

इंटरनेट

मानक

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“पुराने को छोड़ नये के तरफ”

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IS 10810-32 (1984): Methods of test for cables, Part 32:
Carbon content test for polyethylene [ETD 9: Power Cables]



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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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*Indian Standard***METHODS OF TEST FOR CABLES****PART 32 CARBON CONTENT TEST FOR POLYETHYLENE**

1. Scope — Covers the method for determination of carbon black content in polyethylene insulation or sheath of electric cable.

2. Significance — Carbon black is normally used to enhance the weather resistance properties of polyethylene compound. This test is to determine the quantity of carbon black to achieve this result.

3. Terminology — Carbon black content of the polyethylene compound is expressed as percentage by mass.

4. Apparatus

4.1 Combustion Boat — Made of porcelain or silica, having minimum dimensions of 75 mm length, 9 mm width and 8 mm height.

4.2 Combustion Tube — Made of hard glass, of approximately 30 mm diameter and 400 ± 50 mm length.

4.3 Gas Flow Meter — For measuring and controlling the rate of flow of nitrogen within 1.7 ± 0.3 l/min.

4.4 Thermometer — 250° to 550°C .

4.5 Furnace — To accommodate the combustion and to give temperature up to at least 500°C .

4.6 Physical Balance — Accuracy 0.0001 g.

4.7 Desiccator

5. Material

5.1 Nitrogen Gas — (See IS : 1747-1972 Specification for nitrogen).

5.2 Trichloroethylene — [See IS : 245-1970 Specification for trichloroethylene, technical (second revision)].

5.3 Solid Carbon Dioxide

6. Test Specimen — About 1 g sample of polyethylene compound taken from the cable.

7. Conditioning — Nil.

8. Procedure

8.1 Heat the combustion boat to red heat, allow it to cool in a desiccator for at least 30 min and weigh to the nearest 0.0001 g. Place about 1 g of the sample of polyethylene compound, accurately weighed in the boat. Place the boat with the sample in the middle of the combustion tube. Insert a stopper carrying a thermometer and a tube for the admission of nitrogen into one end of the combustion tube. The thermometer shall be so adjusted that its bulb is in contact with the boat. Pass nitrogen through the combustion tube at the rate of 1.7 ± 0.3 l/min and maintain the same rate of flow during the subsequent heating. Place the combustion tube in the furnace and connect its outlet to two cold traps in series, both containing trichloroethylene and the first being cooled with solid carbon dioxide. Put the outlet tube from the second trap to a fume hood or to the outside atmosphere.

8.2 Heat the furnace to $500 \pm 5^\circ\text{C}$ and maintain this temperature for 10 min. Disconnect the outlet tube from the cold traps. Withdraw the combustion tube containing the boat from the furnace and allow to cool for 5 min, maintaining the flow of nitrogen at the same rate as before. Remove the boat from the nitrogen inlet side of the combustion tube, allow it to cool in the desiccator for 20 to 30 min and weigh to the nearest 0.0001 g (W_1). Heat the boat strongly in air to constant mass (W_2).

Adopted 14 March 1984

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IS : 10810 (Part 32) - 1984

9. Tabulation of Observations

<i>Sample No.</i>	<i>Mass of the Boat Before Heating in Air</i> <i>(W₁)</i> g	<i>Mass of the Boat After Heating in Air</i> <i>(W₂)</i> g	<i>Mass of the Material Taken for Test</i> <i>(W₃)</i> g
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10. Calculation

10.1 Carbon black content, percent by mass = $\frac{W_1 - W_2}{W_3} \times 100$

where

W_1 = mass (g) of the boat before heating in air,

W_2 = mass (g) of the boat after heating in air, and

W_3 = mass (g) of the material taken for the test.

11. Report

11.1 Reference specification _____

<i>Sample</i>	<i>Carbon Black Content, percent</i>	
	<i>Observed</i>	<i>Specified</i>

11.2 Conclusion — Specimen meets/does not meet the requirement of the specification.