

## **WHY IS THE DOCUMENT B REQUIREMENT FOR PROTECTED POWER CIRCUITS BEING IGNORED?**

**The latest revisions of Approved Document B (Fire safety) of the Building Regulations came into effect last April and have already had a noticeable impact on the designing of fire safety into buildings. However, one important section of the Document – Clause 5.38 of Volume Two (buildings other than dwelling houses) Protected Power Circuits – does not appear to be universally understood, applied or enforced. Chartered surveyor and chartered building consultant, Michael G Proud ARICS MCIQB MBEng, explains.**

The introduction of the Regulatory Reform (Fire Safety) Order in October 2006 gave a major, and undoubtedly irreversible, boost to the trend to use fire engineering principles and techniques to devise fire safety solutions. This is particularly so for large or complex buildings, or those that establish new architectural or building design boundaries. Frequently in these structures, occupant safety, structural integrity and property protection rely solely on the dependable operation of sophisticated fire detection and alarm systems; smoke venting systems; electrically-operated fire doors and smoke curtains; firefighting lifts; pressurisation and depressurisation fans; motor-driven smoke control dampers; and pumps for sprinkler systems and wet-risers.

To be effective, these life-preserving systems and components must remain operational under fire conditions, the more so if, as is increasingly becoming commonplace, they are integrated into a single building management system. So, to ensure that they continue to operate in a fire, it is essential that the power circuits continue to function, and this is undoubtedly the reasoning behind revising the protection required for power circuits in Clause 5.38.

So what, precisely, is Clause 5.38 seeking? It states:

**“Where it is critical for electrical circuits to be able to continue to function during a fire, protected circuits are needed. The potential for damage to cables forming protected circuits should**

**be limited by the use of sufficiently robust cables**, careful selection of cable routes and / or the provision of physical protection in areas where cables may be susceptible to damage. Methods of cable support should generally be non-combustible and such that circuit integrity will not be reduced below that afforded by the cable.

A protected circuit for operation of equipment in the event of fire should consist of cable meeting at least the requirements of PH 30 classification when tested in accordance with BS EN 50200:2006, or an equivalent standard. It should follow a route selected to pass only through parts of the building in which the fire risk is negligible and should be separate from any circuit provided for another purpose.

**In large or complex buildings there may be fire protection systems that need to operate for an extended period during a fire.** Further guidance on the selection of cable for such systems is given in BS 5839-1, BS 5266-1, and BS 7346-6.”

The emboldening is mine, as these particular references highlight the requirements of this part of Approved Document B that are too frequently not being applied. The question is, if Building Control Surveyors are not insisting on compliance, why not? And if contractors are not installing compliant cable in all relevant buildings, why not? Perhaps it is a lack of awareness of the availability of cables that meet the required standard, in particular BS 7346-6 [Components for smoke and heat control systems: specifications for cable systems] with its much more stringent testing requirements than the earlier BS 7846; or perhaps it is a failure to understand the importance of Clause 5.38 or a misinterpretation of what is a “large or complex building”.

#### **AVAILABLE CABLE OPTIONS.**

The reality is that cables do exist that satisfy this stringent standard. Traditionally, fire safety requirements have been met using mineral insulated cables that incorporate insulation of highly-compressed Magnesium Oxide. These are certainly a robust and long lasting solution, but both specifiers and installers have moved away from mineral insulated cables in recent years because of the cables’ high cost. They are also difficult and expensive to terminate, and their

declining use has meant that the skills required are fast disappearing. With mineral insulated cable manufacture all but disappeared from the UK – I believe there is now just one indigenous producer – the quality of imported cables has become suspect and supply problems are often being cited as an additional reason for their not being used.

In terms of options to mineral insulated cables, there appear to be just two on the market that can claim to satisfy the demanding requirements of Clause 5.38. However, it is believed that, currently, only one of these options is third-party approved. This is a particularly important consideration bearing in mind that the Regulatory Reform (Fire Safety) Order has, rightly, made the market far more conscious of the need to use only proven, third-party approved, top quality products. The Fire Safety Order demands that “reasonable” steps be taken to ensure fire safety, so it is surely reasonable for installers to expect independent test certification by such organisations as BASEC or LPCB. These organisations are accredited by UKAS – United Kingdom Accreditation Service – to ensure that their credentials are of the highest international standards.

In Firetuf Powerplus, Draka has developed a solution that uniquely meets both the required superior standard and is third-party approved across its entire size range. It is a conventional 600/1000V SWA [Steel Wired Armoured] power cable design with additional fire barriers that provides the necessary enhanced circuit integrity performance to meet the demanding requirements of BS 7346-6:2005 and is LPCB [Loss Prevention Certification Board] approved. Firetuf Powerplus utilises high-performance materials to achieve the maximum 120 minute rating when subjected to integrated testing involving flame irradiation exposure, direct impact and high-pressure water spray under fire conditions.

It certainly does not require special glands or any different skills or techniques from other Draka OHLS – Zero Halogen Low Smoke – cables. Another plus is that, from the installer’s viewpoint, the cable is easy to fit, and shows significant installed savings when compared with corresponding mineral insulated cable.

**“LARGE AND COMPLEX” BUILDINGS.**

So, with the availability of a cable solution to meet the more stringent requirements of Clause 5.38, the possibility that there is insufficient understanding of what constitutes a “large and complex” building must be having a bearing.

Like a number of the terms used in the Fire Safety Order, such as “reasonable”, “competent” and “responsible”, determining if a building should be considered as “large and complex” is not always easy. So, perhaps the approach that building designers, fire engineers, installers and building control officers ought to adopt is to invert the description, by asking if the building could reasonably be described as “small and straightforward”? If not, then the Clause 5.38’s more demanding BS 7346-6:2005 power circuit cable requirements should be applied.

Certainly, the type of structure envisaged by the authors of the revised Approved Document B could reasonably be taken to include all multi-use or multi-function buildings, high-rise structures, buildings with complicated or lengthy evacuation protocols, high-hazard structures, and any building where life safety is dependant upon the reliable operation of active fire precautions or electrically-operated passive measures.

For these buildings, cables that comply only with the less demanding standard of BS 7846 are simply not acceptable; they do not comply with the requirements of Approved Document B, and potentially leave everyone involved additionally liable to prosecution under the Fire Safety Order. Companies may even have to face the prospect of an action under the new Corporate Manslaughter and Corporate Homicide Act if it can be shown that the organisation’s management paid scant regard to the proper management of health and safety with fatal results. And that “scant attention” may well be interpreted as failing to ensure that company staff complied fully with Clause 5.38, who in turn failed to install the required performance power cable resulting in the death of occupants or firefighters.

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