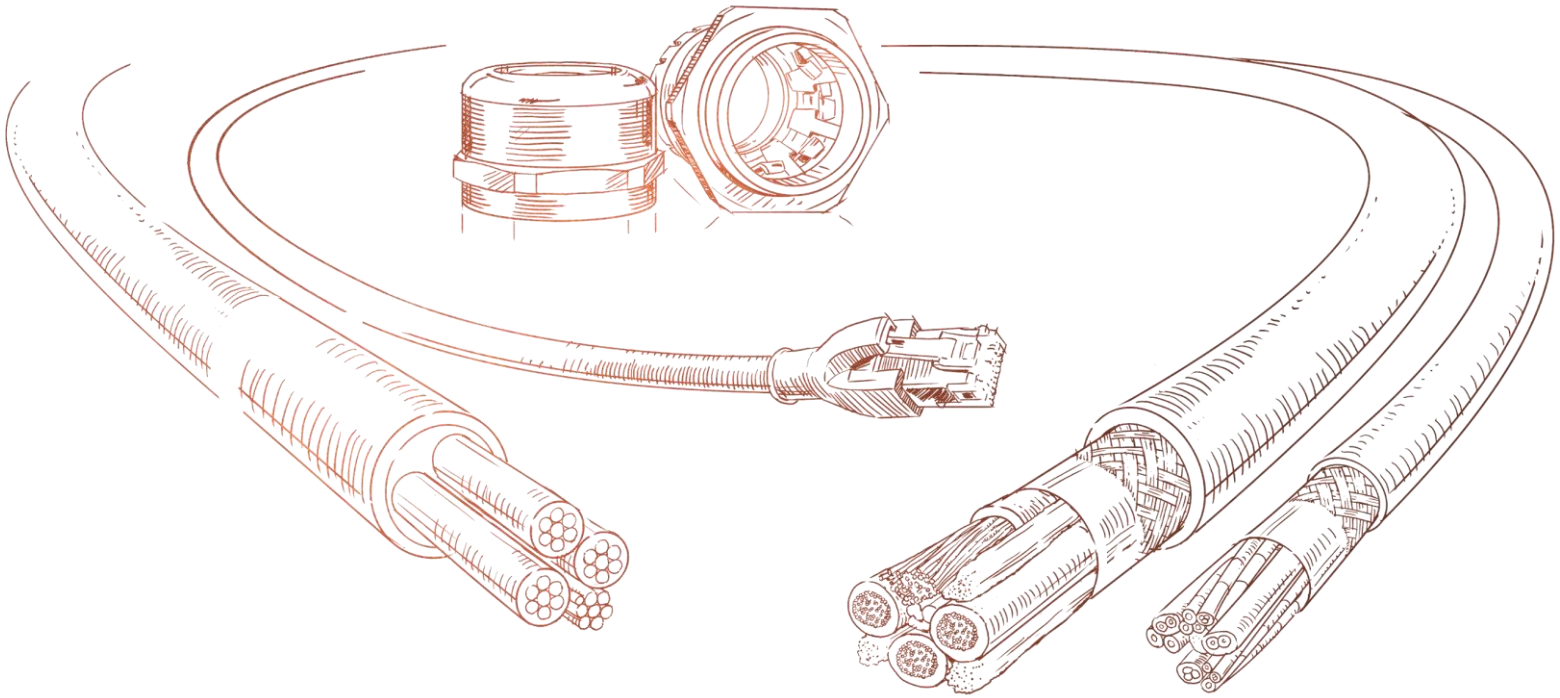
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Channeling POWER

