

Cables for railway tunnels: safety first

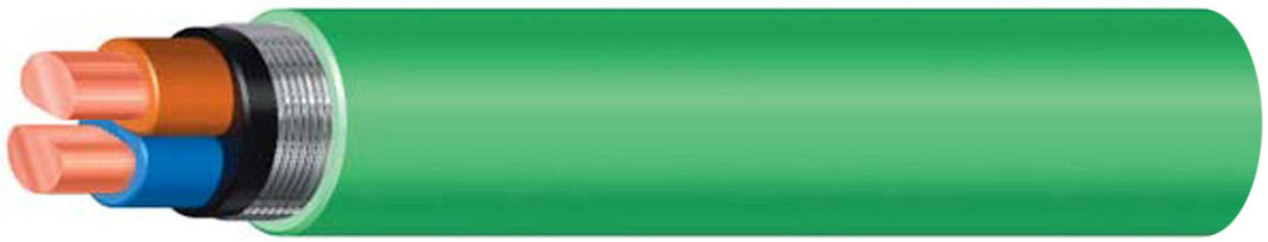
Railway tunnels require high levels of service and safety for users. When a railway passes through a closed, confined space, there is greater risk for the passengers, driver and any other people who happen to be in the facility. The tunnel must be equipped with a series of safety service installations that reduce the risk of accidents and fires to a minimum.

The energy supply to the tunnel safety installations and services must ensure that they continue to work reliably and respond properly in the event of an incident. The lighting, for example, requires a light point distribution system that guarantees the optimum lighting levels necessary in all zones of the tunnel, and particularly at emergency exits. Lighting must have the maximum safety features to guarantee proper evacuation of users in the event of serious accident or fire. In the specific event of fire, the tunnel must be equipped with efficient detection, alarm and fire-fighting systems. The materials used in these systems must minimise risks for people, equipment and facilities when they are subject to fire. These risks are:

- Fire spreading along the cables as they are installed in extensive networks throughout the facility and sometimes in high concentrations.
- Harmful effects arising from the combustion of materials that can emit toxic gases or substances.
- Opacity of smoke emitted from the combustion of materials that hinders or impedes visibility of evacuation channels.

General Cable has a broad range of specific High Safety (HS) and Increased High Safety (HS+) cables for the railway sector, the features of which minimise the risks described above and fulfil safety conditions even as strict as those required for tunnels. This range comprises both energy cables and signal cables for detection and alarm systems, with designs that can be tailored to suit the requirements of each specific installation.

For **general installations**, **exZhellent XXI** 0.6/1 kV High Safety (HS) type cables, with the technical name R1F3Z1-K (AS), are available for general circuits.



These cables are both non-flame and non-fire propagating, have a halogen-free composition, emit low heat upon combustion and emit neither opaque smoke nor toxic gases during a fire. They comply with the most stringent international and national standards:

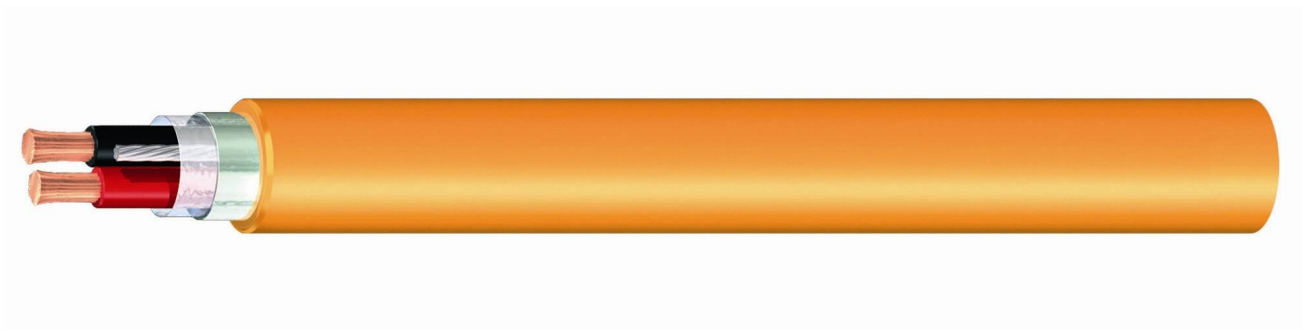
- UNE-EN 50266-2-2 (Non-fire propagating, Category A)
- UNE-EN 60332-1-2 (Non-flame propagating)
- UNE-EN 50267-2-2 (Low gas acidity and corrosivity)
- UNE-EN 61034-2 (Low opaque smoke emission).

These cables also have some additional features over and above those of standard cables that give them the following essential properties:

- Non-fire propagating in accordance with UNE-EN 50266-2-2 (equivalent to the international IEC 60332-3-22), category A. This test category is the strictest established in these standards to prevent the spread of fire.
- Corrugated tinned steel tape armour (optional) to give the cable a mechanical resistance that both protects it from the stresses of the installation and provides it with anti-rodent protection. The armour is also both light and manageable.

For **safety system installations**, Increased High Safety (HS+) type cables are available.

SEGURFOC ALARMAS of 300/500 V, with the technical name SO2Z1 (AS+), for detection and alarm circuits.



SEGURFOC-331 of 0.6/1 kV, with the technical name RZ1-K Mica (AS+), for energy and control circuits.



Cables of this type, commonly known as **fire-resistant cables**, are guaranteed to work even under the extreme fire conditions that occur in tunnels. These cables are ideal for railway tunnel installations such as lighting, detection, or PA systems, alarm sirens, evacuation signage, smoke extractors, and ventilation systems, etc.

These cables comply with the following standards:

- UNE-EN 50200 PH 90, fire resistance for 90 minutes at 830 °C with mechanical impact.
- BS 6387 category CWZ, resistant to fire at 950 °C, mechanical impact and water sprinklers.

Not only are the Increased High Safety Cables (HS +) fire-resistant, they also have all the features of High Safety Cables (HS): they are neither flame nor fire propagating, have a halogen-free composition, emit only low heat during combustion, and emit neither opaque smoke nor toxic gases in a fire.

Compliance with the BS 6387 standard category CWZ is a particularly important feature, as it guarantees the cables will work under extremely harsh fire conditions, such as temperatures as high as 950 °C. Tunnel fires can produce extremely high temperatures, which is why this aspect is so important.

Use of these cables in railway infrastructures and particularly in tunnels, not only guarantees optimum operation and exceptional reliability of electrical installations, but also provides the maximum possible guarantee of safety in the event of fire.

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