
















RFI	COMP. dng		TITLE: - CHEMICAL AND THERMAL RESISTANT SELF PRIMING, AMINE ADDUCT CURED EPOXY WHITE PAINT		TRE/168	
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COPYRIGHT AND CONFIDENTIAL The Information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the Company.		1.GENERAL: This specification covers the technical & quality requirements of two component epoxy system, chemical and thermal resistant self priming air / oven drying Amine Adduct Cured Epoxy Coating for internal surface of Transformer which gives tough, flexible, smooth and egg shell to satin finish with excellent moisture , heat and oil resistance and good durability in chemical atmosphere.				
		2.APPLICATION: The Paint shall be used as self priming coating suitable for application by brush/ spray on Sa 2.5 blasted steel surfaces of Transformers, which after complete air / oven drying at 90 ± 10^0 C for 1 Hr are subjected to vapour phase treatment in Solvent vapor Shellsol – H at 130^0 C for 96 Hrs.				
		3.COMPLIANCE WITH NATIONAL STANDARDS: There is no Indian Standard covering this material.				
		4.COLOUR: WHITE				
		5.FINISH: Smooth and Egg Shell Gloss.				
		6.FREEDOM FROM DEFECTS: The base / hardener of the paint shall remain free from defects like hard settling of pigments, skinning when kept in closed container and livering (excessive viscosity build up) when kept in closed container till its shelf life. The dried paint film shall be free from defects like bittyness, floating of pigments, surface haze, orange peeling, colour fading, wrinkles etc when dried in oven at 90 ± 10^0 C for 1 hour and subjected to vapour phase operation at 130^0 C in Shellsol – H solvent for 96 hour.				
		7.CHEMICAL COMPOSITION: The paint shall be based on two component epoxy system i.e. base and hardener. The base shall contain epoxy binder, pigments and extenders. The hardener should be polyamine adduct. The mixing ratio of the base and hardener shall be as per supplier's recommendation. The type and content of the binding material as determined by IR spectrography shall be strictly adhered to the "Type Approved Sample".				
		The paint shall confirm to the requirements of ISO 14001 and shall be free from lead/ lead components.				
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COPYRIGHT AND CONFIDENTIAL The Information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the Company.		8.TEST SAMPLES: Tender samples will not be required when once the type approval (Clause 11) is given and the supplier concerned declares that the material for which the tender is given is of the same quality as the type approved sample. Representative samples of the material shall be drawn and treated as prescribed under Clause 3 of IS: 101.				
		9.TEST METHOD. Unless otherwise specified material shall be tested in accordance with IS: 101.				
		10.PROPERTIES ON BASE AND CATALYST MIX: Base and Catalyst mix (as per supplier's recommendations),when tested in accordance with IS:101 IS:2074, and Appendices 1 &2 to this specification, shall have the properties as below:				
		10.1 Mass per 10 Litres (IS 101 Part1, Sec 7/87) Min 12.0 Kg / 10 Litre				
		10.2 Drying Time (IS 101 Part 3 Sec 1/86) Surface dry: 2 hours, Max. at 30 ⁰ C Hard dry : 16 hours, Max. at 30 ⁰ C				
		10.3 Consistency: (IS 101 Part 1 Sec 5/89) Smooth & Uniform suitable for brush or spray application by thinner addition Mix Viscosity : Min 300 gm @30 ⁰ C by Stormer Thinner Intake (By Volume) Brush : 0-5% Air Spray : 10-30 % Air less Spray : 5-20%				
		10.4 Scratch Hardness (IS 101 Part 5, Sec 2) Scratch Hardness on Mild Steel Panel After the paint film @ 75 micron is cured for 7 days at ambient temperature and tested under a load of min 1500 gms. No such scratch as to show the bare metal shall be produced.				
		10.5 Flexibility (ASTM D522 "Mandrel bend test of attached organic coating") Min. 12% Elongation (to be tested on tin panel @75 micron DFT and air dried for 48 hours)				
		10.6 Resistance to Salt Spray (ASTM B 117) It should pass minimum 500 hour without any film defect and <2 mm scribe line corrosion when applied on Sa 2.5 blasted panel at 75 micron DFT.				