HCMUT | INDUSTRIAL AUTOMATION SEMINAR

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Industrial Automation

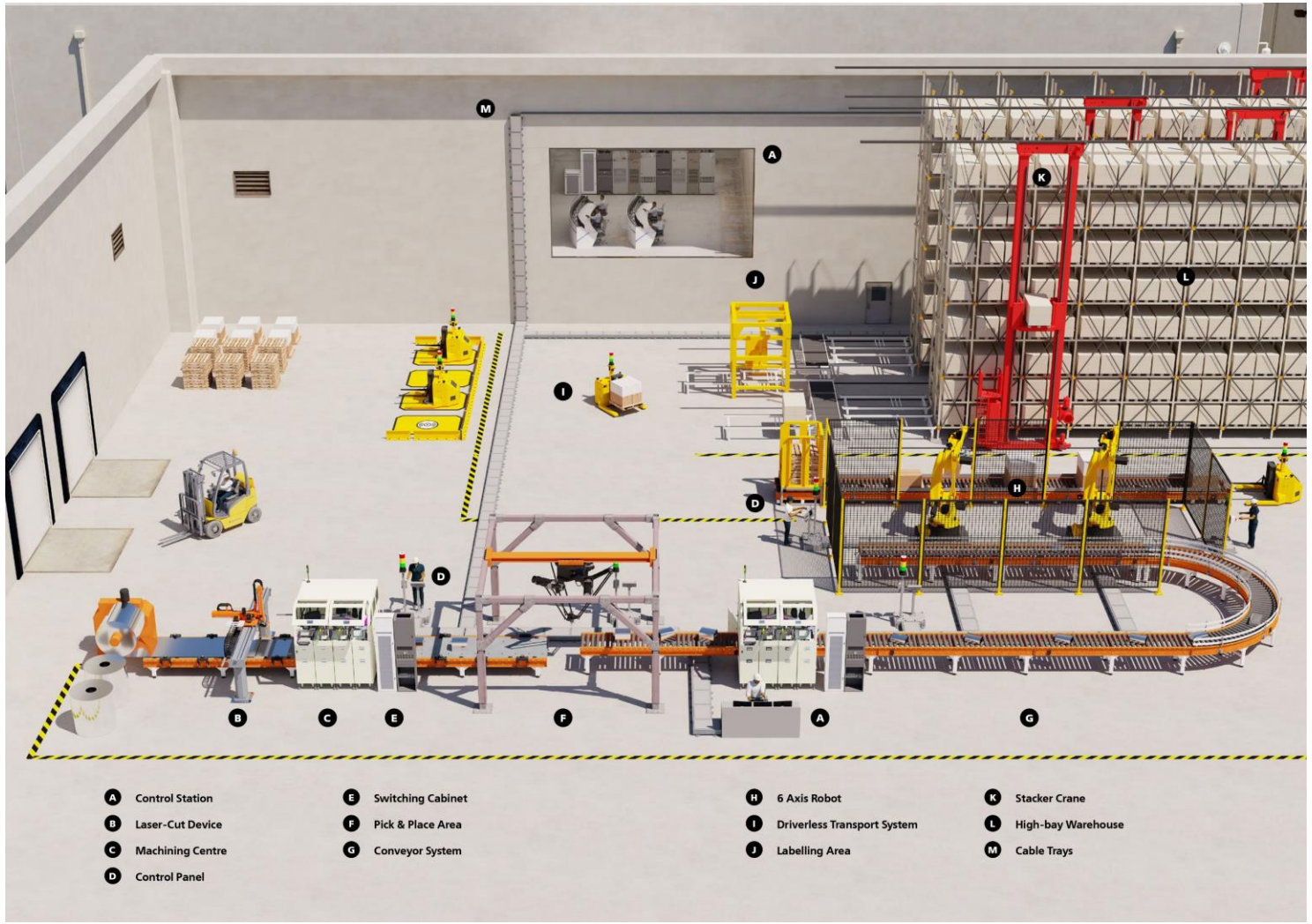
Industrial Automation



Integrated automation systems in industry require a very large number of processors, sensors, drives and controls that are intelligently and digitally interconnected with each other.

The right cables and wires are indispensable for this: they ensure that all system components reliably receive the power and data they need.

Industrial Automation



What factors to consider?

