

Rail Coach Factory, Kapurthala

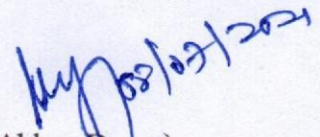
MD35131

Dated: 08-07-2021

Sub: Issue of Amendment No. 1 of MDTS-48279 Rev.03 for Adhesion Promoting Primer.

Please find attached copy of Amendment No. 1 of MDTS-48279 Rev.03 for Adhesion Promoting Primer in three pages for future procurement of adhesion promoting primer.

This has the approval of competent authority.


(Abhey Dogra)
Dy.CME/Design-II

CQM, CPLE, CWE(Fur), CMM/HSQ, CMM/TKJ, Dy.CMM/Fur/LHB, Dy.CMM/G,
Dy.CPLE-III, CMT

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AMENDMENT NO. 01 OF MDT548279 Rev 03 FOR ADHESION PROMOTING PRIMER

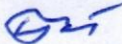
PARA 1.2 OF CHAPTER-I MODIFIED AS UNDER:

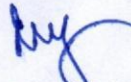
- Technical and safety data-sheet of the offered product.
- Deviation statements with respect to specification; if any.
- Test certificates from NABL certified Labs as per ISO/IEC 17025 indicating compliance to all the test parameters
- Test certificate for smoke and fire characteristics as mentioned in table-II shall be conducted by lab certified by "certifier" railway certification agency and the testing lab should be accredited as per ISO/IEC-17025 to perform/conduct fire test as per EN4545-2 (proof of same for latest form current year or from last three(3) years has to be submitted).
- The firm shall submit the undertaking that all the test certificates submitted with the offer pertains to the same product being offered.

(1.) TABLE II – OF CHAPTER-II REQUIREMENTS FOR ADHESION PROMOTING PRIMER (TWO PACK) MODIFIED AS UNDER:

S. N.	Characteristics	Requirements	Test Method
6.	Volume solids, %, min	33.0	IS: 101 Part 8/Sec 6 or Appendix-I
14.	Pot life(After induction time) at i) 27 ± 2oC, min ii) 40 ± 2oC, min	4 hours 3 hours	IS: 13213 Annexure-E or Appendix-II
15.	Theoretical Spreading (Covering Capacity), min	8 Sq./Lt., at 40 microns DFT	IS: 101 Part 4/Sec1 or Appendix -I
16.	Fineness of grind (Max)	10 microns	IS : 101-87(Part 3/Sec 5)
*17.	Amine Value of Part B	125-250	As per Appendix-IV/ISO 9702
*18.	Hot water resistance	450 hrs. @40°C, No blister or loss of adhesion after 24 hrs. of recovery period	ASTM D 870 (Test panel as per Table-III)
23.	% Pigmentation in Base -(By Centrifuge Method)	37±2	IS: 101 (Part 8/Sec 4) or ASTM-D-2698

*If test to S.No.17 and 18 not found under NABL scope, may be considered from reputed Lab


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Certified to ISO/IEC 17025 or Lab certified by "Certifier" Railway Certification agency.

(3.) TABLE III: DETAILS OF PREPARING PAINTED PANELS FOR TESTING ADHESION PROMOTING PRIMER (TWO PACK) MODIFIED AS UNDER:

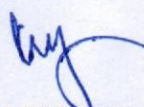
Sl. No.	Test	Type of Metal Panel	Size in mm	Painting Detail	DFT	Method of application	Duration of Air Drying Before Commencement of test (Applicable for panels either air dried or dried at elevated temperature)	Special Instruction
6.	Adhesion	S.S.	-do-	-do-	-do-	-do-	-do-	Cross cut 1 mm (ASTM D3359-02.) Pull up adhesion as per ASTM D 4541

(4.) Para 6. Classification of tests modified as under:

The Adhesion promoting primer (APP) shall be subjected to the following types of test during different stage of design approval

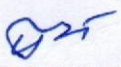
SN	Category of test	Parameters	Remarks
1.	Type test	<ul style="list-style-type: none"> Fire Properties test as per EN45545 Part-II HL3 	<p>These tests shall be repeated every three years. However, if the consignee or inspecting agency desires to do the type tests, before three years, the supplier should not deny the same. There are various circumstances when type tests may be needed on next supply before three years of last supply/last type tests e.g.:</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.



