~~. (Proposed for deletion)

5.3 ~~Should have No Objection Certificate from Pollution Control Board~~. (Proposed for deletion)

5.4 ~~Shall have minimum turnover of Rs.1.0 Crores per annum for last 2 years~~. (Proposed for deletion)
Proposed for modification as: Shall have balance sheet for last 2 years.

5.5 The approval to the firm will be given for full paint system for exterior painting of the coaches of Indian Railways and not for individual paint items.

5.6 Approval to a firm will be given only after:

i) Inspection of the factory premises to assess the capacity and capability of the firm.

ii) Samples of paints drawn during inspection meets the requirements of the relevant RDSO Specification on testing at RDSO. Since IS: 1745-1978 (Third Revision) (Reaffirmed 2018) Specification for Petroleum Hydrocarbon solvents (Third Revision) Low Aromatic Grade Solvent 145/205 is not manufactured by the firm, sample shall be drawn from storage for quality control purpose.

5.7 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-III.

5.8 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 (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.

6. M & P REQUIREMENTS

The firm should possess the following minimum machines and plants as given in Table-1 below for manufacturing & supply of Ready Mixed Synthetic Paints for the painting of exterior of the coaches on Indian Railways.

Table-1

SN	Machinery & Plants	Quantity (Minimum)
1	High tech grinding machines of minimum capacity 1000 litres per day . High speed Attritor of 500 liters with Glass/ SS/ Ceramic beads of suitable size/ dia, and sand mill of the 200 liters capacity may also be acceptable but the same should be replaced by the modern facilities of grinding within a year, whenever asked for.	Capacity of 500 /200 liters each and total capacity should be 1000 litres
2	Steel Ball Mills and Pebbles ball mill/ Other suitable high tech grinding machine	1000/2000 litres Cap. Total capacity 5000 litres, Min
3	Blenders with stirrer	1000 to 2000 litres. Total capacity 6000 litres, min. and stirrer of 2000 to 3000 rpm
4	Mixing tanks	1000 to 2000 litres. Total capacity 6000 litres, Min.
5	Alkyd Resin processing plants based on solvent process with suitable heating and chilling arrangement.	Alkyd Resin plant of solvent process should be available with total capacity of the kettle/kettels should be 2.5 tonne. Min
6	Triple Roller Mill and Pug Mixture	One no. each 1000 Kg per day and 300 Kg per day
7	Storage tanks for Resins, Solvents & oils.	1 no. min for each product with minimum capacity of 5000 litres
8	Generator, 50 KV Amp	1 No. Min
9	Electronic Weighing Machine a) 300 Kgs (Max) b) 25 Kgs (Max)	 1 No. Min with least count 1 Kg 1 No. Min with least count 0.1 Kg
10	Sealing, Packing and Nitrogen purging facility	1 No. Min
11	Stores for keeping raw materials, intermediates and finished goods	Suitable area
12	Filter Press	2 nos. filter press for filtering the paints up to 10 to 50 micron dia with total capacity6000 liters/day
13	Pre Mixer	Two nos. Capacity 100/200 litre Total 500 litre per day
14	Solvent pump	One No. Capacity 2 H.P
15	Loading pump	One No. Capacity 2 H.P
16	Hoist/suitable plant design to meet the requirement	One No. Capacity 2 ton

7. TESTING FACILITIES

7.1 There should be a well equipped laboratory having full testing facilities. The testing equipment should meet the requirements of the specifications which are covered by IS: 101 latest version /ASTM. Other equipments not covered by IS: 101 shall be of standard make having valid calibration certificate.

7.2 The firm should have proper air conditioned laboratory to maintain the normal test conditions of 27± 2 °C temperature and 65 ±5% R.H. for which suitable indicating instruments should be available.