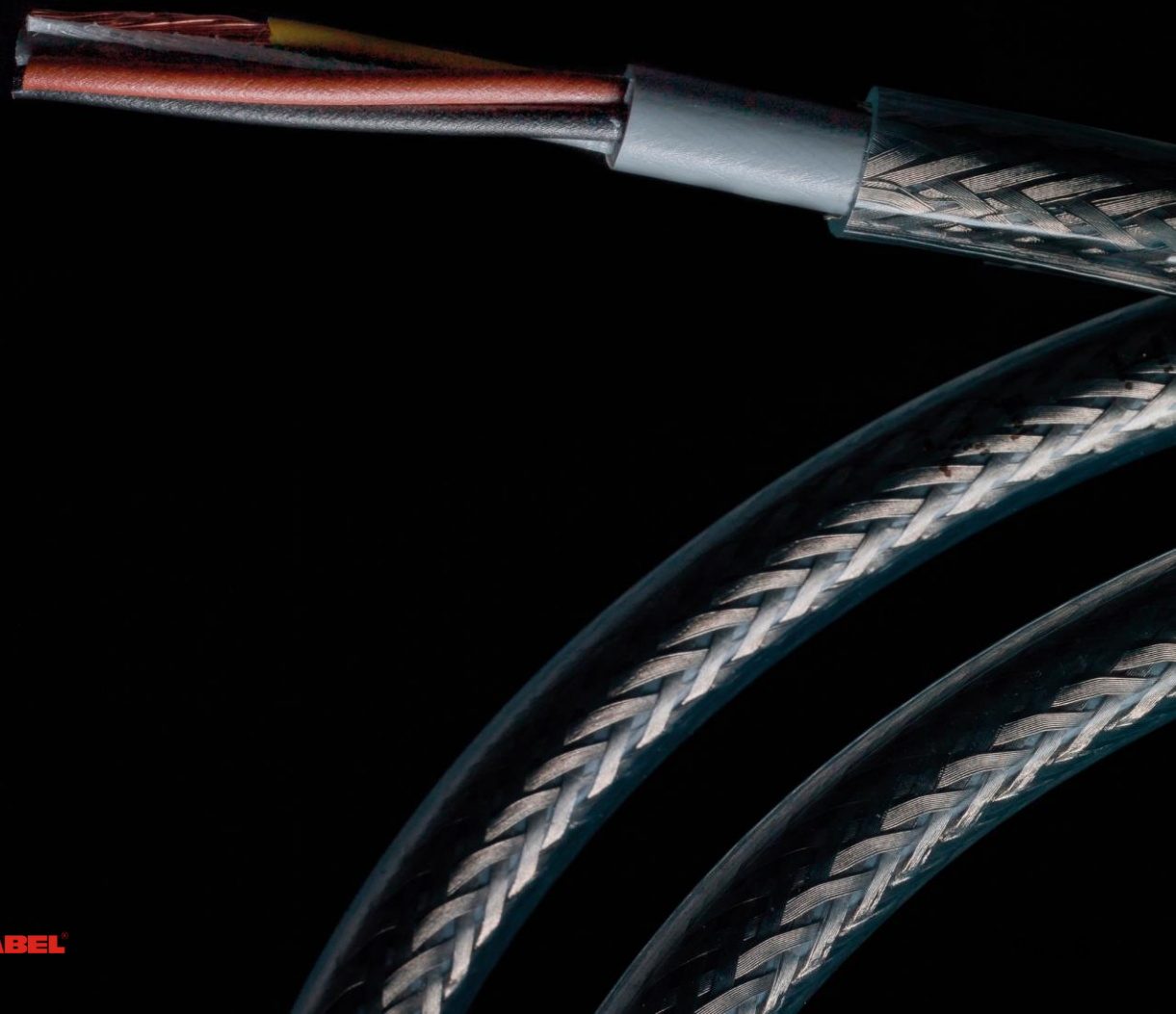
PICK THE RIGHT CABLES

. Specification

. Availability

. Price

. Approval



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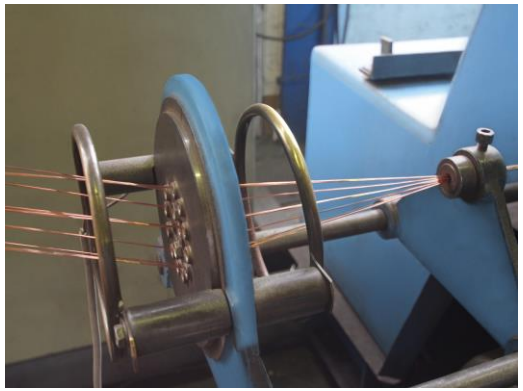
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How Cables Are Made

