

# Halogen-free Security Cables and Wires

## What are halogens?

Halogens "formation of salt" are the elements as fluorine, chlorine, bromine and iodine. Fluorine and chlorine are important for cables and wires as atoms in the plastic molecules, for example fluorine plastics or PVC (polyvinyl chloride) are of significance; and bromine as component of flame protection additives.

## When is a cable halogen-free ?

The burning behaviour of cables and wires is very important for the installation in buildings and also in control plants.

## Thereby the following points are very important:

- Behaviour under flame influence i. e. the inflammability as well as the propagation of fire
- Subsequent damage by formation of corrosive and toxic gases
- Development of smoke density (darkening of emergency exits hindered the fire extinguishing works)

Cables produced of not halogen-free (halogenated) materials such as mainly the materials with chlorine in the molecule-chain: Polyvinyl chloride (PVC), chloroprene rubber (CR), chlorinated polyethylene (CM), chlorosulfonated polyethylene (CSM) and fluorhydrocarbons.

Polytetrafluorethylene (PTFE)  
Fluorethylenepropylene (FEP)  
Perfluoralkoxypolymeric (PFA)

These materials have a better behaviour in case of fire.

These are hardly combustible or not flammable and vastly self-extinguishing. Due to this effect and in case of fire the released molecules constituents chlorine and fluorine, which hinder the admittance of oxygen to the fire location and suffocate the flame.

The remarkable disadvantages of these materials are existing in the fact that the released chlorine and fluorine atoms composite themselves with hydrogen which is decomposed from plastic material as well as with hydraulic acid or hydrofluoric acid from the existing air.

These compositions are extremely corrosive and also toxic. In consequence the damages by corrosion are often higher than the actual damage caused by fire.

Halogen-free cables contain no halogens, i. e. the insulation and sheath materials of these cables are composed with polymers on the basis of pure

hydrocarbons. By burning such kind of materials, produce no corrosive and toxic gases but only water vapour and carbondioxide.

Polymers like polyethelene (PE) or polypropylene (PP) are halogen-free. These materials are easy flammable and not self-extinguishing.

Halogen-free cables for the security requirements must be hardly flammable and self-extinguishing. This happens by using the special polymer compounds, containing the considerable percentage of flame protective materials.

Such kind of protective materials consist for example, of an aluminium hydroxide which on one side cools the fire location by setting free of crystal water and on the other side the released water vapour hinders the admittance of oxygen and thereby this suffocates the flame. By using of additional supporting tapes and filling yarns of glass web, mica and similar materials the functionality for example of E 90 can be realised with the suitable cable accessories.

## Application

The application of halogen-free security cables and wires are specified more and more with increasing numbers for the buildings where people gather or everywhere, where safety consciousness to protect the human life and valuable materials take a special significance. For example,

- Hospitals, airports, in multi-storey buildings, stores and shops, hotels, theaters, cinemas, schools etc.
- Fire warning plants, alarm systems, ventilation systems, escalators, lifts, safety lights, operation and intensive stations, maintenance equipment
- Underground railways and other railway plants
- Data processing installations
- Power stations and industrial plants with high valuable machines and materials or risky potentials
- Mining works
- Shipbuilding and offshore plants
- Emergency power supply works

## HELUKABEL-Security Cables and Wires and the advantages

- Flame retardant and hardly combustibility so that no flame propagation in case of fire can be resulted
- Halogen-free; no evolution of corrosive gases
- In case of burning, the halogen-free cables emits low smoke