### ERVITAL FIRE RESISTANT SIGNAL CONTROL CABLES

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Application</th>
<th>Specification</th>
<th>Conductor Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERVITAL JE-H(Si)H...Bd FE180/PH120</td>
<td># Fire detection and fire alarm system circuits</td>
<td>VDE 0815</td>
<td>1</td>
</tr>
<tr>
<td>ERVITAL JE-H(Si)H...Bd FE180/E30</td>
<td># Fire detection and fire alarm system circuits</td>
<td>VDE 0815</td>
<td>1</td>
</tr>
<tr>
<td>ERVITAL JE-H(Si)H...Bd FE180/E90</td>
<td># Fire detection and fire alarm system circuits</td>
<td>VDE 0815</td>
<td>1</td>
</tr>
<tr>
<td>ERVITAL LIHH FE180/PH120</td>
<td># Emergency announcement systems</td>
<td>VDE 0812 / VDE 0815</td>
<td>5</td>
</tr>
<tr>
<td>ERVITAL LIHCH FE180/PH120</td>
<td># Emergency announcement systems</td>
<td>VDE 0812 / VDE 0815</td>
<td>5</td>
</tr>
<tr>
<td>ERVITAL LIHCH FE180/E30</td>
<td># Emergency announcement systems</td>
<td>VDE 0812 / VDE 0815</td>
<td>5</td>
</tr>
<tr>
<td>ERVITAL LIHCH FE180/E90</td>
<td># Emergency announcement systems</td>
<td>VDE 0812 / VDE 0815</td>
<td>5</td>
</tr>
<tr>
<td>ERVITAL LIH(Si)H FE180/PH120</td>
<td># Emergency announcement systems</td>
<td>VDE 0812 / VDE 0815</td>
<td>5</td>
</tr>
<tr>
<td>ERVITAL LIH(Si)CH FE180/PH120</td>
<td># Emergency announcement systems</td>
<td>VDE 0812 / VDE 0815</td>
<td>5</td>
</tr>
</tbody>
</table>

### ERVITAL FIRE RESISTANT ENERGY CABLES

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Application</th>
<th>Specification</th>
<th>Conductor Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERVITAL NHXH FE180/E90</td>
<td># Fire detection and fire alarm system circuits</td>
<td>VDE 0266</td>
<td>1-2</td>
</tr>
<tr>
<td>ERVITAL NHXCH FE180/E90</td>
<td># Fire escape route lighting</td>
<td>VDE 0266</td>
<td>1-2</td>
</tr>
<tr>
<td>ERVITAL (N)HXH FE180/E30</td>
<td># Emergency announcement systems</td>
<td>HD 604 S1 Section SH</td>
<td>1-2</td>
</tr>
<tr>
<td>ERVITAL (N)HXH FE180/E90</td>
<td># Fire-fighting water pumps</td>
<td>HD 604 S1 Section SH</td>
<td>1-2</td>
</tr>
<tr>
<td>ERVITAL (N)HXCH FE180/E30</td>
<td># Smoke, heat exhaust and pressurization fans</td>
<td>HD 604 S1 Section SH</td>
<td>1-2</td>
</tr>
<tr>
<td>ERVITAL (N)HXCH FE180/E90</td>
<td># Emergency lifts</td>
<td>HD 604 S1 Section SH</td>
<td>1-2</td>
</tr>
</tbody>
</table>

### FIRESAFE FIRE RESISTANT CABLES

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Application</th>
<th>Specification</th>
<th>Conductor Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRESAFE</td>
<td># Emergency lighting, fire detection and fire alarm system circuits.</td>
<td>-</td>
<td>1-2</td>
</tr>
<tr>
<td>FIRESAFE GOLD</td>
<td># Emergency lighting, fire detection and fire alarm system circuits.</td>
<td>BS 7629-1:2015</td>
<td>1-2</td>
</tr>
</tbody>
</table>
## FIRE RESISTANT SIGNAL CONTROL & ENERGY CABLES