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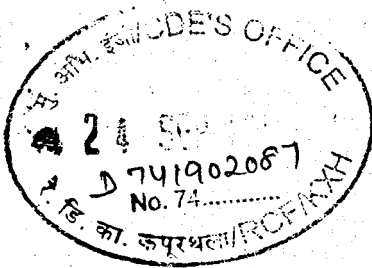

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2.	Routine test	<ul style="list-style-type: none"> • Hot water resistance. • Humidity Resistance. • Salt spray resistance. 	<ul style="list-style-type: none"> • These tests are required to verify the functional working of the system and shall be repeated after every 12 months.
3.	Acceptance test.	All other parameters except SN. 1 & 2.	<ul style="list-style-type: none"> • These tests shall be done on all or samples of lot for bulk supply. Sampling shall be done as per IS:2500

(5.) SpecM&C/PCN/100/2018 year updated in introduction and Table-1 of Chapter-I.


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RAIL COACH FACTORY KAPURTHALA

MD35131

Dated: 24-09-2019

Sub: Issue of specification no. MDTS-48279 Rev-03 Schedule of requirements of Adhesion Promoter Primer

Please find enclosed a copy of specification no. MDTS-48279 Rev-03 Schedule of requirements of Adhesion Promoter Primer, for information and necessary action at your end.

[Signature]
ADE/Fur
24/09/19

CQM, CPLE, CWE (Fur), CMM/HSQ, CMM/Tkj, Dy. CMM/Fur/LHB, Dy CMM/G, CMT, Dy.CPLE-III

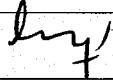

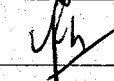
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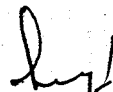
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
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NAME	DESIGNATION	SIGNATURE	DATE	LEVEL
Harish Kumar	SSE/Dev		13/9/19	Prepared
Abhey Dogra	Dy.CME/D-II		13/09/19	Agreed & Reviewed
Manish Bhimte	CDE		16.9.19	Approved

Issue / Rev.	Details of changes	Date
01	Specification revised. Amine Value of Part B, Hot water resistance, Humidity Resistance, Salt spray resistance & prototype approval added. Para 2.5 deleted	21.04.2017
02	<ul style="list-style-type: none"> • Fire properties as per EN45545 and % Pigmentation in base and (SN. 22-23) added in Table-II. • Testing on MS test panel added for salt spray, humidity & hot water tests(Para's 7-9 of Table-III). • Para 1.2 of Chapter-I & Prototype approval (Para 5) of Chapter-II modified. Fineness of grind (Para 16), Hot water resistance (Para 18) and Humidity resistance (Para 19) of Table-II modified. • Classification of test (para 6) of Chapter-II added. 	04.07.2018
03	<ul style="list-style-type: none"> • Para 7.0 Warranty clause added 	13.09.2019


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1. Scope:

This standard covers surface preparation, technical requirements, important instructions etc. for adhesion promoting primer (two packs) for the interior/exterior painting of railway coaches.

2. Introduction:


The adhesion promoting primer is applied directly on stainless steel and also works on Corten steel substrate, for interior as well as exterior application. It eliminates Garnet Blasting from operation. After Application of Adhesion Promoting Primer Coaches can be coated by Epoxy cum Polyurethane painting system M&C/PCN/100/2013 for exterior painting of railway coaches and sound insulation (water based to MDTS262 and PU based to MDTS076) paint for interior painting. This specification consists of technical and physico-chemical requirements of Adhesion promoting primer (two pack).