7.3 Firm should possess the following minimum test equipment as given in Table-2 for quality control of Ready Mixed Synthetic Paints for the painting of exterior of the coaches on Indian Railways:

Table-2

S No.	Name of the Equipment	Quantity (minimum)
1.	1) Ford Cup No. 4 2) Stop Watch	1 No.
2.	Pykynometer & Electronic Balance	1 No.
3.	Pfund Crypto-meter	1 No.
4.	Gloss Meter, 60^0& 20^0 Digital.	1 No.
5.	Automatic Scratch Hardness Tester	1 No.
6	1. Flexibility & Adhesion Apparatus Dia of the mandrel 6/6.25 mm. 2. Refrigerator For Maintaining 0^0C Temp.	1 No.
7.	1. Abel Flash Point Apparatus 2. Abel Flash Point thermometer	1 No.
8.	Hegmann Gauge	1 No.
9.	1. Volume Solid Discs & 2. Balance with accuracy of 0.1 mg.	1 No.
10.	Salt Spray Apparatus	1 No.
11.	Humidity Chamber	1 No.
12.	Centrifuge with minimum 3000 rpm	1 No.
13.	Dean & Stark Apparatus	1 No.
14.	Set of sieves as required in testing of different paints.	1 No.
15.	Muffle Furnace of range 0 - 800^0 C	1 No.
16.	Pulse Echo Coating Thickness Gauge or any other suitable thickness guage meter with digital display to measure Dry film thickness of organic coatings.	1 No.
17.	QUV Weather meter	1 No.
18.	pH meter	1 No.
19.	Air Oven, 250^0C	1 No. of each range
20.	Distillation Apparatus	Adequate Qty./Nos.
21.	Wet Film Thickness Gauge	1 Nos.

22.	1) Round Bottom Flask. 2) Air Condenser 3) Desiccators 4) Soda Lime Guard tube 5) Sintered Glass Crucible G-4 6) High Vacuum Pump.	Adequate Qty./Nos.
23	Analytical Balance Single Pan 0.0 To 200 g with Accuracy ± 0.0001gm	1 No.
24	1) Electronic Balance 0.0 To 2000g with Accuracy ±0.1 g and 2) Electronic Balance 0.0 To 500 g with Accuracy ± 0.01g	1 No. 1 No.
25	Electronic Balance 0 to 5000 g with accuracy ± 1g	1 No.
26	Vernier Calipers	1 No.
27	Air/Airless spray equipment system with booth	1 No.
28	Hot Plate	
29	Electric Water Still	1 No.
30	Hygrometer	1 No.
31	Computer aided Colour Comparator	1 No.
32	Refrigerator- For Storage of Chemicals	1 No.
33	Wet Abrasion tester	1 No.
34	Impact Tester	1 No.
35	Automatic film applicator	1 No.
36	Outdoor exposure rack	1 No.
37	Crosscut tester for checking adhesion and compatibility	1 No.
38	Other equipments /instruments/material required for various testing e.g.Thermometers, Glass wares such as measuring cylinders, beakers, flasks, petridishes, porciline and silica crucible/ dishes etc., of various capacities, Heating Mantle	Adequate Qty./Nos.
39	Water bath	Adequate Qty./Nos.
40	Panels M.S/Tinned /Glass of suitable size & Brushes of suitable size.	Adequate Qty./Nos.
41	All relevant and latest specifications	Adequate Qty./Nos.

8. QUALITY CONTROL REQUIREMENTS & TRAINING FACILITIES

8.1 There should be a system to ensure the traceability of the product from raw material stage to finished product stage. The system should be such as to facilitate the identification of the raw material, intermediate products and finish products.

8.2 Shall have ERP/SAP supported multimodule applications software.

8.3 Ensure that the system of 'first in first out' is followed for raw materials and the intermediate stage products.

8.4 Ensure that there is Quality Assurance Plan for the products detailing various aspects as per Guidelines of ISO Document no. QM-RF-8.1-3 (Latest version)

- Organisation chart
- Write up on manufacturing process of resins and paints
- Process flow chart for resins and paints
- Traceability of various products.
- Inspection and testing plan for all the products starting from raw materials, in process and final product.
- Details of non-conformity.
- Details of customer complaints and Warranty failures/In service failures.
- M&P/T&P as per specification/STR/IS

The QAP shall be available and submitted (in triplicate) along with vendor approval application form for approval by RDSO.

