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RDSO Specification for Epoxy Stearate Water Seal Compound (Two pack)			

**RDSO SPECIFICATION NO.
M&C/PCN/107/2020
(Rev 1.0)**



**SPECIFICATION FOR EPOXY STEARATE
WATER SEAL COMPOUND (TWO PACK)**

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0. FOREWORD:

This standard was originally adopted in the year 1986. In this revision, requirement limit of weight per epoxy equivalent, keeping property, volume solid and pot life has been revised in the light of technological advancement & experience gathered. The requirement of specific gravity of resin used, from TABLE-1 has been deleted because it does not reflect on the quality of the material. The minimum temperature of the surface to be painted has been incorporated. Under scope, the suitability of the material by airless spray has also been incorporated. Methods of test have been specified as per revised IS: 101.

1. SCOPE:

This standard prescribes requirements and methods of testing of Epoxy Stearate Water Seal Compound supplied in Dual Pack, intended to be used for application on Coach Flooring to prevent seepage of water. It is suitable for application by Brushing/Airless Spraying.

NOTE: “Firm should comply Make in India Policy and Public Procurement (Preference to Make in India) Order-2017 under this specification” and subsequent Amendment done time to time.

2. TERMINOLOGY:

For the purpose of this standard apart from Glossary of Terms given in IS 1303 -1983, Reaffirmed 2017 or its latest version shall apply. Rounding off, of observed values on different tests shall be in accordance with IS: 2-1960, Reaffirmed 2016 or its latest version.

2.1 PACK :

The term used to describe each of the Two Packs of the composition which when mixed together form and Epoxy Stearate Water Seal Compound.

3. REQUIREMENT

3.1 The mixing ratio of Two Packs, Pack “A” and Pack “B” shall be a simple ratio such as (preferably volume/volume) as supplied in Dual Containers or the proportion recommended by the Manufacturer/Supplier.

3.1 COMPOSITION

An Epoxy Stearate Water Seal Compound shall consist essentially of Two Packs namely Pack “A” and Pack “B”.

3.1.1 PACK “A”:

Normally referred to as Base shall consist of Epoxy Stearate with or without diluents.

3.1.1.1 In the formulation of the Epoxy Stearate water seal compound Epoxy Resin of the following grade shall be used.

TABLE-I: REQUIREMENTS FOR EPOXY RESIN

SN	Characteristic	Requirement	Method of Test
1.	Weight per Epoxy equivalent on Non-volatile vehicle content basis	200-600	CI 2.2 & 4 IS:9162-79 Reaffirmed 2016 or its latest version

3.1.2 PACK “B”:

Normally referred to as Hardener, shall be liquid type, such as an Aliphatic Amine, an Aliphatic or Aromatic Amine adduct, a Polyamide or Amido Polyamine or any other suitable Hardeners. It shall react with Epoxy resin at normal ambient temperature.

4. PROPERTIES

GENERAL

- 4.1 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.
- 4.2.1 The preparation of metal panels shall be accordance with IS: 101 (Part1/Sec.3)-86, Reaffirmed 2012 or its latest version.
- 4.2.2 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. The temperature of the surface to be painted must be at least 3°C above the dew point to prevent moisture condensation.
- 4.2.3 The Two Packs i.e. Base and Hardener shall be mixed in the ratio recommended by the Manufacturer/Supplier, before conducting the test or tests. Where the paint is required to be applied on panels, it shall be done so by suitable Brush/Spray

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**TABLE-II: REQUIREMENTS FOR EPOXY STEARATE WATER SEAL
COMPOUND (TWO PACK)**

SN	Characteristics	Requirements	Test Method
1	Drying time a) Surface Dry, Max. b) Hard Dry, Max c) Curing Time, Max.	4 Hours 8 Hours 7 Days	IS:101(Pt3/Sec1)-86, Reaffirmed 2017 or its latest version -do-
2	Consistency	Smooth, uniform and suitable for Brush/Air/Airless Spray Application	IS:101(Pt1/Sec5)-89, Reaffirmed 2019 or its latest version
3	Finish	Smooth and egg Shell	IS: 101(Pt3/Sec4)-87, Reaffirmed 2019 or its latest version
4	Colour	Light yellow or Brown	IS: 101(Pt4/sec2)-89, Reaffirmed 2019 or its latest version
5	Dry Film Thickness per coat, Min a) By Brush b) By Airless Spray	60 microns 60 microns	IS:101 (Pt3/sec2)-89, Reaffirmed 2019 or its latest version /Elcometer
6	Volume Solids, %, Min.	45.0	APPENDIX-I
7	Scratch Hardness (2.0 Kg. LOAD)	No such scratch so as to show bare metal	IS: 101(Pt5/sec2)-88, Reaffirmed 2019 or its latest version
8	Flexibility & Adhesion (6.25 mm Mandrel)	No visible damage or detachment of film	IS: 101(Pt5/sec2)-88, Reaffirmed 2019 or its latest version
9	Flash Point(for both Packs)	Above 25°C	IS: 101(Pt1/sec6)-87, Reaffirmed 2019 or its latest version
10	Keeping Properties (for both Packs)	Not less than 9 months	IS :101(Pt6/sec2)-89, Reaffirmed 2019 or its latest version
11	Mass in Kg./10 litres, Min	11.0	IS:101(Pt1/sec7)-87, Reaffirmed 2019 or its latest version
12	Pot life at a) 27±2°C, Min b) 40±2°C, Min	3.5 Hours 2.0 Hours	APPENDIX II
13	Resistance to Chemicals a) 10% Caustic Soda Solution(w/v) b) 10% Ammonia Solution (v/v) c) 10% Hydrochloric Acid solution (v/v) d) 10% Sulphuric Acid Solution (v/v)	Shall not show any sign of blistering, wrinkling, lifting of paint film upto 500 Hours for Bases (a & b) and 250 Hours for Acids (c & d).	APPENDIX-III
14	Resistance to Abrasion	To pass the test	ASTM: D-968-81 or its latest version