3. Structure:

This specification has been divided into 02 chapters designated as under:

- | | | |
|-----|---------------------------|--------------|
| i) | General | : Chapter-I |
| ii) | Adhesion promoting Primer | : Chapter-II |


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CHAPTER-I

1. General:

This Chapter provides information with regard to Surface preparation, details of various components of painting system, aspects to be adhered to by the manufacturers, procurement details to be followed by the users and other important aspects.

1.1 Scope of supply:

The scope of supply for each set shall include the following unless otherwise stipulated in the tender:-

S.No.	Description
1	Adhesion promoting primer (two pack)
2	Thinner (if required)
3	Metal conditioner

1.2 While quoting, the supplier shall submit the following details :


- Part No with Brand Name of OEM and Authorisation certificate from OEM (Where the supplier is a authorised dealer of the OEM)
- Technical and safety data-sheet of the offered product
- Test certificates from NABL certified Labs or reputed International Lab (latest test report or within last one year) indicating compliance to all the test parameters
- Test certificate for fire and smoke characteristics (latest reports or of last one year as per requirements) as mentioned in Table-II shall be conducted by International Lab. certified by "Certifier" Railway Certification agency and the testing Lab. should be accredited as per ISO/IEC-17025 to perform/conduct fire test as per EN4545-2 (Proof of same has to be submitted).

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

Bulk orders to be placed on suppliers who have established history of satisfactory performance in Indian Railways/International Railways for similar items over past three years.

2. Surface preparation:

- 1) Apply metal conditioner (suitable and compatible) for rusted areas (especially Sole Bars, Corten steel areas, under frame structure etc.) with brush or sponge. No need to clean skin tensioning marks.
- 2) Dilute metal conditioner with Water as per manufacturers Guidelines.
- 3) Wash and clean metal conditioner with water


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- 4) Allow to complete dry of water from surface by wiping with cotton or air blow.

3. Components of painting system:

Table-I

The painting system has the following System:

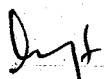
SN	Painting operation	Description of paint	Method of Application	Chapter of Specification	Specification Reference
1	Priming	Adhesion promoting Primer	Airless spray	Chapter-II	MDTS-48279
2	Priming	Epoxy Zinc Phosphate primer	Airless spray	Chapter-II	M&C/PCN/100/2013
3	Putty	Unsaturated Polyester Putty	By Knife/ Spatula	Chapter-III	M&C/PCN/100/2013
4	Surfacer	PU Surfacer	Airless Spray	Chapter-IV	M&C/PCN/100/2013
5	Finishing	PU Full Gloss enamel	Airless spray	Chapter-V	M&C/PCN/100/2013


4. Important instructions

A. For manufacturers:

- The paint Manufacturers shall indicate the presence of un-reacted monomer in the system to ensure freedom from pollution hazards.
- Manufacturers shall submit internal test certificate for each product for all the parameters specified, at the time of supplying the material.
- Manufacturers shall submit material safety data sheet along with the supplies.
- Marking and Packing: Each container shall be marked with the following:-
 - Name of the material
 - Source of manufacture
 - Volume of the material
 - Batch No. or Lot No. in code or otherwise and
 - Month& year of manufacture
 - Shelf life of paint /material on container and temperature to be stored at.

B. Testing Authorities:


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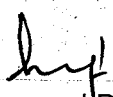

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
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All the paint shall be tested in as supply condition after mixing pack A&B in 3:1ratio or as per manufacturer's recommendations. No thinner shall be employed until recommended by the manufacturer, All the characteristics specified shall be tested in this mixture as per specification at the time of initial approval. All the tests except long duration test like salt spray, protection against corrosion under condition of condensation and accelerated test for durability will be carried out whenever it is required by purchaser/inspection agency .

