

इंटरनेट

मानक

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“Step Out From the Old to the New”

IS 10810-61 (1988): Methods of test for cables, Part 61:
Flame retardant test [ETD 9: Power Cables]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard
METHODS OF TEST FOR CABLES
PART 61 FLAME RETARDANT TEST

1. Scope — Covers a method to assess the ability of electric cable to resist ignition and to prevent fire from spreading.

2. Significance — The way a cable behaves in a fire depends on the material and the design of the cable as well as the external circumstances. A cable is considered flame retardant if it, when being tested, is ignited but extinguishes again when the external heat supply ceases and the spread of the fire does not exceed the given maximum value.

3. Terminology — See IS : 1885 (Part 32)-1971 'Electrotechnical vocabulary: Part 32 Cables, conductors and accessories for electricity supply'.

4. Apparatus — The test equipment shall consist of a vertical steel tube having a wall thickness of 0.8 ± 0.1 mm with rectangular ventilation openings, a lid of steel and an edged conical tray of stainless steel for a volume of 1 litre of ignition fluid. The mass of the tray shall be 160 ± 20 g. The complete equipment with all dimensions is shown in Fig. 1. The tray shall be placed on a heat insulating bedding.

It shall be possible to vary the distance between the lid and the tube between 10 and 30 mm.

At the upper end of the tube, there shall be a horizontal steel rod for suspension of the test specimen described in 6. At the lower end of the tube which shall be open, the test specimen is fixed with a metal wire with a maximum diameter of 0.8 mm.

When adjusting the lid according to 8.1, the temperature in the tube is measured about 130 mm from its upper end.

5. Material

5.1 Ignition Fluid — Ethanol 95 percent with a specific heat energy of about 23 MJ/kg.

6. Test Specimen

6.1 Test specimen shall consist of one cable or several cables cabled together with a lay of between 10 and 15 times as cabling diameter. The cabling diameter is the circumscribed circle of the test specimen. The length of the test specimen shall be 850 mm in a finished condition.

6.2 Number of Specimens — When testing single-core cable with an external diameter less than 4 mm, five pieces of the cable are cabled to one test specimen. When testing single core cable with an external diameter equal to or larger than 4 mm but less than 10 mm, three pieces of the cable are cabled to one test specimen. When testing a single core cable with an external diameter equal to or larger than 10 mm and when testing multiconductor cables, one piece of cable is used as test specimen.

The external diameter of the test specimen shall not exceed 70 mm.

7. Conditioning — No pre-conditioning of the test specimen is required.

8. Procedure

8.1 Calibration of the Test Equipment — Before the test the test equipment shall be calibrated as follows:

20 x t ml (not less than 70 mm) ethanol 95 percent with a specific heat energy of about $t = K + \frac{D}{5}$ mm led in the fuel tray; where t is the burning time of ethanol in minutes,