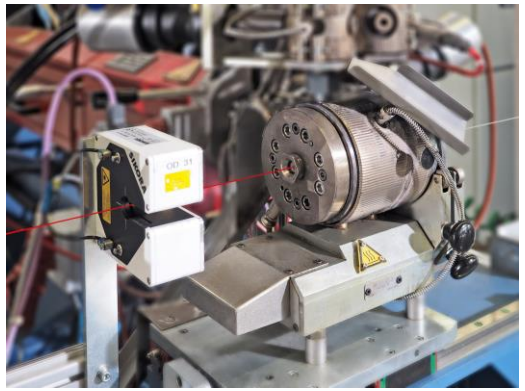
How Cables Are Made



Step 1: Wire Drawing



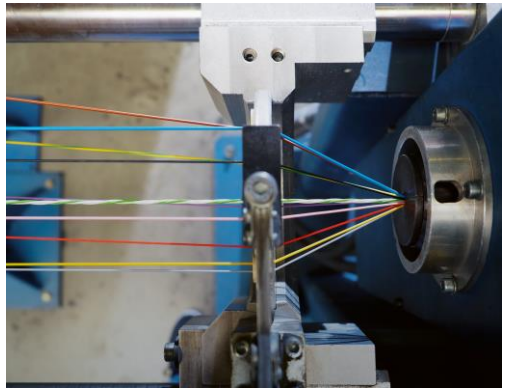
Step 2: Stranding



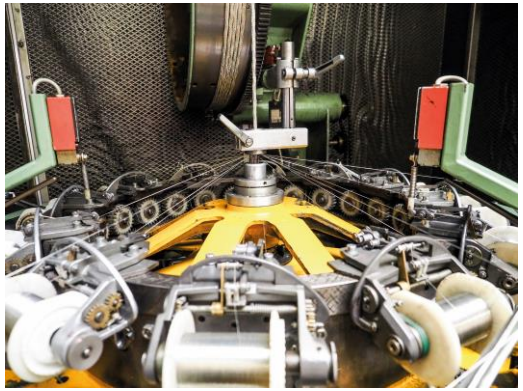
Step 3: Core Insulation



Step 7: Cable Marking



Step 4: Laying Up



Step 5: Braiding



Step 6: Jacket Extrusion

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Cable Applications

Cable Applications

- Cable Application
  - General
    - Power
    - Control
    - Data
  - Special
    - Heat
    - Moving
    - Servo Motor