<table>
<thead>
<tr>
<th>Insulation</th>
<th>Sheath</th>
<th>Nominal Voltage</th>
<th>Temperature range for static installation (°C)</th>
<th>Flame Retardant Test</th>
<th>Flame Propagation Test</th>
<th>Smoke Density Test</th>
<th>Corrosive Gas Test</th>
<th>Halogen Free Test</th>
<th>Circuit Integrity Test (FE180)</th>
<th>Circuit Integrity With Shock Test (PH120)</th>
<th>Circuit Integrity With Shock and Water Test (Cat. C-W-Z)</th>
<th>Cable System Circuit Integrity (E30/E90)</th>
<th>DIN EN 406-2/E010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>225 V</td>
<td>-40°C … +70°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>BS 6387</td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>225 V</td>
<td>-40°C … +70°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>225 V</td>
<td>-40°C … +70°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>300/500 V</td>
<td>-40°C … +70°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>300/500 V</td>
<td>-40°C … +70°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>300/500 V</td>
<td>-40°C … +70°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>300/500 V</td>
<td>-40°C … +70°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>300/500 V</td>
<td>-40°C … +70°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>0.6/1 kV</td>
<td>-40°C … +90°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>0.6/1 kV</td>
<td>-40°C … +90°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>0.6/1 kV</td>
<td>-40°C … +90°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>0.6/1 kV</td>
<td>-40°C … +90°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>0.6/1 kV</td>
<td>-40°C … +90°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>300/500 V</td>
<td>-40°C … +70°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone</td>
<td>HFFR</td>
<td>300/500 V</td>
<td>-40°C … +70°C</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
EN 60332-1-2: Test for Vertical Flame Propagation for a Single Insulated Wire or Cable

**Sample Characteristics**
- Minimum Length: 600 mm

**Test Characteristics**
- **Flame Temperature**: Determined by the stipulated setting of the burner flame
- **Duration**: min. 60 sec. Burner at an angle of 45° to the vertical

**Requirement**
The fire damage must end at least 50 mm below the upper fixing clamp. The cable must be self-extinguishing

EN 60332-3-24: Test for Vertical Flame Spread of Vertically - Mounted Bunched Wires or Cables - Category C

**Sample Characteristics**
- Minimum Length: 4 m x test pcs.
- **Total Volume**: 1,5 l non-metallic material/m

**Test Characteristics**
- **Flame Temperature**: Determined by the stipulated quantity of propane gas and air
- **Duration**: 20 min.

**Requirement**
The visible area of fire damage to the cables must not exceed 2,5 m in height from the bottom edge of the burner

EN 60754-1: Test on Gases Evolved during Combustion of Materials from Cables - Part 1: Determination of the Amount of Halogen Acid Gas

**Sample Characteristics**
- Insulation and sheath compounds

**Test Characteristics**
- **Heat Temperature**: 800°C
- **Duration**: 40 minutes in total, with at least 20 minutes at the maximum temperature

**Requirement**
The test is passed if the halogen acid gas content is lower than 5 mg/g

EN 60754-2: Test on Gases Evolved during Combustion of Materials from Cables - Part 2: Determination of Acidity (by pH Measurement) & Conductivity

**Sample Characteristics**
- Insulation and sheath compounds

**Test Characteristics**
- **Heat Temperature**: 935°C
- **Duration**: 30 min.

**Requirement**
The test is passed if the pH-values is lower than 4,3 and the electrical conductivity does not exceed 100 S/cm
FIRE RESISTANT CABLES
FLAME & FIRE TESTS

EN 61034-2: Measurement of Smoke Density of Cables Burning under Defined Conditions

**Sample Characteristics**
- Insulation and sheath compounds

**Test Characteristics**
- **Test Set-Up:** A cable specimen is burnt in a closed chamber using a flammable liquid
- **Flame Temperature:** Determined by the quantity and composition of the fuel
- **Duration:** 40 min.

**Requirement**
- Light transmission is 60% min.

IEC 60331-23: Tests for Electric Cables under Fire Conditions - Circuit Integrity (FE180)

**Sample Characteristics**
- **Minimum Length:** 1.200 mm

**Test Characteristics**
- **Flame Temperature:** 750°C
- **Voltage:** Cable nominal voltage
- **Duration:** 180 min.

**Requirement**
- Function continuity ≥ 180 min.
  - (The sample will be connected to electrical supply and placed into the flames)

EN 50200: Test for Resistance to Fire of Unprotected Small Cables for Use in Emergency Circuits (PH120)

**Sample Characteristics**
- **Cable Diameter:** 20 ≤ mm
- **Minimum Length:** 1.200 mm

**Test Characteristics**
- **Flame Temperature:** 830°C
- **Mechanical Shock:** Each 5 min.
- **Voltage:** Cable nominal voltage
- **Duration:** 120 min.

**Requirement**
- Function continuity ≥ 120 min.

EN 50200 Annex E: Similar to EN 50200 with Water Spray

**Sample Characteristics**
- **Cable Diameter:** 20 ≤ mm
- **Minimum Length:** 1.200 mm

**Test Characteristics**
- **Flame Temperature:** 830°C
- **Duration:** 30 min.
  - (15 min. fire & shock and than 15 min. fire & shock & water)

**Requirement**
- Function continuity ≥ 30 min.
BS 6387 CAT C: Test Method for Resistance to Fire of Cables Required to Maintain Circuit Integrity under Fire Conditions

Sample Characteristics
Minimum Length: 1.200 mm

Test Characteristics
Flame Temperature: 950°C
Voltage: Cable nominal voltage
Duration: 180 min.

