



TSD 6206 A

**PLANT PURCHASING SPECIFICATION**  
**BHOPAL**

BP 27664

Rev. No. 03

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SUPERSEDES  
BP 27664 Rev. 02

**EPOXY RESIN FOR VACUUM PRESSURE IMPREGNATION**

**1. General**

This specification covers the technical requirements of solvent free, unmodified epoxy resin based on **Bisphenol-A** and **Diglycidylether**. The resin has low reactivity when processed with **4-Methyl-Cyclohexane-1, 2-Dicarboxylic Acid Anhydride** Hardener. The resin/hardener mixture has a long pot life even at elevated temperatures and is therefore suitable for preparing large impregnating baths.

**2. Application**

Used for vacuum pressure impregnation of windings of electrical machines.

**3. Compliance With National Standards**

There is no Indian Standard covering this type of material.

**4. Materials**

The material shall be ordered on **BHEL** approved sources & their grades only.

**5. Requirements**

**5.1. Composition and Class**

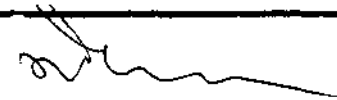
The resin shall be based on **Bisphenol-A-Diglycidylether**. It shall be of low viscosity and very low reactivity when processed with Anhydride Hardener to BP 27669.

Mixtures of epoxy resin to BP 27664 and hardener to BP 27669 shall show good thermal, mechanical and electrical properties upto 155 °C.

The **IR** spectra of the individual resin lot should always comply with the sample lot type approved earlier and no deviation of this shall be allowed.

5.2. The material shall comply with the requirements given in Table 1 with the test sample drawn and tested in accordance with the relevant clauses of corporate standard AA 0851710 and IS specified therein.

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Table 1

S.No.	Characteristics	Requirements	Method of test
1	Density at 25 °C (g/cm <sup>3</sup> )	1.16 to 1.18	Corporate St.
2	Epoxy Equivalent gm/Eq.	172 to 176	CS-AA 0851710

**53. Additional Test for Acceptance of the Resin**

For final acceptance of the resin, following property shall also be tested in addition to that given in Table 1.

**53.1. Sample Preparation**

Resin and hardener are heated in separate containers to 70°C and thereafter 100 pbw of the resin shall be mixed with 120 pbw of the hardener to BP 27669. The viscosity of this resin mix is determined at 70°C (Cl. 5.3.2.1).

The resin mix is divided equally into 4 glass containers **G1**, **G2**, **G3** & **G4**.

Resin mix in **G1** & **G2** is heated for 20 hours at 100°C. **Thereafter**, viscosity of these two samples is measured at 70°C (Cl. 5.3.2.2). The individual values should not **differ** from their mean by more than 0.5 mPa.s.

Resin mix in **G3** & **G4** is heated for 10 days at 70°C. **Thereafter**, viscosity of these two samples is measured at 70°C (Cl. 5.3.2.3). The individual values should not differ from their mean by more than 0.5 mPa.s.

Viscosity shall be measured in a Brooke field Viscometer with UL Adapter at **12 rpm**.

The measure of reactivity of the impregnating resin is determined from the difference in viscosity before and after heating (Cl. 5.3.2.2 & Cl. 5.3.2.3).

While conducting the **test**, due attention should be paid to see that the glass containers used are not contaminated by the compounds having a catalytic or inhibiting influence on the impregnating resin and thus increase or reduce the viscosity while heating.

It should be ensured that the testing conditioned tolerance of the measuring method is less than **0.2 mPa.s**.

**53.2. Measurement of Viscosity of Mixed resin as per Cl 5.3.1 at 70 °C (Corporate Standard CS-AA 0851710)****53.2.1 Initial Viscosity**

Viscosity at 70°C

≤18.5 mPa.s



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**PLANT PURCHASING SPECIFICATION****BHOPAL****BP 27664****Rev. No. 03****PAGE 3 OF 4****53.2.2 Heating for 20 hours at 100°C**

Viscosity after 20 hrs / 100°C	≤19.9 mPa.s
Permissible Viscosity increase after 20 hrs / 100°C	≤1.4 mPa.s

**53.2.3 Heating for 10 days at 70°C**

Viscosity after 10 days / 70°C	≤21.5 mPa.s
Permissible Viscosity increase after 10 days / 70°C	< 3.0 mPa.s

**5.4. Shelf Life and Keeping Property**

When stored under cover in a dry place in the original sealed container at room temperature the material shall retain the properties prescribed in this specification for a period of at least 24 months after the date of manufacture, which shall be subsequent to the date of placing order.

**Note:**

- i) The resin when delivered in barrel is in crystalline condition at room temperature. It should be melted for 18 hrs approx. at 120-125 °C before mixing with hardener.
- ii) After expiry of shelf life, the resin shall be tested for viscosity (at 70°C after mixing the recommended resin & hardener 100:120 proportion) and reactivity (increase in viscosity measured at 70°C after heating at 100°C for 20 hours). The increase in viscosity (reactivity) shall be < 2 mPa.s from the initial value. The resin is in usable condition if the above requirements are met.

**6. Test Certificate**

Three copies of test certificate shall be supplied giving the following information.

BP 27664 Rev 03: Epoxy Resin for Vacuum Pressure impregnation

BHEL Order No.

Batch No.

Date of Manufacture

Date of Expiry

Size and No. of drums

Test results for the properties of resin as per Cl. 5.

In **addition**, the supplier shall ensure to enclose one copy of test certificate furnishing properties as given in Cl. 5.2 and 5.3 along with the dispatch documents to facilitate quick clearance of the material.



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**7. Packing and Marking**

The material shall be packed in metallic drums of 200 litres or any suitable size as per our order and sealed. The drums are to be suitably packed to prevent damage during transit. Each drum shall bear the following information.

BP 27664 : Epoxy Resin For Vacuum Pressure Impregnation

BHEL Order No.

Batch No.

Date of Manufacture

Date of Expiry

Net Weight

Supplier's Name

**8. Rejection & Replacement**

Material failing to conform to this specification will be rejected. The supplier shall undertake to replace the rejected material at his own cost.