

RFI	COMP. dng		TITLE: - PHENOLIC RESIN BASE HARD DRYING CLEAR VARNISH		TRE/382/03	
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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 requirements of Phenolic resin base hard drying clear varnish having excellent resistance to Transformer oil, moisture and humidity, can be applied by either brushing or spraying or flooding . 2. APPLICATION: Used for painting of pipes after pickling, painting inside surface of transformer tanks, radiator and on other metallic surfaces which are in contact with transformer oil. 3. COMPLIANCE WITH NATIONAL STANDARDS: There is no Indian standard covering this material. 4. SAMPLE FOR TEST: One litre of varnish shall be supplied for testing and approval purpose for the new vendor who is not in BHEL approved vendor list along with test certificates from any NABL lab. Approval will include laboratory testing and shop trials at BHEL. 5. METHOD OF TEST: As stated against each clause. 6. PROPERTIES: When tested in accordance with relevant parts and clauses of IS : 101, test sample shall show the following properties. 6.1. General Condition: Uniform in appearance and free from defects like skinning when kept in closed container, living (excessive viscosity built up) and hard settling. 6.2. Colour: Clear Brown 6.3. Clarity Clear & Transparent 6.4. Finish Hard firmly adherent smooth film, free from sagging, wrinkling and orange peeling. 6.5. Weight per 10 Litre at 27 ± 2°C 9.0 ± 0.3 Kg 6.6. Viscosity at 27 ± 2°C in FC4 25 to 35 seconds. 6.7. Gloss 80 % Min. 6.8. Solids content at 100°C 45 to 50 % 6.9. Flexibility & Adhesion 8 mm, Min. 6.10. Air Drying Time 6.10.1 Surface Dry: 4 hours, max. 6.10.2 Hard Dry:				
Rev 03 Dt. 02.06.20	PAGE 3 OF 3			सं.	CHECKED & APPROVED S.G.Bokade (Sd)	
		Clause 8 added.  (NKM)  (AKD)			तैयार किया PREPD. Arun Khare (Sd)	दिनांक DATE 07.12.04

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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.		16 hours, max. at room temperature or 15 min at room temperature & thereafter 1 hr at 90 ± 10 °C in oven 6.11 Thermal resistance. Suitable for 90°C continuous and 120°C intermittent operations. 6.12 Resistance to Transformer Oil at 90°C for 48 Hours No sign of flaking, blistering, softening, colour fading and other signs of deterioration of electrical properties of transformer oil e.g. Tan Delta, Resistivity etc. (Refer Annexure 'A' for method of testing) 7 SHELF LIFE: When stored under cover in a dry place in the original sealed container under normal temperature condition the material shall retain the properties prescribed in this specification for a period of at least 12 months after the date of manufacturing which shall be subsequent to the date of placing order. 8 TEST CERTIFICATE: Unless otherwise stated three copies of test certificate shall be supplied along with each consignment. In addition, the supplier shall ensure to enclose once copy of test certificate along with their dispatch documents to facilitate quick clearance of the material. The test certificate shall bear the following information 1. TRE/382/03: Phenolic resin base hard drying clear varnish 2. BHEL Order No. 3. Batch No, 4. Date of Manufacture 5. Date of expiry 6. Test result of clause 6 9 PACKING AND MARKING: The material shall be packed in drums of 20 litre or any suitable sizes as per order and sealed. The drums are to be packed suitably to prevent damage during transit. Each drum shall bear the following information. 1. TRE/382/03: Phenolic resin base hard drying clear varnish 2. BHEL Order No. 3. Batch No. 4. Date of manufacturing. 5. Date of expiry 6. Supplier's / Manufacturer's Name & Grade if any 7. Quantity				
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Annexure 'A' <u>Method of testing</u> 1. Panels of size 100mm x 50mm to be coated with varnish and dried for 15 minutes at room temperature and then for 1 hour at $90 \pm 10^\circ\text{C}$, by which time the coating becomes tack-free dry. This extent of drying does not result in complete curing of the varnish and hence, the panels to allow for dry at room temperature for 96 hours. 2. Three no 500ml beakers to be filled with fresh transformer oil. One beaker kept as oil blank; one cleaned but unvarnished panel to be kept in the second one and the varnished panel dried for 96 hours to be kept in the third beaker. 3. All beakers to be kept in an air circulated oven at $90 \pm 10^\circ\text{C}$ for 48 hours. 4. After the ageing period, panel to be taken out of the oil and checked for any colour change of the varnish coating. 5. There should not be any change in appearance, clarity or colour of the transformer oil. 6. Varnish film on panel to be examined and there should not be sign of flaking, softening, and blistering. 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. 8. Acceptance Criteria															
TABLE : ACCEPTACE VALUE OF OIL AFTER TESTING <table border="1"> <thead> <tr> <th>S.NO.</th> <th>CHARACTERISTICS</th> <th>VALUE</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>Tan delta at 90 degree C</td> <td>0.005 max.</td> </tr> <tr> <td>4</td> <td>Resistivity at 90 degree C</td> <td>20×10^{12} ohms cm, min.</td> </tr> </tbody> </table>							S.NO.	CHARACTERISTICS	VALUE	3	Tan delta at 90 degree C	0.005 max.	4	Resistivity at 90 degree C	20×10^{12} ohms cm, min.
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