

Thermosetting insulated fire survival cables are particularly suited for environments like high-rise buildings, hospitals and power stations, where maintaining electrical service during a fire is crucial for safe evacuation. IS 17505 (Part 1):2021 specifies the requirements for thermosetting insulated fire survival cables with low emission of smoke and corrosive gases under fire conditions, designed for fixed installations. The standard is intended for cables operating at voltages up to 1100 V AC and 1500 V DC, ensuring that the cables can withstand exposure to fire, while retaining their integrity to support essential systems.

The cables covered by this standard have thermosetting insulation, providing enhanced fire-resistance properties. The key features of these cables include:

1. **Thermosetting Insulation:** Materials such as cross-linked polyethylene (XLPE) or halogen-free, flame-retardant thermoplastic elastomers are used, offering resistance to high temperatures and maintaining the circuit integrity in fire situations.
2. **Armoured Construction:** The cables are designed with armouring to provide mechanical protection, crucial in environments where they may be exposed to physical damage.
3. **Fire Survival:** The cables are capable of surviving under extreme fire conditions, which is essential for safety in critical infrastructures.
4. **Low Emission:** These cables emit low levels of smoke and non-corrosive gases when subjected to fire, preventing hazards like toxic smoke inhalation and electrical failures.

Tests and Importance:

The standard outlines various tests to ensure the cables meet required performance criteria in fire conditions, including:

1. **Circuit Integrity Test:** The cables must maintain electrical continuity when subjected to high temperatures and mechanical shock in a fire. This test simulates real-world fire situations and ensures the cables continue to function under stress.
2. **Flame Retardant Test:** The cables must resist flames and prevent the spread of fire. These tests ensure that the cable does not contribute to the spread of fire, a critical factor in fire safety.
3. **Oxygen Index and Smoke Density:** These tests assess how much oxygen is required to sustain combustion (Oxygen Index) and how much smoke is generated during burning. Cables with a high oxygen index and low smoke density are essential for reducing fire hazards in confined spaces.
4. **Abrasion Resistance:** This test checks the durability of the cable's outer sheath under mechanical stress, simulating conditions where the cable may be subject to wear and tear.
5. **Water Immersion Test:** Evaluates the performance of the cable's sheath when exposed to water, ensuring that the insulation maintains its properties under damp conditions.
6. **High Voltage Test:** Ensures that the cables can withstand voltage levels beyond their rated capacity, providing added security in critical applications.

These rigorous testing procedures ensure that the cables not only provide safety in the event of a fire but also maintain their electrical functionality during emergencies. The inclusion of these fire-resilient cables is crucial for infrastructure such as emergency lighting, fire alarms, and critical communication systems, where continued operation during a fire can save lives.

Overall, IS 17505 (Part 1):2021 enhances safety and reliability in buildings and industrial settings by ensuring that electrical cables maintain their integrity during fire emergencies, which is vital for both human safety and equipment functionality.