C. Coach Builders:

- a. Normally addition of thinner in prepared paint (obtained after mixing Pack A & Pack B in recommended mixing ratio) shall not be required. If environmental fluctuations (e.g. fall in temperature) take place, then small amount of thinner as recommended by the manufacturer, subject to a maximum of 10% (v/v), may be added to adjust the spray viscosity.
- b. For ensuring adherence to flash off time, after the painting operation, the coach shall be placed at the entrance of the curing oven and the coach shall be moved inside the oven slowly to cover the stipulated flash off time.


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CHAPTER-II

SPECIFICATION FOR ADHESION PROMOTING PRIMER (TWO PACK)

1. Scope:

This standard specifies requirements and methods of testing of Adhesion Promoting Primer supplied in two packs, intended to be used, for coaches. Two components Adhesion Promoting primer is intended to be used as first coat on bare metal to provide etching and adhesion to stainless steel and mild steel surface. The material shall have good adhesion on the substrate and shall have good compatibility with subsequent coats of two pack unsaturated polyester based putty, two pack Epoxy Zinc Phosphate Primer, two pack polyurethane based under coat paint and two pack polyurethane based top coat paint, sound insulation paint as the painting system may require the application of these materials. The primer should be suitable for spray application (as per Chapter I, Para 3) It may also be suitable for application by brush for touching up smaller areas.

2. Terminology:

- 2.1 Pack : The term used to describe each of the two packs of the paint which when mixed together, form an Adhesion Promoting priming paint.
- 2.2 Paint : The mixture of the 2 packs, along with thinner, in the proportion recommended by the manufacturer. The mixing of the two packs shall be done with the heavy duty stirrer for 15 minutes. max. (the rise in temp. shall not be more than 5°C).

3. Requirements:

- 3.1 The mixing ratio of the pack A and pack B shall be simple ratio and same as supplied in dual containers.

- 3.2 Composition: The paint shall consist essentially of two packs, namely

Pack A and Pack B

- 3.2.1 Pack A: (Normally referred to as base) shall consist of

(a) Acrylic resin (b) Epoxy ester Resin (c) Pigment

- 3.2.2 Part -A Content

a. Pigment 40 ± 5% by mass

b. Methyl Iso butyl Ketone 11.0 % by mass

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c. 1Methoxy 2 Propyl Acetate MPA 11.0 % by mass

3.2.3 Pack B : (Normally referred to as Hardener or catalyst solution)

a. n-Butanol 40.0 % by mass

b. 2-methoxy-1-methylMethyl acetate MPA 25.0 by mass

This shall be liquid type, such as combination of amine or any other suitable hardeners. It shall react with Part A at normal ambient temperature.

3.2.4 Metal conditioner

The supplier has to supply suitable and compatible metal conditioner along with the two pack adhesion promoting primer .

4. Properties:

4.1 General: The paint shall comply with the requirements specified in Table II of this specification.


4.2 Unless otherwise specified, the following testing conditions shall apply.


4.3 The preparation of metal panels shall be in accordance with CL.5.2.1.1 of IS:101- 86.

4.4 All the tests shall be conducted at room temperature ($27 \pm 2^{\circ}\text{C}$) and a relative humidity at $65 \pm 5\%$ in a well-ventilated chamber free from draughts and dust.

4.5 Condition in Containers: Each component as delivered shall be free of gel, coarse particles, skins, foreign matter and sediments. Any sediment that does form must be easy to stir up with a high speed stirrer for 15 minutes maximum, in order to give a homogenous paint.

4.6 The two packs i.e. base and hardener shall be mixed in the ratio as recommended by the manufacturer, before conducting the test or tests. Where the paint is required to be applied on panels, it shall be done so by suitable spray (as per Chapter I, Para 3). After mixing the two components thoroughly, an induction time of 10 to 15 minutes shall be allowed before use.

