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Paper

Flammability undesirable

A fire at a plant or production facility causes immense destruction. Not only the damage caused by the fire, but also the secondary damage must not be underestimated. Aggressive fumes combine with steam from the extinguishing water to form a corrosive acid, which can also severely damage machines that are not directly affected by the fire. Hence the European Union Construction Products Regulation now also takes into account cables and classifies their requirements according to fire behavior.

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Fire protection in buildings is not a new topic these days. Escape routes are mandatory for any building where people work or live. To further improve the fire protection and give people in buildings as long as possible for an unharmed escape in the event of a fire, products delaying the spread of a fire for as long as possible or even preventing it from spreading must be utilized.

Cables, the possible fuse cord in the building

Cables run through modern buildings like veins in a human body. Like blood in the body, more and more data from all areas of buildings must nowadays be distributed or merged for the automation or for production applications. So these cables also connect all building sections from cellar to roof. If such cables are highly flammable, they would act as a fuse cord and distribute

a fire throughout the building. This must be prevented by all means – in the best possible way. However, major fires such as the one at Germany's Duesseldorf Airport have shown that not only flame retardancy needs to be considered, but also the smoke development, which together with the extinguishing water forms corrosive acids.



So it does not come to that – prevent firefighting by using tested materials in buildings.

To better and uniformly take into account cables when it comes to building fire protection in Europe, tiered flammability properties for cables are now described by the Construction Products Regulation (CPR). The Construction Products Regulation applies to all products that are permanently connected to the building and contribute to the function of the structure. Cables connecting a device to the building via a connector (e.g., non-permanent network connection via patch cable) are exempt from this regulation. Also exempt from this regulation are fire-resistant cables as well as cables inside machines or cables that have been manufactured for special industrial facilities (in this case, a machine is considered a temporary installation in a building).

Cables that are to be permanently installed in a building must be CE-marked in accordance with the Construction Products Regulation and have a Declaration of Performance (DOP) from the manufacturer. The DOP certifies the compliance with the fire classes listed by the manufacturer.

Classification describes properties

To implement the Construction Products Regulation, the fire behavior of cables was described in DIN EN50575 and evaluated according to flame propagation, heat generation, smoke development, acid formation and formation of burning droplets. For ease of handling, the cables graded in this way are classified into fire/Euro classes from A to F,

as is the norm in the Construction Products Regulation (DIN EN 13501-6, ca = cable):

- Aca (incombustible)
- B1ca or B2ca (very high flame retardancy)
- Cca (high flame retardancy)
- Dca (medium flame retardancy)
- Eca (low flame retardancy)
- Fca (no flame retardancy)

It makes sense to assign the different flame retardancy classes to the safety requirements of buildings. For example, buildings with very high fire safety requirements include hospitals and day-care centers. Buildings with high fire safety requirements include office or administrative buildings. Furthermore, the location of the cable installation needs to be evaluated, e.g., whether the line is installed in an escape route or at any point in the building.

Besides the fire classes, the classification is supplemented by additional property profiles concerning

- Smoke development (s1 to s3 according to EN50399/ EN61034)
- Toxicity (a1 to a3 according to EN60754-2)
- Burning droplets (d0 to d2 according to EN50399)

To lastingly ensure the product quality, regulation EN50575 defines a conformity monitoring corresponding to the classification. Depending on the level of classification, type approvals and regular factory audits or just type approvals must be carried out.



Fire protection is a major issue in all buildings. To further improve the fire protection, products delaying the spread of a fire for as long as possible or even preventing it from spreading must be utilized, e.g., also in industrial installations.

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

For additional information on industrial security measures that may be implemented, please visit <https://www.siemens.com/industrialsecurity>

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Which classification applies to industry?

The product class to be used now for the respective building must be stipulated by new regulations of the local building laws. Furthermore, the planners are called upon to assess and evaluate the safety requirements of buildings (e.g., of industrial facilities). The installation location also must be evaluated as to whether the cable can be installed in an escape route or outside of it.

In a brochure by the ZVEI (German Electrical and Electronic Manufacturers' Association), recommendations are given for industrial buildings and the CPR classes to be used there. As outlined above, this information only applies to cables that are required for the function of the building and are permanently connected to the building. In automation systems, e.g., with PROFINET, many point-to-point connections are installed. The cable is thus terminated on both ends with a connector, i.e., it belongs to a machine or installation and thus is not subject to the Construction Products Regulation. Cables that support the infrastructure of the building and thus are permanently connected to the building, however, do fall within the scope of the CPR.

When it comes to the requirements for such installations, several points of view must always be evaluated:

- Safety requirements of the building
- Installation location
- Possible structural protection of low-classification cables to improve the fire behavior
- Project costs

FastConnect cables are the right choice also for buildings

Since today's automation technology not only covers machinery and equipment, but increasingly also automates buildings, FastConnect cables from Siemens are marked with a corresponding CE label on the packaging upon delivery. The fire classes of the cables are listed in the data sheet and always identifiable by the user by looking at the cable printing. FastConnect cables thus always offer the right solution for industrial and building installations