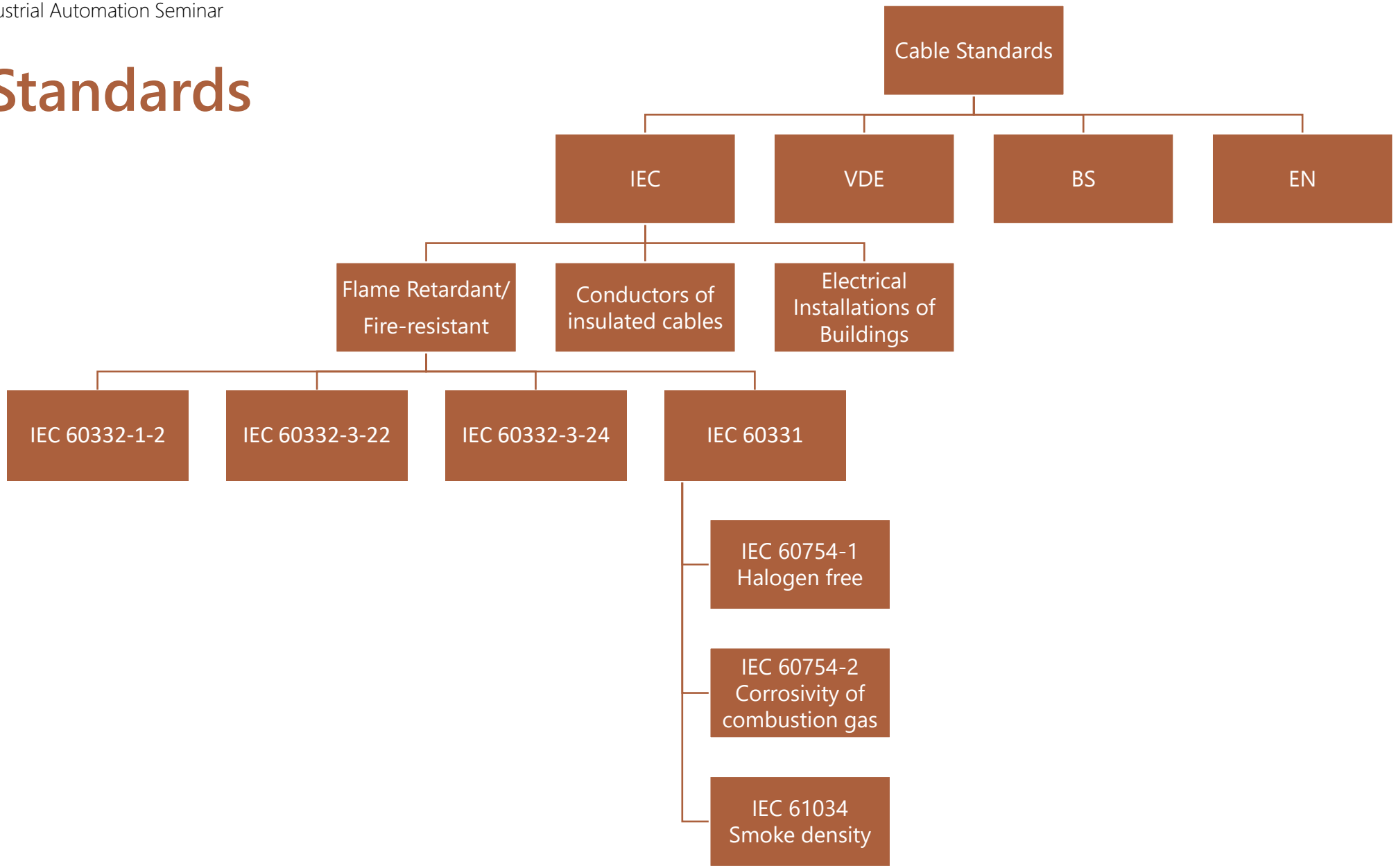




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IEC Standards

IEC Standards

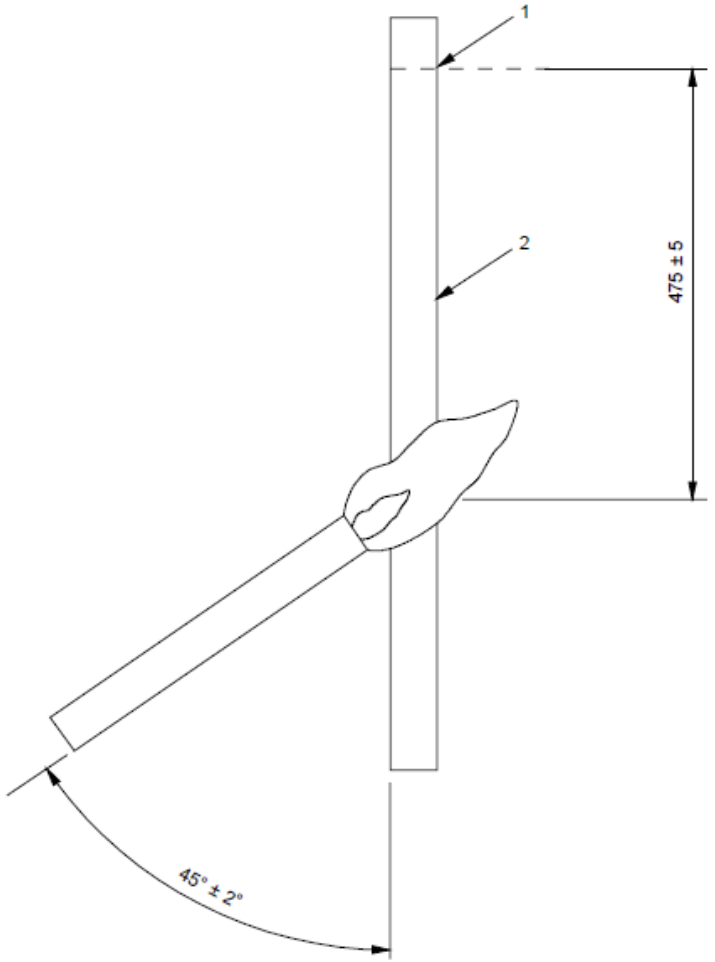


Flame Retardant Standards (Single Fire Test)

IEC 60332-1-2

- Test for vertical flame propagation for a single insulated wire or cable.
- The test is passed, if the sample has not burned or the flame extinguished by itself and the damage by fire does not reach the remotest upper side of the sample.

Overall diameter of test piece (D) (mm.)	Time for flame application (sec)
D ≤ 25	60
25 < D ≤ 50	120
50 < D ≤ 75	240
D > 75	480