8.5 The technical supervisors/managers responsible for production & quality control activities related to manufacturing of subject paint item should have the minimum qualification of B.E. / B.Tech (Paint /Polymer Technology/Chemical Engg.) with a minimum of 3 years experience or M.Sc. (Chemistry) with a minimum of 7 years experience in relevant fields to look after the production, quality control and testing activities and should have knowledge of paint manufacturing, testing of raw materials etc. They should be able to take corrective steps in case of difficulties in maintaining quality control and they should be regularly employed by the firm.

8.6 The quality manual of the firm for ISO should clearly indicate the control over manufacturing and testing of said product. at any stage.

8.7 Ensure that proper analysis is being done on monthly basis to study the rejection at various levels and it is documented.

8.8 Ensure that all the relevant specification, IS standards are available with the firm.

8.9 ~~Firm should have test certificates (with latest amendments if any) not older than 6 years for all the paint system for which registration is required issued by approved test house viz. NTH/MSME/HBTI or other NABL accredited lab~~. (Proposed for deletion)

8.10 A periodical/Need basis Quality Audit check may be carried out of the firm to check the quality of paint and other infrastructure and testing facilities mentioned in the STR .

9. MANDATORY REQUIREMENT OF ISO: 9000 CERTIFICATION

The vendor should possess valid ISO 9001-2015 or latest certificate in respect of the products applied for.

10. R&D FACILITIES

10.1 ~~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~~. (Proposed for deletion)

11. REPAIR/SERVICE CENTRE

11.1 The firm should have 24X7 customer complaint registration & redressal mechanism through website.

12. CAPACITY OF THE FIRM

12.1 The firm should have valid capacity certificate issued by NSIC /Other approved agency for small scale industries.

12.2 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.

13. MAJOR STEPS INVOLVED IN GETTING THE FIRMS APPROVAL/REGISTRATION AS PER LATEST ISO APEX DOCUMENTS:

13.1 The firm shall apply online for vendor registration on RDSO website.

13.2 The application form and other relevant documents shall be scrutinized at M&C Dte and if any deficiencies are found, the firm shall be asked to comply the deficiencies as per latest ISO apex guidelines.

13.3 After all deficiencies are complied by the firm, the capacity , capability and STR verification of the firm shall be assessed by nominated official. Samples shall also be drawn from the firms premises after satisfactory compliance of STR and shall be tested at RDSO/National Test House (Lab which is accredited by an accrediting agency which meets the criteria laid down in QO-D-8.1-11 {Latest version}) and if test facility for any of parameter is not available either at RDSO/NTH/as specified in QO-D-8.1-11 then it may be referred to Govt lab/University/any other NABL accredited lab, where it exist.

13.4 If all the test results are satisfactory and all other requirements are fulfilled, the firm shall be approved for “List of RDSO Vendors for developmental orders”.

ANNEXURE –I

SN	Description of Machine/Equipment/Man power	Capacity requirement/Qualification	Total requirement	No.of Machines available	Operation to be performed by Machine/Equipment	Capacity of available Machine	Year & Make of machine	Present Status— Working/ Undercommencing/ Not working
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	High tech grinding machines of minimum capacity 200 litres per day . High speed Attritor with glass/ SS/ Ceramic beads of suitable size/ dia, and sand mill of the same capacity may also be acceptable but the same should be replaced by the modern facilities of grinding within a year.	Capacity of 200 /500 liters each and total capacity should be 1000 litres	Adequate Nos.					
2	Steel Ball Mills and Pebbles ball mill/ Other suitable high tech grinding machine	1000/2000 litres Cap. Total capacity 5000 litres, Min	Adequate Nos.					
3	Blenders with stirrer	1000 to 2000 litres. Total cap. 6000 litres, min. and stirrer of 2000 to 3000 rpm	Adequate Nos.					
4	Mixing tanks	1000 to 2000 litres. Total cap.6000 litres, Min.	Adequate Nos.					
5	Alkyd Resin processing plants based on solvent process with suitable heating and chilling arrangement.	2.5 ton. Min	1No.					