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COPYRIGHT AND CONFIDENTIAL The Information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the Company.		<p>10.7 Impact Test (ISO 6272/ASTM D2794) Direct Impact resistance - To pass min 7 Joules (to be tested on burnished MS panel @ 75 Micron DFT and air dried for 48 hours)</p> <p>10.8 Resistance to transformer oil at 100 deg.C ± 10 degree C for 7 days Panel preparation and test to be performed as per appendix 3.</p> <p>10.9 Adhesion by Pull Off using UTM adhesion tester (ISO 4624) Min. 5 MPA when applied on 2 mm Sa2.5 blasted panel at 75 micron DFT and tested after 7 days air drying.</p> <p>10.10 Adhesion Cross Cut (ISO 2409) It should pass with classification 0 when applied on Sa 2.5 blasted panel at 75 micron DFT and tested after 48 hours of air drying.</p> <p>10.11 Pencil Hardness (ASTM D3363) H-2H @ 75 micron DFT when tested after 7 days air drying.</p> <p>10.12 Pot Life (IS 13213: 91 Ann.E) 3 hrs (min) at 30° C</p> <p>10.13 Non-Volatile Matter Content (IS 101 Part 8, Sec 2/90) 70 % ± 3 % (by weight of the base paint)</p> <p>10.14 Pigment (IS 101 Part 8, Sec 2/90) 40 % ± 3 % (by weight of the base paint)</p> <p>10.15 CUREDEPOXY Resin Content; 28 % ± 3 % (by weight of the mixed paint after finding the pigment and non-volatile matter content).</p> <p>10.16 Volume Solid (IS 101 Part 8, Sec 6/93 - (disc & NVM to be determined by Air Drying method for 24 hours) 60 % ± 3 %</p> <p>10.17 Dry Film Thickness (IS 101 Part 3, Sec 2/89) Min 75 micron / coat</p> <p>11.0 Type Approval Validity of type test certificate shall be three years from the date of test.</p> <p>Chemical Composition of paint shall be confirmed by IR spectrography / thin layer chromatography by supplier and report should be provided.</p>				
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COPYRIGHT AND CONFIDENTIAL The Information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the Company.		<p>11.1 Chemical and Thermal Resistance Test (Appendix -I) Type Test Panels prepared and tested in accordance with Appendix-1 to this specification, when kept in the SHELLSOL-H (or equivalents) vapour at 130⁰ C for 96 hours, shall not show any sign of deterioration. If this testing facility is not available with the vendor then four nos. painted panel which shall be prepared as per above procedure shall be submitted for further testing in BHEL.</p> <p>12.0 .KEEPING PROPERTY: When stored in a covered dry place in the original sealed containers under normal temperature conditions, the base and accelerator when mixed in appropriate proportions shall retain the properties prescribed in this specification for a period of at least 12 months after the date of manufacture which shall be subsequent to the date of placing the order.</p> <p>13.0 INSPECTION AT SUPPLIER'S WORKS: Whenever specified, tests and inspections are to be conducted in the presence of BHEL's representative. The supplier shall offer BHEL's representative all reasonable facilities, without charge to satisfy the later that the material is being furnished in accordance with this specification. The supplier shall prepare and provide necessary test specimens for testing to be carried out at his premises. If facilities are not available at his works, the supplier shall make necessary arrangements for carrying out the prescribed tests else-where. The supplier shall notify BHEL in advance about the readiness of the material for inspection and testing. BHEL reserves the right to test the material at BHEL's works and the final acceptance of the material shall be based on these test results.</p> <p>14.0 TEST CERTIFICATES: Unless otherwise stated, three copies of Test Certificates shall be supplied giving the following information: In addition the supplier shall ensure to enclose one copy of Test Certificate along with their despatch document to facilitate quick clearance of the material. TRE/168 : Chemical and Thermal Resistant Self Priming, Amine Adduct Cured Epoxy White Paint. BHEL Order No. Supplier's Name and Trade Mark, if any. Batch No. Date of Manufacture and Expiry Test Results of Clauses 10 &11.</p>				