Requirement
Function continuity ≥ 180 min.

BS 6387 CAT W: Test Method for Resistance to Fire of Cables Required to Maintain Circuit Integrity under Fire Conditions with Water

Sample Characteristics
Minimum Length: 1.500 mm

Test Characteristics
Flame Temperature: 650°C
Voltage: Cable nominal voltage
Water spray with sprinkle
Duration: 30 min. (15 min. fire and than 15 min. fire & water)

Requirement
Function continuity ≥ 30 min.

BS 6387 CAT Z: Test Method for Resistance to Fire of Cables Required to Maintain Circuit Integrity under Fire Conditions with Mechanical Shock

Sample Characteristics
Cable Diameter: ≤ 20 mm
Minimum Length: 1.200 mm

Test Characteristics
Flame Temperature: 950°C
Voltage: Cable nominal voltage
Mechanical Shock: Each 30 s
Duration: 15 min.

Requirement
Function continuity ≥ 15 min.


Sample Characteristics
Minimum Length: 4.000 mm x test pcs.

Test Characteristics
Fire Temperature: from ambient to > 1,000°C (ΔT=345log[8tmin+1])
Voltage: 400V for 0,6/1kV Cables & 110V for ≤ 0,6/1kV cables
Duration: 90 min.

Requirement
Function continuity ≥ 30, 60 or 90 min.
### Table

<table>
<thead>
<tr>
<th>Standard(s)</th>
<th>FE180</th>
<th>PH120</th>
<th>E30</th>
<th>E60</th>
<th>E90</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 60331-21/23</td>
<td>IEC 60331-21/23</td>
<td>TS/BS/EN 50200 - TS/BS/EN50362</td>
<td>DIN VDE 4102-12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>750°C</td>
<td>830±40°C</td>
<td>up to 1000°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>180 min.</td>
<td>120 min.</td>
<td>30 min.</td>
<td>60 min.</td>
<td>90 min.</td>
</tr>
<tr>
<td>Voltage</td>
<td>up to 1 kV</td>
<td>up to 1 kV</td>
<td>up to 1 kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test Method</td>
<td>Flame is applied to the cable only</td>
<td>Flame and physical impact are applied to the cable only</td>
<td>Flame is applied to the whole cable system</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Explanation

**IEC 60331-21/23**
These standards contain the information about tests for electric cables under fire conditions - Circuit integrity - Part 21/23

**TS/BS/EN 50200 - TS/BS/EN50362**
These standards contain method of testing resistance to fire of unprotected small and big cables (smaller than 20mm and bigger than 20mm overall diameter) for use in emergency circuits. (Circuit integrity with shock)

**DIN VDE 4102-12**
This standard specifies requirements for and methods of testing the maintenance of circuit integrity in electrical cable systems under fire conditions. It applies only to cables rated for voltages up to 1 kV. The test method specified here identifies the maintenance of circuit integrity as the absence of a short circuit or interruption in the cable system. It is not suitable for determining function impairment as a result of voltage drops or a heat-induced increase in conductor resistance.
## FIRE RESISTANT CABLES
### COMPARISON OF FIRE TESTS

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>W</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard(s)</strong></td>
<td>BS 6387</td>
<td>BS 6387</td>
<td>BS 6387</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>950±40°C</td>
<td>650±40°C</td>
<td>950±40°C</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>180 min.</td>
<td>30 min.</td>
<td>15 min.</td>
</tr>
<tr>
<td><strong>Voltage</strong></td>
<td>up to 1 kV</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test Method</strong></td>
<td>Flame is applied to the cable only</td>
<td>Flame and water spray are applied to the cable only</td>
<td>Flame and physical impact are applied to the cable only</td>
</tr>
</tbody>
</table>

### Figure

- **BS 6387 C** Protocol C subjects the cable under test to a flame via direct impingement corresponding to a temperature attack of 950 °C ±40 °C.
- **BS 6387 W** Protocol W subjects the cable under test to a flame via direct impingement corresponding to a temperature attack of 650 °C ±40 °C with direct application of water simulating a sprinkler system.
- **BS 6387 Z** Protocol Z subjects the cable under test to a flame via direct impingement corresponding to a temperature attack of 950 °C ±40 °C with indirect application of mechanical shock.