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नेपाल गुणस्तर  
**NEPAL STANDARD**

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**METHODS OF TEST FOR CABLES**  
**PART 7 MEASUREMENT OF TEMPERATURE INDEX**

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## METHODS OF TEST FOR CABLES

### PART 7 MEASUREMENT OF TEMPERATURE INDEX

#### 1. SCOPE

This test method is applicable for testing the temperature index of insulation or sheath of electric cables and is limited to physically self-supporting test specimens.

#### 2. SIGNIFICANCE

Oxygen index is the most widely used fire parameter in the assessment of materials. However, the burning is significantly influenced by the actual temperature involved. The temperature index helps in assessment of the material properties under heat and fire. It explores the temperature at which the oxygen index of a material becomes 21.

#### 3. REFERENCE

The following standard is a necessary adjunct to this standard:

NS No:	Title
NS 529:20XX	Method of test for cables: Part 6 Oxygen index test

#### 4. TERMINOLOGY

##### 4.1. Temperature Index

The temperature index is the temperature in °C at which the oxygen index of a material becomes 21 (the approximate percentage of oxygen in air) under the conditions of the test.

#### 5. APPARATUS

The test apparatus is same as recommended for oxygen index test is Method of test for cables: Part 6 Oxygen index test with appropriate heating system.

#### 6. Test Specimens

##### 6.1. Three test specimens of flat rectangular sheets having the following dimensions:

Width	: 6.5±0.5mm
Thickness	: 3.0±0.5mm
Length	: 70 to 150mm

Note- In case of flexible material, the thickness of specimen can be 2.0±0.25 mm instead of 3.0±0.5mm

##### 6.2. Test the specimen in the condition as received unless otherwise agreed upon.

Note- Moisture content of some materials affects the oxygen index. Conditioning at 27 ±2° C and 50±5 percent relative humidity for a minimum period of 40h is recommended where a material is suspected to be affected by the retained moisture.

##### 6.3. The specimens may be obtained by moulding, cutting or machining from those cable constituents to be tested. Where this is not possible with a cable containing vulcanized material, a moulded and vulcanized slab prepared from material sampled during manufacture of the same production batch shall be used.

6.4. The edges of the test pieces shall be smooth and free from fuse or burrs of material from machining or peripheral flash from moulding.

**7. PROCEDURE**

7.1. Place the thermocouple near the bottom to verify pre heating air temperature and then position it near the top to determine the chimney temperature. Its position should be such, so as to avoid turbulence and shall not be subjected to heat from the burning specimen.

7.2. Record the ambient temperature. Adjust the gas flow in the chimney to  $4 \pm 1$  cm/s as calculated at standard temperature (0°C) and pressure (101.3 kPa) from the total flow of gas in  $\text{mm}^3/\text{s}$  divided by the area of the column in  $\text{mm}^2$ .

7.3. When the temperature is stable, clamp the specimen vertically by any small holding device, at its base in the approximate centre of the column with the top of the specimen at least 100mm below the top of the open column. Re-adjust the thermocouple so as not to touch the specimen and be approximately 25mm away from the centerline of the specimen.

Remove the thermocouple after the temperature has re-established (usually within 10 min) and determine the oxygen index of material at this temperature as per Method of test for cables: Part 6 Oxygen index test.

7.4. Take the first reading at ambient temperature and continue repeating 7.1 to 7.3, however, raising the temperature in 7.2 by 20° C (maximum) for two successive determinations of values, for a total of minimum three different temperatures (including the reading at ambient temperature). The temperature index shall be determined by extrapolation of this data.

7.5. Plot values of oxygen index against temperature using linear graph paper and read off the value of temperature at which the oxygen index is 21.

**8. TABULATION OF OBSERVATION**

S.No	Test Temperature	Volume Flow Rate $\text{mm}^3/\text{s}$			Specimen Burns	
		Oxygen	Nitrogen	Air	Duration (min)	$\geq 50\text{mm}$ (Yes/No)

**9. Calculation**

The minimum temperature index is the temperature at which the oxygen index is 21 read off in graph as per 7.6.

**10. Report**

- 10.1.** Measurement of Temperature Index
  - Reference Specification .....
  - Material Under test.....
  - Ambient temperature.....
  - Specified temperature index.....
  - Observed temperature index.....

- 10.2.** Conclusion
  - Specimen meets/does not meet the specification requirements.

## Reference:

This Standards has been formulated based on **IS 10810 (Part 64) :2003 (Reaffirmed 2018) Methods of Test for Cables part 64 Measurement of Temperature Index.**