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5 MARKING AND PACKING

- 5.1 Each container shall be marked with the following:
- a) Name of the Material
 - b) Source of Manufacture
 - c) Volume of the Material
 - d) Batch No. or Lot No. in code or otherwise and
 - e) Month & year of Manufacture
- 5.2 For Touch up/Patch painting, the material shall be supplied in one litre container otherwise in 20 lit containers.

6 INSPECTION

- 6.1 At the time of initial approval, full testing shall be done.
- 6.2 In case of acceptance testing, Inspecting Authority shall draw the sample from the batch under consideration and test shall be done as per TABLE-II.

APPENDIX –I

PROCEDURE FOR DETERMINING VOLUME SOLIDS PERCENTAGE IN POLYURETHANE PAINTS

1. SCOPE

This method is applicable to the determination of the volume of non-volatile matter 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 (square feet 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, 60mm dia and 0.70mm thickness with a small hole 2 to 3mm 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^oC for 10 minutes and cool.

(ii) Weight the disc in air. Let it be W1 grams.

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- (iii) Suspend the disc in water and weigh again. Let it be W2 grams.
- (iv) Calculated the volume of the disc V as follows :
 $V = W1 - W2 / d$ where d 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 105⁰C for 3 hours. Let it be W grams.
- (vi) Determine the specific gravity of the paint to the nearest 0.001g/ml by using weight per gallon cup. Let it be P.
- (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 beads or drops do not dry on the bottom edge of the disc.
- (viii) Dry the disc in an oven for 3 hours at 105⁰C 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) Calculated the volume of the coated disc as follows :
 $V1 = W3 - W4 / d$, where d is the density of water at room temperature.
- (xii) Calculate the volume of the dried coating as follows :
Volume of dried coating = V1 - V
- (xiii) Calculate the volume of wet coating as follows :
 $V_w = W3 - W1 / WXP$ where W=grams of non-volatile matter in 1.0 gm paint.
P=specific gravity of the paint
- (xiv) Calculate the percentage volume solids of the paints as follows:

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

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) Theoretical Coverage (sq.m/l) = %Volume Solids/Dry film thickness X 10 (microns).
- (b) Wet film thickness(microns) = Dry film thickness(microns)/% Vol. Solids X 100

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APPENDIX-II

PROCEDURE FOR DETERMINING OF POT LIFE

(AS PER U.S. DEPTT. OF TRANSPORT/FED. RAIL, ROAD ADMN. OFFICE OF SAFETY TEST METHOD 2.7.1)

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. Measure the viscosity initially and every hour thereafter. However, the interval may be shortened, if desired. 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 compatible 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

Accelerated Tests: (Resistance to Chemicals)

The following short - term tests of chemical resistance, do not categorize the type of service for which High build epoxy paint coatings are intended but are included to assure the customer that the coating contains a sufficiently cured resin to exhibit the long term requirements.

Prepare the panels as per clause 7 of TABLE-III. Allow the panels to air dry for 7 days and seal the edges with wax.

- a) **Resistance to 10% Caustic Soda Solution:** Immerse $3/4^{\text{th}}$ of the panel in 10% (w/v) caustic soda solution for 500 hours. Remove the panel, wash in running water and allow it to air dry for an hour and record the observations.
- b) **Resistance to 10% Ammonia Solution:** Immerse $3/4^{\text{th}}$ of the panel in 10% (v/v) ammonia solution for 500 hours. Remove the panel, wash in running water and allow it to air dry for an hour and record the observations.
- c) **Resistance to 10% Hydrochloric Acid Solution:** Immerse $3/4^{\text{th}}$ of the panel in 10% (v/v) Hydrochloric acid solution for 250 hours. Remove the panel, wash in running water and allow it to air dry for an hour and record the observations.
- d) **Resistance to 10% Sulphuric Acid Solution:** Immerse $3/4^{\text{th}}$ of the panel in 10% (v/v) sulphuric acid for 250 hours. Remove the panel, wash in running water and allow it to air dry for an hour and record the observations.