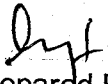

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TABLE II - REQUIREMENTS FOR ADHESION PROMOTING PRIMER (TWO PACK)

S. N.	Characteristics	Requirements	Test Method
1.	Drying time (a) Surface Dry, max (b) Hard Dry, max (c) Hard Dry at 70°C, max	20 Minutes 1 hour 30 minutes, with 15 minutes flash off time	IS : 101-86 (Part 3/ Sec. 1)
2.	Consistency	Smooth and uniform, suitable for brush/spray application	IS : 101-89 (Part 1/ Sec.5)
3.	Finish	Smooth and Matt to Satin	IS : 101-87 (Part 3/ Sec. 4)
4.	Colour	Self standard Yellow Green	IS: 101-89 (Part 4/ Sec. 2)
5.	Dry film thickness/Per coat, min.	35-45 microns	IS: 101(Pt.3/Sec.2)-89 By Elcometer /thickness gauge meter
6.	Volume solids, %, min	33.0	See Appendix-1
7.	Flexibility & Adhesion (6.25mm mandrel)	No visible damage or detachment of film	IS: 101-88 (Part 5/ Sec. 2)
8.	Cross Cut Adhesion 1mm cuts	Should be minimum 4B on non blasted SS	ASTM D 3359-02
9.	Pull up Adhesion	Min 850 Psi on non-blasted SS surface	ASTM D 4541
10.	Flash Point (a) Component A (b) Component B	Above 17°C Above 17°C	IS: 101-87 (Part 1/ Sec. 6)
11.	Impact Resistance – Direct and reverse 50 cm height, 1KG weight, 12 mm dia.	No crack observed	ASTM D2794
12.	Keeping Properties for both the packs	Min. 12 months	See Appendix-III
13.	Mass in Kg/10 liters,	11.5-14.0	IS : 101-87 (Part 1/ Sec. 7)
14.	Pot life(After induction time) at i) 27 ± 2°C, min ii) 40 ± 2°C, min	4hours 3 hours	Appendix-II


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15.	Theoretical Spreading (Covering Capacity), min	8 Sq.m/ lt., at 40 microns DFT	As per Appendix-I
16.	Fineness of grind (Max)	10 microns	IS : 101-87 (Part 1/Sec 7)
17.	Amine Value of Part B	125-250	As per Appendix-IV
18.	Hot water resistance	450 hrs @40°C, No blister or loss of adhesion after 24 hrs of recovery period	ASTM D 870 (Test panel as per Table-III)
19.	Humidity Resistance	1000 hrs @ 50° C X RH 95% - No blister or loss of adhesion after 24 hrs of recovery period	ASTM D-2247 (Test panel as per Table-III)
20.	Salt spray resistance	500 hrs. Creep age <3 mm, Blister within 3mm of creep age not out of this area.	ASTMB-117 (Test panel as per Table-III)
21.	Viscosity (Efflux time by Ford cup No. 4 of paint i.e. mixture of two components at 27± 2oC in Supply condition.	60 sec.max.	IS : 101-89 (Part 1/Sec5)
22.	Fire Properties test	Hazard Level -3 (HL3) – R1/R7/R17	EN:45545 Part-II
23.	% Pigmentation in Base -(By Centrifuge Method)	37±2	ASTM-D-2698

**TABLE III: DETAILS OF PREPARING PAINTED PANELS FOR TESTING
ADHESION PROMOTING PRIMER (TWO PACK)**

Sl. No.	Test	Type of Metal Panel	Size in m.m.	Painting Detail	DFT	Method of application	Duration of Air Drying Before Commencement of test (Applicable for panels either air dried or dried at elevated temperature)	Special Instruction
1.	Drying time	S.S. unblasted	150 x 100 x 1.25	One coat of Adhesion Promoting Primer	35-40 μ	as per Chapter I, Para 3	-	-No garnet blasting.
2.	Finish	-do-	-do-	-do-	-do-	-do-	24 hours	-