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COPYRIGHT AND CONFIDENTIAL The Information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the Company.		<p>15.0 PACKING AND MARKING:</p> <p>Unless otherwise stated, base and accelerator shall be packed separately in steel containers of appropriate capacities .</p> <p>Each container shall bear the following information:</p> <p>TRE/ 168 Chemical and Thermal Resistant Self-Priming, Amine Adduct Cured Epoxy White Paint.</p> <p>BHEL Order No.</p> <p>Manufacturer's/Supplier's Name.</p> <p>Trade Mark,if any.</p> <p>Batch No.</p> <p>Date of Manufacture and Expiry</p> <p>Quantity.</p> <p>16.0 REJECTION AND REPLACEMENT:</p> <p>If the material does not comply with the requirements of this specification during receipt inspection at BHEL or if any defect is found during further processing of the material, BHEL reserves the right to reject the whole consignment not withstanding any previous certification of satisfactory testing and/or inspection. The supplier shall undertake to replace the rejected material at his own cost and the rejected material shall be taken back by the supplier after fulfilling all the commercial terms and conditions.</p> <p>17.0 INSPECTION AT SUPPLIER'S WORKS:</p> <p>Whenever specified, tests and inspections are to be conducted in the presence of BHEL's representative. The supplier shall offer BHEL's representative all reasonable facilities, without charge to satisfy the later that the material is being furnished in accordance with this specification. The supplier shall prepare and provide necessary test specimens for testing to be carried out at his premises.</p> <p>If facilities are not available at his works, the supplier shall make necessary arrangements for carrying out the prescribed tests else- where. The supplier shall notify BHEL in advance about the readiness of the material for inspection and testing. BHEL reserves the right to test the material at BHEL's works and the final acceptance of the material shall be based on these test results.</p>				
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<div>APPENDIX –I</div> <div>CHEMICAL AND THERMAL RESISTANCE TESTS (Clause 10.12)</div> <div>Take a panel of 150 x 150 mm mild Steel, emery and degrease with xylol to remove dirt, oil and grease, if any. Apply a coat of epoxy finishing paint and allow to oven dry at 90 ±10⁰C. Apply a second coat of epoxy paint to get uniform coating and allow to dry for 96 hours. Weight the painted panel and expose the panel in the chamber of SHELLSOL-H vapours at 130 deg.C under vacuum for 96 hrs. At the end of 96 hrs takeout the panel from the chamber and observe for any deterioration in paint film i.e .blisters, paint film softening and colour change etc. and weight the panel again.</div> <div>The paint passes the test if no discolouration, softening, blistering in paint film takes place and weight loss is not more than 50 mg.</div> <div>APPENDIX-2</div> <div>DETERMINATION OF POT LIFE (Clause 10.15)</div> <div>About 100 ml of the mixed paint prepared by mixing the base and accelerator in the recommended proportions is taken in a beaker. The paint shall be such that it should be usable by brush under a specified pot life of 3 hours at room temperature. In order to see if the paint has gelled or not, a small quantity of the mixed paint is dissolved in the recommended thinner. It should not dissolve if the paint has gelled and vice-versa.</div> <div>APPENDIX-3</div> <div>Method of testing</div> <div><div>1. Panels of size 100mm x 50mm to be Sa 2.5 shot blasted and coated with paint at 75 micron DFT min. and dried for 7 days at room temperature.</div><div>2. Three no. 1 Litre beakers to be filled with fresh transformer oil. One beaker kept as oil blank; one cleaned but un painted panel to be kept in the second one and the painted panel dried to be kept in the third beaker.</div><div>3. All beakers to be kept in an air circulated oven at 100 ±10 °C for 07 days.</div><div>4. After the ageing period, panel to be taken out of the oil and checked for an appreciable colour change of the painted panel.</div><div>5. There should not be any appreciable change in appearance, clarity or colour of the transformer oil.</div><div>6. Painted panel to be examined and there should not be sign of flaking, softening, and blistering.</div><div>7. Remaining transformer oil and blank transformer oil will be checked for the electrical resistivity and tan delta. There should not be appreciable deterioration in electrical properties of oil.</div></div> <tr><td rowspan="2">पुनः Rev. 02 Dt. 30.0 1.19</td><td colspan="2">Specification revised and updated</td><td rowspan="2">सं.</td><td colspan="2">CHECKED & APPROVED S.G.Bokade</td></tr> <tr><td><div><div>NKM</div><div>AKD</div></div></td><td></td><td>तैयार किया PREPD.</td><td>दिनांक DATE 25.05.09</td></tr>							पुनः Rev. 02 Dt. 30.0 1.19	Specification revised and updated		सं.	CHECKED & APPROVED S.G.Bokade		<div><div>NKM</div><div>AKD</div></div>		तैयार किया PREPD.	दिनांक DATE 25.05.09
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