

Halogen-free Security Cables and Wires

Continuance of insulation effect under direct fire conditions

According to DIN VDE 0472 part I 814 Δ IEC 60331

Test sample of 1200 mm cable length is fixed in a horizontal position, 75 mm over the gas burner. The rated voltage of 3 A fuse is fixed between the core groups. The burner flame is so to regulate that the temperature on cable should be $800 \pm 50^\circ\text{C}$. The measuring can be effected until the fuse is blown. Test voltage 400 V for power cables and wires
Test voltage 110 V for telecommunication cables

- The test shall be regarded as passed when no 3 A fuse has blown during the test period between 20 to 180 minutes.

Non-Halogen verification

According to DIN VDE 0472 part 815, IEC 60754-1, DIN VDE 0482 part 267 and EN 50267-2-1

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:

$\leq 0,2\%$ chlorine and

$\leq 0,1\%$ fluorine

are regarded as halogen-free.

Smoke density

According to DIN VDE 0472 part 816 Δ IEC 61034-1 and IEC 61034-2, DIN EN 61034-1+2, HD 606 and BS 7622 part 1 and 2

The test of smoke density is effected to a single cable, laid in a horizontal position within a room of 3 meter cube. The photometrically measured absorption of light is a measuring unit (in %) of light transmittance for the smoke density.

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

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

Functionality of electric cable systems

According to DIN 4102 part 12 (system test)
DIN 4102 part 12 describes the requirements and measurements necessary in achieving circuit integrity of a complete electric cable system in case of fire.

Cable systems

Regarded as cable systems are power cables, insulated power cables and wires, telecommunication installation cables for telephone and data transmission and rail-distributors including their corresponding connecting devices such as the necessary ducts and conduits, coatings and coverings, connecting elements, supporting devices, cable trays and clamps.

Functionality

According to DIN VDE 4102 part 12

The functionality is given, when during the test under fire no short circuit and no interruption of current flow occurs in the tested electrical cable system.

According to this standard, the security cables are always to be tested together with the corresponding supporting devices, clamps, holder and mounting accessories.

Note: The above defined functionality has no relationship with the continuance of insulation effect under fire conditions according to DIN VDE 0472 part 814.

Test

During this test under fire a complete cable installation will be tested in a large combustion chamber, i. e. cables and wires including clamps, supporting devices, holders, dowels etc.

Test voltage for power cables:	380 V
Test voltage for telecommunication cables:	110 V
Current load:	3 A

The combustion chamber is to be heated up according to ETK (Standard temperature curve).

The test period is distinguished in 3 classes:

- E30 for the functionality ≥ 30 minutes
- E60 for the functionality ≥ 60 minutes
- E90 for the functionality ≥ 90 minutes

Raise of temperature in combustion chamber:

- For E30 to approx. 820°C
- For E60 to approx. 870°C
- For E90 to approx. 980°C

After passing the functionality test, this will be certified with the class identification as E30, E60 or E90.

Note: At the moment the class E60, which is specified in DIN-VDE standards, is not applied for economical and technical reasons.