6	Triple Roller Mill and Pug Mixture	1000 Kg per day and 300 Kg per day	One no. each					
7	Storage tanks for Resins, Solvents & oils.	minimum capacity of 5000 litres	1 no. min for each product					
8	Generator,	50 KVAmp	1No.					
9	Electronic Weighing Machines a) 300 Kgs (Max) b) 25 Kgs (Max)	least count 1 Kg least count 0.1 Kg	1No. min of each					
10	Sealing, Packing and Nitrogen purging facility	1 No. Min	1No.					
11	Stores for keeping raw materials, intermediates and finished goods		Suitable area					
12	Bond House with lock and key facility	20 Sq. mtr.-1 No. Min	1No.					
13	Filter Press for filtering the paints up to 10 to 50 micron dia	total capacity 6000 liters/day	2 nos.					
14	Pre Mixer	Capacity 100/200 litre Total 500 litre per day	2 nos.					
15	Solvent pump	2 H.P	1No.					
16	Loading pump	2 H.P	1No.					
17	Hoist/Suitable plant design	2 ton	1No.					
18	1) Ford Cup No. 4 2) Stop Watch		1No.each					
19	Pykynometer & Electronic Balance		1No.					
20	Pfund Crypto-meter		1No.					
21	Gloss Meter, 60°& 20° Digital.		1 No.					

22	Automatic Scratch Hardness Tester		1 No.					
23	1. Flexibility & Adhesion Apparatus Dia of the mandrel 6/6.25 mm. 2. Refrigerator For Maintaining 0°C Temp.		1 No. each					
24	1. Abel Flash Point Apparatus 2. Abel Flash Point thermometer		1 No. each					
25	Hegmann Gauge		1 No.					
26	Volume Solid Discs & Balance with accuracy of 0.1 mg.		Adequate Nos.					
27	Salt Spray Apparatus		1 No.					
28	Humidity Chamber		1 No.					
29	Centrifuge with minimum 3000 rpm		1 No.					
30	Dean & Stark Apparatus		1 No.					
31	Set of sieves as required in testing of different paints.		1 No.					
32	Muffle Furnace of range 0 - 800 °C.		1 No.					
33	Pulse Echo Coating Thickness Gauge or any other suitable thickness guagemeter with digital display to measure Dry film thickness of organic coatings.		1 No.					
34	QUV Weather meter		1 No.					
35	1. Round Bottom Flask. 2. Air Condenser 3. Dessicators 4. Soda Lime Guard tube 5. Sintered Glass Crucible G-4		1 No.					

	6. High Vacuum Pump.							
36	Air Oven, 250 °C		1 No.					
37	Distillation Apparatus		Adequate nos.					
38	Wet Film Thickness Gauge		1 Nos.					
39	Analytical Balance Single Pan 0.0 To 200 g with Accuracy ± 0.0001gm		1 No.					
40	1. Electronic Balance 0.0 To 2000g with Accuracy ±0.1 g and 2. Electronic Balance 0.0 To 500 g with Accuracy ± 0.01g		1 No. 1 No.					
41	Electronic Balance	0 to 5000 g with accuracy ± 1g	1 No.					
42	pH meter		1 No.					
43	Vernier Calipers		1 No.					
44	Air/Airless spray equipment system with booth		1 No.					
45	Hot Plate		Adequate nos.					
46	Electric Water Still		1 No.					
47	Hygrometer		Adequate nos.					
48	Computer aided Colour Comparator		1 No.					
49	Refrigerator- For Storage of Chemicals		1 No.					
50	Wet Abrasion tester		1 No.					
51	Impact Tester		1 No.					
52	Automatic film applicator		1 No.					
53	Outdoor exposure rack		1 No.					
54	Crosscut tester for checking adhesion and compatibility		1 No.					

55	Other equipments /instruments/material required for various testing 1. Thermometer. 2. Glass wares such as measuring cylinders, beakers, flasks, petridishes, porcelains and silica crucible/ dishes etc., of various capacities. 3. Panels M.S/Tinned /Glass of suitable size. 4. Brushes of suitable size. 5. Facility for maintaining standard test conditions of 27±20°C and % relative humidity of 65±5. 6. Water bath 7. Heating Mantle 8. All relevant and latest specifications	Adequate Qty./Nos.						
56	**Manpower—** The Technical supervisors/ managers responsible for production & quality control activities related to manufacturing of Subject paint item should have the minimum qualification of B.E. / B.Tech (Paint /Polymer Technology/ Chemical Engg.) with a minimum of 3 years experience or M.Sc. (Chemistry) with a minimum of 7 years experience in relevant fields.		1 No. each for Production & Quality Control respectively					

Note: Information in column 1 to 4 shall be indicated by RDSO whereas information in column 5 to 9 shall be furnished by vendor.