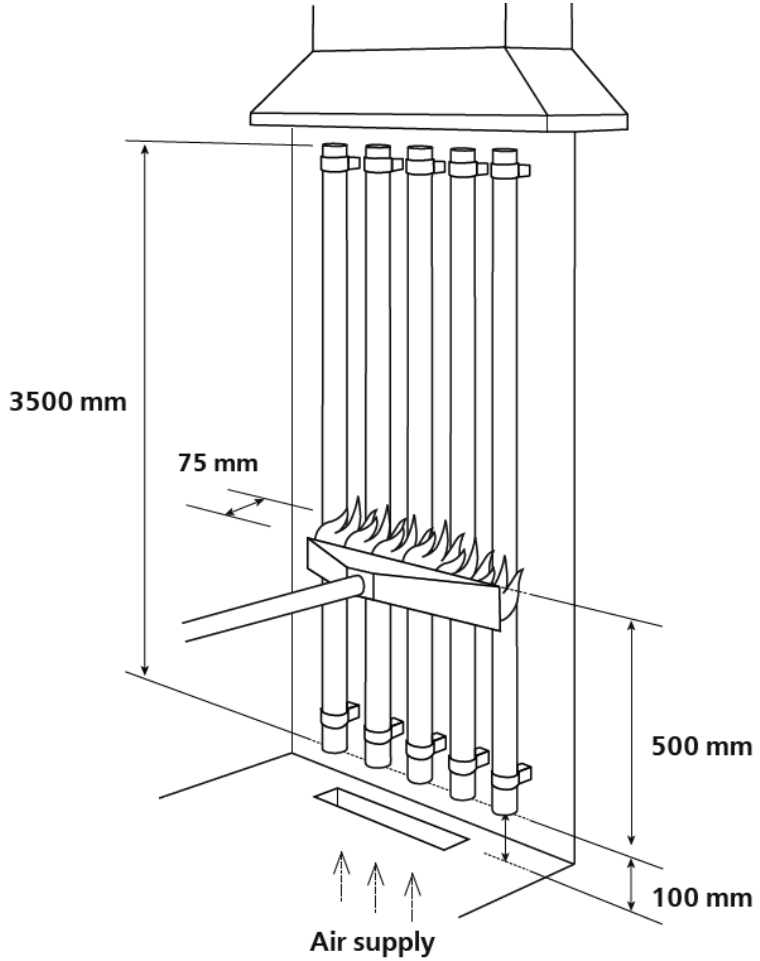


Flame Retardant Standards (Bundle Fire Test)

IEC 60332-3-22 & IEC 60332-3-24

- Test to guarantee that flame spread on the vertical cable bundle is prevented in the event of a fire.
- The Compliance criteria: cable may show fire damage up to a maximum of 2.5 m above the lower end of the burner

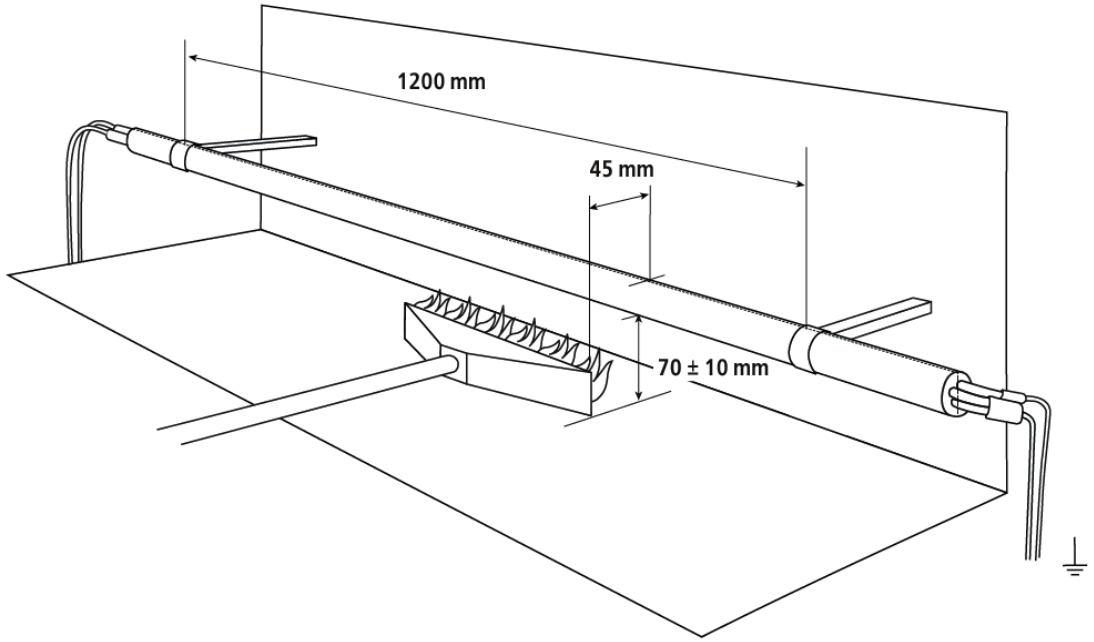
Standards	Category	Duration
IEC 60332-3-21 / EN 50266-2-1	Category A F/ R Special application only	n.a.
IEC 60332-3-22 / EN 50266-2-2	Category A (7 l flammable material/m) *	40 min
IEC 60332-3-23 / EN 50266-2-3	Category B (3,5 l flammable material/m)	40 min
IEC 60332-3-24 / EN 50266-2-4	Category C (1,5 l flammable material/m)	20 min
IEC 60332-3-25 / EN 50266-2-5	Category D (0,5 l flammable material/m)	20 min



