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Indian Standard

METHODS OF TEST FOR CABLES

PART 24 WATER SOLUBLE IMPURITIES TEST OF INSULATING PAPER

1. Scope — Covers the procedure of determining water soluble impurities (if any) present in the insulating paper for electric cables.

2. Significance — This test is intended to determine the extent of water soluble impurities in paper since excessive impurities may deteriorate the insulating property of paper insulation in presence of moisture during the service life of the cable.

3. Terminology — The amount of water soluble impurities present is expressed as the percentage by mass soluble in water.

4. Apparatus

4.1 *Glass Beaker* — Capacity 400 ml, with a watch glass.

4.2 *Measuring Cylinder* — Capacity 100 ml.

4.3 *Evaporating Dish* — Capacity 100 ml.

4.4 *Balance* — Accuracy 1 mg.

5. Material — Double distilled water.

6. Test Specimen — A representative sample of paper weighing 5·0 g shall be cut off and weighed to an accuracy of 1 mg. These weighed samples shall then be cut into small pieces.

7. Conditioning — The paper specimen shall be conditioned by first partially drying it by subjecting it to a temperature of 60°C for 10 minutes and then freely exposing it in an atmosphere having relative humidity of 65 ± 2 percent and a temperature of 27 ± 2°C for a period of not less than 24 hours.

8. Procedure

8.1 The conditioned specimen shall be weighed.

8.2 The conditioned papers shall be placed in the beaker with 200 ml of distilled water. The beaker shall then be covered with a watch glass to prevent entry of dirt and placed on a boiling water bath. This condition shall be maintained until the fibres of paper have separated, distilled water being added to keep constant volume in the beaker. The quantity of distilled water used shall be noted. The contents of the beaker shall then be filtered through a fine filter paper (such as Whatman No. 42) and a measurement made of the volume of the filtrate which shall then be drained into an accurately weighed evaporating dish. The filtrate shall be evaporated and the residue dried to a constant mass at a temperature of 105 ± 2 °C.

8.3 A blank determination shall then be carried out of the distilled water by using the same quantity as used for extracting the paper.

9. Tabulation of Observations

Sample Number	*Weight of Conditioned Test Sample* W_1	*Weight of Empty Dish* W_2	*Weight of Dish and the Mass of Filtrate After Evaporation* W_3	*Weight of Dish and the Mass After Evaporation of the Blank* W_4	*Corrected Weight of Soluble Impurities After Deducting the Weight of Blank* $W_3 - W_4$

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Gr 1

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10. Calculation

10.1 The percentage soluble impurities $= \frac{(W_3 - W_4) - W_2}{W_1} \times 100$

10.2 The value so obtained shall be corrected to allow for the water retained in the sample and filter paper by multiplying the result of the calculation by k,

where

$$k = \frac{200}{\text{Volume of filtrate (ml)}}$$

11. Report

11.1 *Water Soluble Impurities Test of Insulating Paper*

Cable Type

Batch No./Lot No.

Cable No./Drum No.

Date of Testing

11.2 *Results*

Reference Specification _____

Sample No.	*Percentage Soluble Impurities*	
	Observed	Specified

Note — If necessary, the above test may be carried out on duplicate samples. The percentage of water soluble impurities as measured in two tests should not differ by more than 0·1.

11.3 *Conclusion* — The specimen meets/does not meet the requirements of the specification.