ANNEXURE –II

1.0 **Exterior paint system for Railway coach painting comprises of IS:8662-2004 (Second Revision) (Reaffirmed 2019) based paints as given below:**

(i) Red Oxide Zinc Chrome Primer to IS: 2074 (Part-1)/2015 or latest.

(ii) Filler Grey to IS: 110 -2017, Third revision or latest.

(iii) Knifing stopper putty to IS: 5083-1988, (Second Revision), (Reaffirmed 2019) or latest.

(iv) Synthetic Enamel, Undercoating to IS:8662-2004, (Second Revision) (Reaffirmed 2019) or latest.

(v) Synthetic Enamel, Black Matt Finish to IS:8662-2004, (Second Revision) (Reaffirmed 2019) or latest.

(vi) Synthetic Enamel, Finishing - Gulf Red (ISC:473) to IS:8662-2004, (Second Revision) (Reaffirmed 2019) or latest.

(vii) Synthetic Enamel, Finishing - Black to IS:8662-2004, (Second Revision) (Reaffirmed 2019) or latest.

(viii) Synthetic, Enamel, Finishing - Pale Cream (ISC:352) to IS:8662-2004, (Second Revision) (Reaffirmed 2019) or latest.

(ix) Synthetic Enamel,Finishing – Air Craft Blue (ISC:108) to IS:8662-2004, (Second Revision) (Reaffirmed 2019) or latest.

(x) Synthetic Enamel,Finishing – Satin Blue (ISC:177) to IS:8662-2004, (Second Revision) (Reaffirmed 2019) or latest.

(xi) Synthetic Enamel,Finishing of any other colour as per IS:5-1994 colour code to IS:8662-2004, (Second Revision) (Reaffirmed 2019) or latest.

(xii) IS: 1745-1978 (Third Revision) (Reaffirmed 2018) or latest Specification for Petroleum Hydrocarbon solvents (Third Revision) Low Aromatic Grade Solvent 145/205

2.0 ADDITIONAL REQUIREMENTS OF VARIOUS PAINTS USED FOR EXTERIOR PAINTING OF THE RAILWAY COACHES

2.1 Red Oxide Zinc Chrome Primer to IS: 2074 (Part-1)/2015

The paint shall meet all the requirements given in IS: 2074 (Part-1)/2015. In addition to the above,the paint shall have the following additional requirements (which are in the form of modification or addition to the above said specification)

a) Consistency : Shall also be suitable for Air/airless spray

b) Hard Dry : Not more than 8 hrs.

c) Wet Opacity : Min.220 Square meters/ 10 liters

d) Non Volatile Vehicle content : Min 20% by mass

2.2 Filler Grey to IS: 110-2017, Third revision

a) Consistency : Shall also be suitable for Air/airless spray

The paint shall meet all the requirements given in IS: 110 -2017, Third revision.

2.3 Knifing stopper putty to IS: 5083-1988, Second Revision (Reaffirmed 2019)

The paint shall meet all the requirements given in IS: 5083/1988 Second Revision (Reaffirmed 2019). And also it must be compatible with the previous paint applied and the subsequent paints to be applied.

2.4 Synthetic Enamel Undercoat to to IS:8662-2004, (Second Revision) (Reaffirmed 2019)

The paint shall meet all the requirements given in IS:8662-2004, (Second Revision) (Reaffirmed 2019). In addition to the above, the paint shall have the following additional requirements (which are in the form of modification or addition to the above said specification)

a) Consistency : Shall also be suitable for Air/airless spray

b) Non Volatile Vehicle content : Min 20% by mass

c) Wet Opacity : Min.160 Square meters/ 10 liters

Note: The paints pertaining to Clause 2.1, 2.2, 2.3 & 2.4 shall be compatible with the Alkyd modified synthetic enamel UV resistant high-gloss and colour retention finish paints.