Fire Resistant Standards

IEC 60331

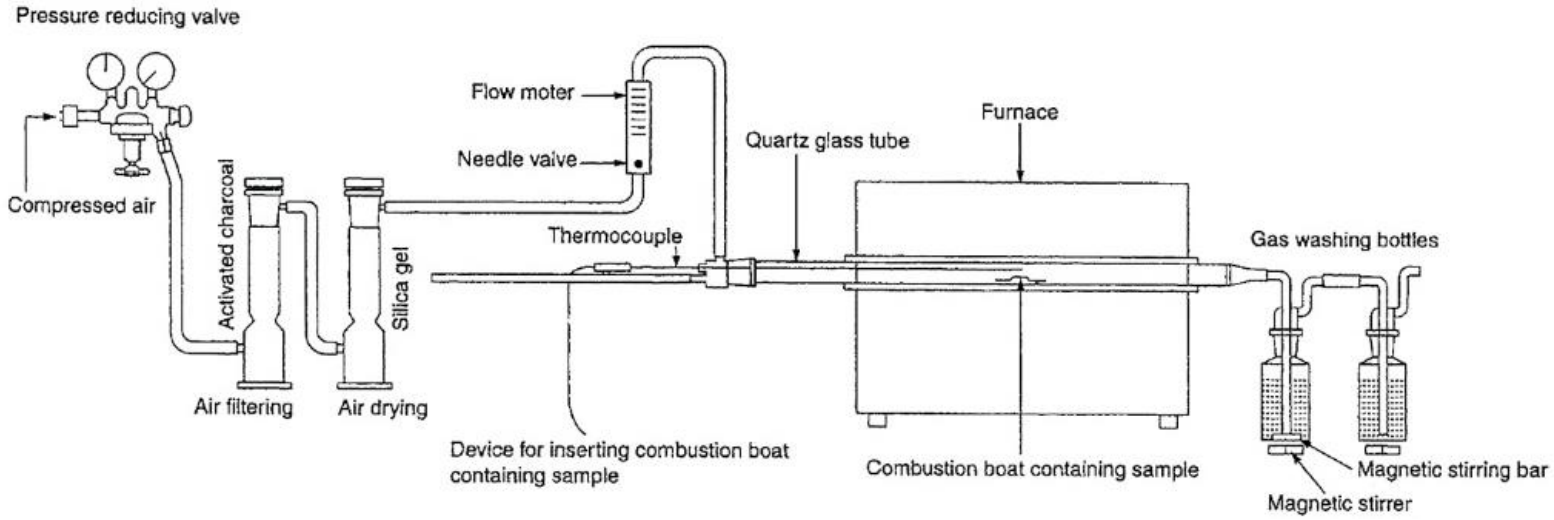
- Test sample of 1200 mm cable length is fixed in a horizontal position, 75 mm over the gas brenner.
- The rated voltage of 3 A fuse is fixed between the core groups. The burner flame is so to regulate that the
- Temperature on cables should be 800±50°C. The measuring can be effected until the fuse is blown.
- The test shall be regarded passed when no 3 A fuse has blown during the test period between 20 to 180 minutes.



Non-Halogen Standards

IEC 60754-1

- The corrosion test of gases caused by fire is carried out to the test materials, not of complete cable samples.
- The proof of halogen is effected by chemical analysis Materials with a content of ≤ 0.2% chlorine and ≤ 0.1% fluorine