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
3.	Colour	-do-	-do-	-do-	-do-	-do-	24 hours	-
4.	Dry film thickness	-do-	-do-	-do-	-	-do-	-do-	-
5.	Flexibility	Tinned	150 X50 X.315	-do-	-do-	-do-	7 days	-
6.	Adhesion	S.S.	-do-	-do-	-do-	-do-	-do-	Cross cut 1 mm (ASTM D3359-02 .)
7.	Resistance to Salt Spray	Un- blasted S.S. and Mild sleet plates	150 X 100 X 1.25	- One coat of Adhesion Promoting Primer	Max.40 μ	-do-	-do-	For 500 hours
8.	Resistance to Humidity	Un- blasted S.S. and Mild sleet plates	150 X 100 X 1.25	One coat of Adhesion Promoting Primer	Max.40 μ			For 1000 hours
9.	Resistance to hot water	Un- blasted S.S. and Mild sleet plates	150 X 100 X 1.25	One coat of Adhesion Promoting Primer	Max.40 μ			For 450 hours


5. Prototype approval:

The firm who has not got their prototype sample approved earlier, shall submit following documents for prototype approval from CDE/RCF for PO placed by RCF or to user railways for PO placed by them respectively, before bulk supply:

- Part No with Brand Name of OEM and Authorisation certificate from OEM (Where the supplier is a authorised dealer of the OEM)
- Technical and safety data-sheet of the offered product
- Test certificates from NABL certified Labs or reputed International Lab (latest test report or within last one year) indicating compliance to all the test parameters.
- Test certificate for fire and smoke. characteristics (latest reports or of last one year as per requirements) as mentioned in Table-II shall be conducted by International Lab. certified by "Certifier" Railway Certification agency and the testing Lab. should be accredited as per ISO/IEC-17025 to perform/conduct fire test as per EN4545-2 (Proof of same has to be submitted).

The prototype approval is applicable on the first supply of material as per this specification from a supplier. RCF will do prototype approval for POs placed by RCF

only

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6. Classification of tests:

- a. Testing of following parameters as mentioned in this specification shall be treated as type tests and shall be repeated every 12 months:

- Fire Properties test as per EN45545

However, if the consignee or inspecting agency desires to do the type tests, before 12 months, the supplier should not deny the same. There are various circumstances when type tests may be needed on next supply before one year of last supply/ last type tests e.g.:

- 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.

- c. All other parameters shall be checked as per acceptance tests.

7. Warranty:

The supplier shall give warranty for failing or proving unsatisfactory in service due to defective design, material or workmanship within 84 months from date of supply or 72 months from date of fitment whichever is earlier and shall replace the same at his own cost and risk.


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APPENDIX -I

PROCEDURE FOR DETERMINING VOLUME SOLIDS PERCENTAGE

1. Scope:

This method is applicable for determination of the volume solids percentage of paint coatings.

2. Significance:

This method is intended to provide a measure of the volume of dry coating obtainable from a given volume of liquid coating. This volume is considered to be the most equitable means of comparing the coverage (sq.metre of surface covered at a specific film thickness per unit volume) and also for calculating the wet film thickness of the given paint.

3. Apparatus:

- (i) Analytical Balance
- (ii) Steel Disc – Preferably stainless steel, 60 mm dia and 0.70 mm thickness with a small hole 2 to 3 mm from the edge. A fine wire such as chromel is attached through the hole and made of the appropriate length for suspending the disc in a liquid.
- (iii) Weight box
- (iv) Beaker 1 litre for weighing the disc in liquid.
- (v) Weight per litre cup for determining the specific gravity of the paint material and of the suspending liquid if not known.
- (vi) Oven.