2.5 Synthetic Enamel Finish Paint to IS:8662-2004 (Second Revision) (Reaffirmed 2019)

The paint shall meet all the requirements given in IS: 8662-2004, (Second Revision) (Reaffirmed 2019). In addition to the above, the paint shall have the following additional requirements (which are in the form of modification or addition to the above said specification). With these additional requirements the paint shall be Alkyd modifiedsynthetic enamel-- UV resistant high-gloss and colour retention finish paint. It shall be free from modified resin or their derivatives or their modifications in any form.

S.No.	Characteristics	Requirements
1.	Non Volatile Vehicle (% by mass),Min	40
2.	Wet opacity Square meters/ 10 liters	As per Annexure D of ICF/MD/SPEC-045 Issue status: 02, Rev. No.03, dated 14/06/2007)
3.	Gloss, 60° in units (Min)	86
4.	Scratch Hardness (1.2 kg load)	No such scratch as to show the bare metal
5.	Resistance to 5% Sulphuric Acid (m/v) (Test method as per Annexure A of ICF/MD/SPEC-045 Issue status: 02, Rev. No.03, dated 14/06/2007)	Shall not show signs of disintegration or change of colour to a rating not less than 8, taking the original as 10. The loss of gloss shall not be more than 30% of the original gloss.
6.	Resistance to 5% Sodium Carbonate (m/v) (Test method as per Annexure B of ICF/MD/SPEC-045	Shall not show signs of disintegration or change of colour to a rating not less than 8,

	Issue status: 02, Rev. No.03, dated 14/06/2007)				taking the original as 10. The loss of gloss shall not be more than 30% of the original gloss.
7.	Wet abrasion test with cleaning solution for 5000 cycles				(Test method as per Annexure E of ICF/MD/SPEC-045 Issue status: 02, Rev. No.03, dated 14/06/2007)
		Colour	As per RDSO specification M&C/PCN/101/2007 for cleaning composition for exterior of Railway Coaches.		
	A)% Gloss retention(Min) B)Colour rating(Min)	i. Air Craft Blue ii. Satin Blue iii. Air Craft Blue iv. Satin Blue	Type I 75 70 8 8	Type II 60 55 7 7	(Test method as per Annexure E of ICF/MD/SPEC-045 Issue status: 02, Rev. No.03, dated 14/06/2007)

8. Accelerated weathering test : Exposure at UV weatherometer Cycles of condensation at 50^0C for 4 hrs.& UV radiation at 60^{0}C for 4 Hrs. (As per test method of Annexure C of ICF/MD/SPEC-045 Issue status: 02, Rev. No.03, dated 14/06/2007)

	Minimum % of Gloss retention after				Colour Rating after				Defect Rating
	360 Hrs./ 15 days	500 hrs/ 21 days	672 hrs/ 28 days	1000 hrs/ 42 days	360 Hrs./ 15 days	500 hrs/ 21 days	672 hrs/ 28 days	1000 hrs/ 42 days	After 1000 hrs.
A) Satin Blue	90	50	45	30	3-7	6-5	4-3	3-2	The film should have minimum defect rating of 8
B) AirCraft Blue	95	90	75	60	10-9	8-7	6-5	4-3	The film should have minimum defect rating of 8

Colour Rating—as per Cl.D.3.2.3 of IS:8662/2004
(Second Revision) (Reaffirmed 2019)
Defect Rating ---as per Cl.D.3.2.4 to Cl.D.3.2.9 of IS:8662/2004
(Second Revision) (Reaffirmed 2019)

ANNEXURE –III

Statement of supplies during the duration between two periodic quality audits as per QO-D-8.1-13 (Latest version)

Name of the Vendor:

S N.	Period	Full Item detail with specification	Supplied to ZonalRly/ PU/ WagonBuilder	PO No. and date	Quantity	Inspecting Agency	Performance Report of Inspecting Agency	Whether supplied within DP or extension of DP taken(Information to be given in detail)	Any other information