and $K = 1$ for a cable with a cross-sectional conductor area ≤ 2.5 mm²,

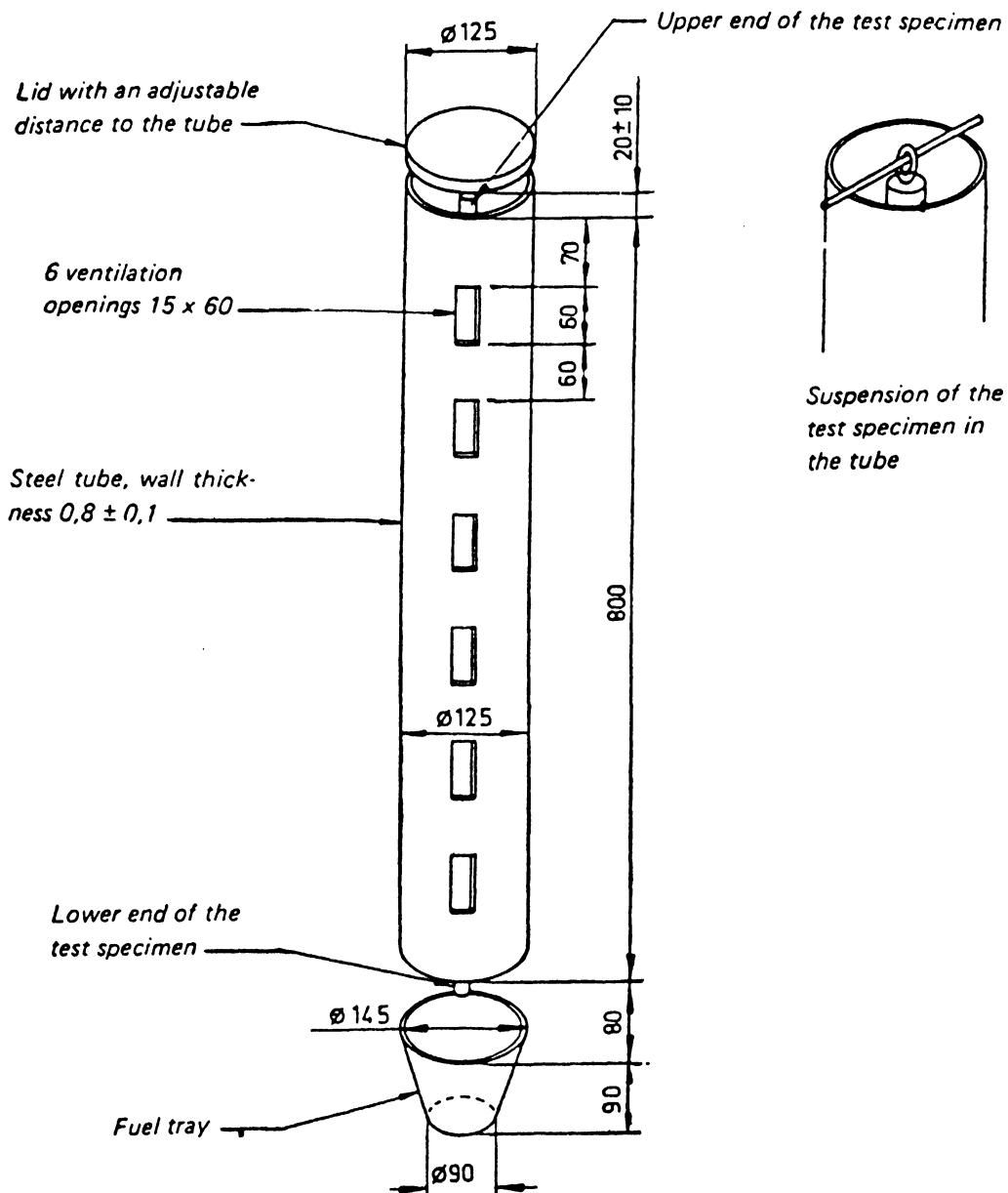
$K = 2$ for a cable with a cross-sectional conductor area > 2.5 mm², and

$D =$ external diameter of the test specimen in mm.

Adopted 30 May 1988

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All dimensions in millimetres.

Tolerance on dimensions where not specified otherwise = ± 1 mm.

FIG. 1 TEST EQUIPMENT FOR FLAME RETARDANT TEST

The distance between the lid and the tube is determined so that the temperature $255 \pm 5^\circ\text{C}$ is obtained, at the point measured about 130 mm from its upper end, after that the ignition fluid has been burning for 3 minutes. This is done by burning a certain quantity of ignition fluid ($20 \times t$) as above and reading the temperature after 3 minutes. If necessary, the procedure is repeated after the test equipment has cooled down and with the lid in another position until the correct temperature has been reached.

8.2 Placing of the Test Specimen — After the test equipment has cooled down the test specimen is placed in the tube with its longitudinal axis along the centre line of the tube. The test specimen shall be provided with a loop at one end and be suspended on the steel rod which is placed over the upper end of the tube so that the lower part of the test specimen extends about 50 mm below the lower part of the tube. The lower part of the test specimen is horizontally fixed with a metal wire with a maximum diameter of 0.8 mm. When testing, a quantity of ethanol ($20 \times t$ ml) is ignited and shall burn for t minutes. The fire is extinguished by taking out the fuel tray.

**AMENDMENT NO. 1 MARCH 2004
TO
IS 10810 (PART 61) : 1988 METHODS OF TEST
FOR CABLES**

PART 61 FLAME RETARDANT TEST

(Page 1, clause 6.2, second para) — Substitute the following for the existing:

'The external diameter of the test specimen shall not exceed 35 mm.'

(ET 09)

Reprography Unit, BIS, New Delhi, India

8.3 The fire in the test specimen shall extinguish by itself. The testing is not finished until all signs of burning, including smoke without visible flame, have ceased.

9. Tabulation of Observation

<i>External Dia of Cable</i>	<i>Number of Cables</i>	<i>Burning Time of Ethanol (t)</i>	<i>Quantity of Ignition Fluid (20 × t)</i>	<i>Unaffected Portion from Top</i>
(mm)		(min)	(ml)	(mm)

10. Calculation — No calculation is involved.

11. Report

11.1 Reference Specification

<i>Designation of Material</i>	<i>Calibration Temperature (°C)</i>	<i>Time of Burning (min)</i>	<i>Unaffected Portion from Top (mm)</i>
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11.2 Conclusion — Specimen meets/does not meet the requirements of the specification.

EXPLANATORY NOTE

In preparing this standard, assistance has been derived from SVENSK STANDARDS ASS 424 14 75.