4. Procedure:

- (i) Dry the disc in an oven at 105°C for 10 minutes and cool.
- (ii) Weight the disc in air. Let it be W1 grams.
- (iii) Suspend the disc in water and weigh again. Let it be W2 grams.
- (iv) Calculate the volume of the disc V as follows :

$$V = \frac{W1 - W2}{d} \text{ where } d \text{ is the density of the water at room temp.}$$

- (v) Determine the weight of non volatile content of the liquid coating material by drying a known amount of paint at 105° C for 3 hours. Let it be W grams.
- (vi) Determine the specific gravity of the paint to the nearest 0.001 g/ml by using weight per gallon cup. Let it be P

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- vii) Dip the disc in the paint sample for 10 minutes and take out the disc and allow the excess coating material to drain off. Blot the coating material off the bottom edge of the disc so that heads or drops do not dry on the bottom edge of the disc.
- viii) Dry the disc in an oven for 3 hours at 105°C and cool.
- ix) Weigh the coated disc in air. Let it be W3 grams.
- x) Suspend the coated disc in water and weigh again. Let it be W4 grams.
- xi) Calculate the volume of the coated disc as follows :


$$V1 = \frac{W3 - W4}{d}$$
where d is the density of the water at room temp
- xii) Calculate the volume of the dried coating as follows :-
Volume of dried coating (Vd) = V1 - V
- xiii) Calculate the volume of wet coating as follows :


$$V_w = \frac{W3 - W1}{W \times P}$$
where W = grams of non volatile matter.
P = specific gravity of the paint.
- xiv) Calculate the percentage volume solids of the paints as follows :

$$\frac{V1 - V}{V_w} \times 100 \text{ (OR)} \quad \frac{V_d}{V_w} \times 100$$

The volume of non-volatile matter or the percentage volume solids of paint is related to the covering capacity and thickness in the following manner :-

- (a)
$$\frac{\% \text{ Volume solids}}{\text{Dry film thickness (microns)}} \times 10 = \text{Covering Capacity}$$
- b)
$$\frac{\text{Dry film thickness (microns)}}{\% \text{ Volume solid}} \times 100 = \text{wet film thickness (microns)}$$


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APPENDIX – II

PROCEDURE FOR DETERMINING OF POT LIFE

Take the usable time as the pot life of paint. Condition the components of the coating for one hour at $27 \pm 2^{\circ}\text{C}$ and mix immediately in proper ratio to get approx. 200 ml. of paint in 250 ml. of container. The lid should be loosely placed on the container.

1. Measure the viscosity initially and every hour thereafter. However, the interval may be shortened, if desired.
2. Near the end of the paint's working life, the viscosity builds-up rapidly. During this period, when it appears the paint may be too viscous to spray, remove a small portion and add the appropriate thinner. If the paint can still be thinned, the end of the working life has not been reached. The end of the working life is reached when the paint gels, becomes stringy or cannot be thinned for application.

APPENDIX- III

KEEPING PROPERTIES

When stored under cover in a dry place in the original sealed containers under normal temperature conditions, the material shall retained the properties prescribed in the specification for the stipulated period from the date of manufacture which shall be subsequent to the date of placement of contract.

APPENDIX-IV

TEST METHOD FOR DETERMINATION OF AMINE VALUE

Purpose:

This method determines amine value of Part B of NAPP primer using potentiometric titration.


Safety Precautions:

1. Proper personal protective equipment should be worn during transfer of materials so that injury due to spillage is avoided.
2. Review MSDS for each material before handling.

Reagents:

1. Bromophenol Blue Indicator
2. Isopropanol/DI Water Solution–80/20 by volume
3. 0.5N HCl aqueous solution.


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Apparatus:

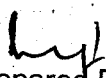
1. Potentiometric Titrator
2. Combined glass pH electrode (Metrohm # 6.0262.100)


Procedure:-

1. Weigh 3.5 - 4.5 grams to the nearest 0.1 mg into a 250 ml beaker.
2. Add 110 mls of 80/20 IPA/DI Water Solution and 4-6 drops of Bromophenol Blue Indicator.
3. Titrate to the potentiometric or visual (yellow) endpoint with 0.5N HCl.

CALCULATION:-

$$\% \text{ Free Amine (as DEA)} = \frac{\text{Normality of HCL} \times \text{ml of HCL required} \times 56.1}{\text{Sample wt (g)} \times 10}$$


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