Corrosivity of combustion gas Standards

IEC 60754-2

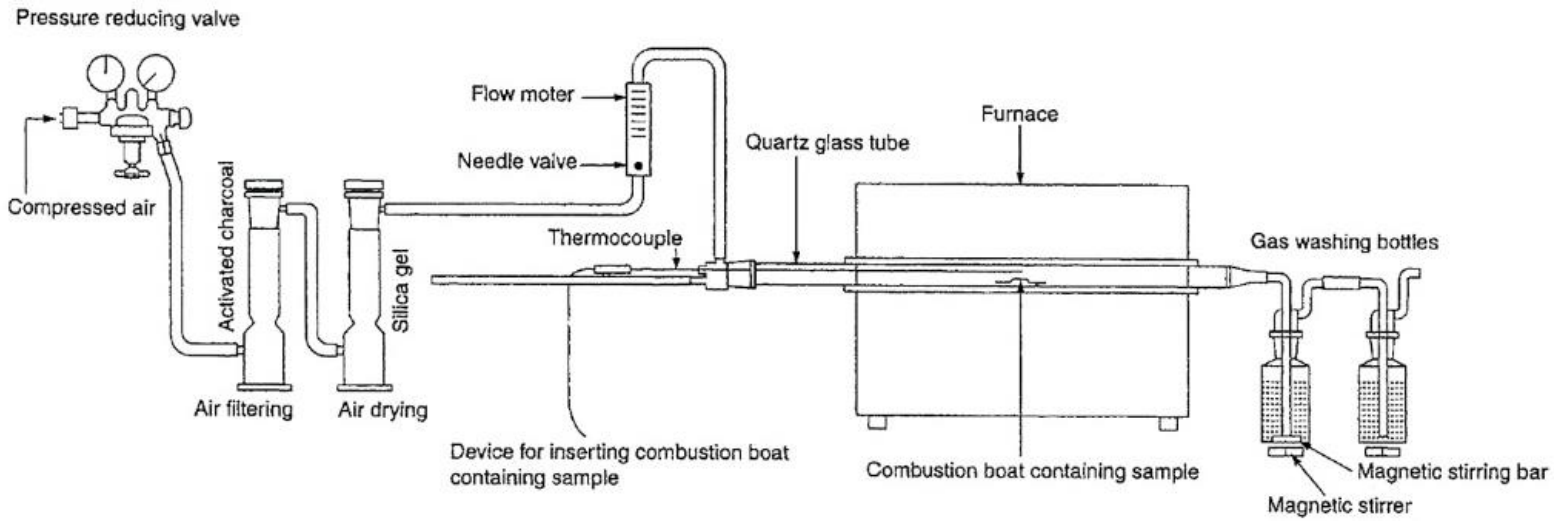
- For the performance of the test procedure the insulation and sheath materials are to be put in the moveable furnace, preheated to 750 to 800°C.

IEC 60754-2

- The burning gas is conducted through two gas-washing bottles. The test shall be regarded passed when:

  pH-value is ≥ 4.3

  and the electrical conductivity ≤ 100 µS•cm-1

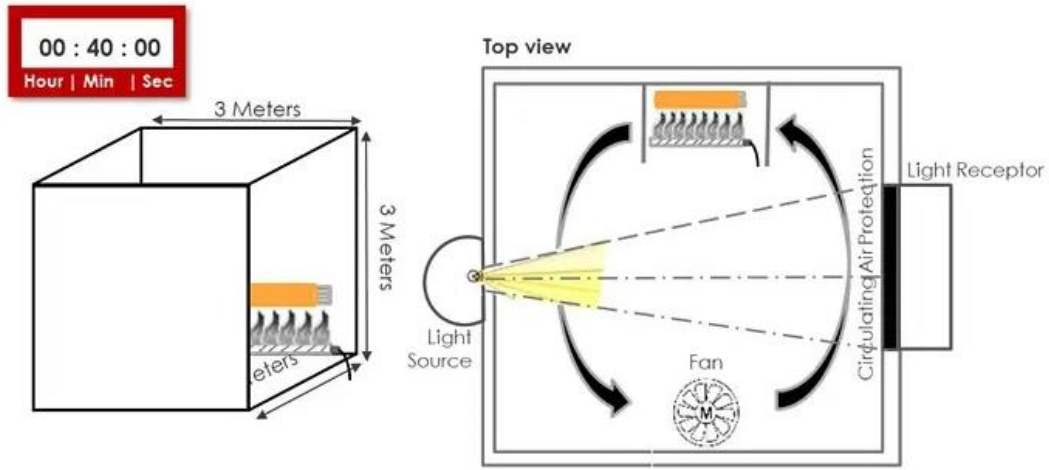


Smoke Density

IEC 61034

- The test is regarded as passed when the light absorption appears within 40 minutes and the following value shall be obtained for light transmission

Cable	Transmission of Light
> 3-5 mm	40%
> 5-10 mm	50%
> 10-20 mm	60%
> 20-40 mm	60%
> 40 mm	70%



IEC Standards

IEC 60332-1-2 < IEC 60332-3-24 < IEC 60332-3-22 < IEC 60331

PICK THE RIGHT CABLES

Stay in Touch with us.

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