

Building design and installation: ensuring fire safety for electrical connections

12 November 2024

To protect electrical junctions in buildings from the threat of fire, embedding connections in concrete has been one of the possible solutions in the past, depending on the building design. While concrete is fire resistant, the challenges of access make inspection, as well as installation, more complex to achieve. Instead, fire-protected enclosures mounted directly onto a wall surface can make maintenance and installation significantly faster while maintaining the required safety standards.

Chris Lloyd, Managing Director at Spelsberg UK, explains the advantages of fire-resistant, surface-mounted enclosures.

In the event of a building fire, safety systems must continue operating for a prolonged period. As well as alarms to warn occupants and alert emergency services, lighting must remain active to highlight a safe exit route. Smoke and heat extraction systems might be relied on, as well as water booster systems to supply extinguishers, while dedicated elevators might need to safely transport fire crews.

All these systems need electrical power and protection of their supply during a blaze, potentially for an hour or more after a fire has taken hold. To achieve this, cable junctions and distribution boards have historically been designed and embedded within concrete protection. However, installing electrical connections within fire-protected enclosures mounted directly onto walls can offer equivalent protection – and in some cases can provide greater security.

The concrete challenge

While concrete is fire-resistant, the protection it provides to embedded electrical junctions depends on its thickness, and whether additional insulating materials are used in combination. Moreover, embedded electrical junctions might not sufficiently contain a fire should an electrical failure occur inside a concrete wall. In a case like this, the fire could spread through cavities or reach flammable materials if the integrity of the wall is compromised.

Threats also remain in the longer term. In the event of any high temperatures, concrete can conduct heat and retain it over an extended duration, sufficient to degrade or damage any enclosed electrical connections. Embedded electrical connections could also be exposed to hidden moisture or damp conditions, which could corrode and damage junctions. However, to deal with either of these situations, the inherent challenge of embedded systems is inspection: the only way to make a visual check is to drill in or completely expose the electrical junction.

Fire-resistant polycarbonate

Using enclosures manufactured from specially treated polycarbonate resistant to flame and heat can protect electrical junctions in the event of a fire. As polycarbonate is non-conductive during fire or heat exposure, the enclosures also prevent the risk of short circuit. Protection features such as ceramic terminal blocks inside the enclosure, resistant to high heat, also help to protect the connections.

Combining these features in a surface-mounted enclosure can ensure electrical integrity for up to 90 minutes, according to the E30-E90 electrical functional integrity standard. This testing and recognition are the hallmark for fire-and heat-protected enclosures like the Spelsberg WKE Lifeline cable junction and connection box.

However, an enclosure designed specifically for fire protection and wall mounting also needs to form a barrier against more than flame and heat. These special junction boxes need to withstand water ingress from sprinkler systems and high-pressure hoses, so an IP66 rating is also key. An IK08 impact protection rating should also apply to defend electrical connections from force, which is another advantage of designing with high-strength polycarbonate.

Easy access for installation and maintenance

While appropriately designed, externally fitted enclosures can provide sufficient fire defence, the significant advantage of easy access also enables frequent inspection to ensure long term integrity. For example, the Spelsberg WKE fire protection box can be rapidly accessed by maintenance and safety teams via four screws positioned in the enclosure cover. This lid is held in place by a cover retainer lanyard to prevent loss during inspection while unauthorised access can be prevented thanks to a safety seal.

To speed up a project for installers, wall-mounted, fire-resistant enclosures really come into their own. Just like a standard junction box, these casings can be installed wherever required or convenient for the environment, without needing to make precise design plans in advance. In the case of the Spelsberg WKE, the enclosure can be quickly mounted in situ by two external lugs that can be rotated 90 degrees.

Inside the box, the terminal block can also be adjusted through three positions, including 0, 45 and 90 degrees, and cables can be quickly and securely inserted with additional metric cable glands.

Enclosure specialisation

Depending on the design of the building or installation, enclosure specification for fire protection can often gain from specialist support. This could range from advising on the right type of enclosure to meet the electrical connection needs of the installation, whether that's a high-rise block of flats or an underground railway, as well as ensuring that the required safety compliance is met for the environment.

Achieving fire safety for electrical connections is essential for building managers, maintenance teams, and electrical installers. At the same time, project time pressures for rapid installation always remain. However, wall-mounted enclosures that meet E30-E90 fire and heat resistance, and also enable rapid installation and maintenance access, are an ideal solution to meet these challenges.

Image captions:



Image 1: Spelsberg WKE Lifeline cable junction and connection box are manufactured exclusively from high-quality materials that are heat and fire resistant.

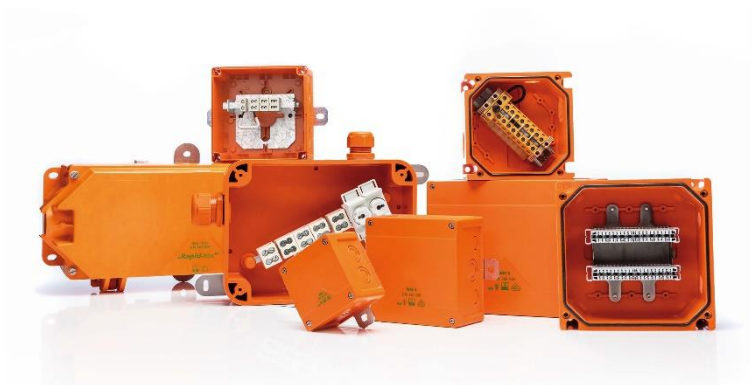


Image 2: - Fire protection solutions from Spelsberg: high-quality cable junction and connection boxes, as well as durable surface-mounted small distribution boards

About Spelsberg

Spelsberg is one of the largest manufacturers of electrical enclosures in the world. With over 4,000 enclosures available as standard and further customisation possible, it offers solutions for almost any application.

With the largest supply of non-metallic enclosures, ex-stock in the UK, its products are often available for delivery within 24 hours; customisation is possible on any product, including bespoke entries, engraved corporate logos or fitted terminals, within 48 hours. Products can be ordered direct from Spelsberg or from most leading supply specialists including RS, Rapid, Farnell and CPC.

The image(s) distributed with this press release may only be used to accompany this copy and are subject to copyright. Please contact DMA Europa if you wish to license the image for further use.

Press contact:

Spelsberg els UK Ltd.

Chris Lloyd

Tel.: +44 (0)1952 605849

cll@spelsberg.co.uk

PR agency:

DMA Europa

Elizabeth Patrick

Progress House, Great Western Avenue, Worcester, WR5 1AQ, UK

Tel.: +44 (0)1905 917477

liz@dmaeuropa.com

news.dmaeuropa.com