Today the UK Building Regulations, Approved Document B adopts the standard time temperature protocol of ISO834-1 / EN1363-1 in BS476 pts 20 to 24 for fire resistance testing of all building elements such as fire doors, fire stopping systems for penetrations, structural elements, fire walls and partitions, in fact every material, component and product used in a building that is required to have a fire resistance rating.

What is often overlooked is that this time temperature protocol for fire resistance testing (ISO834-1 / EN1363-1 aka the standard time temperature curve), was developed almost 100 years ago when buildings and contents were commonly made of masonry, wood and fabric. At this time plastics and synthetic materials did not exist. Further, buildings of this age were mostly not very tall or very large. Today our built environment is far more complex, inclusive of small domestic, industrial and commercial buildings and super high rise, mega-interconnected transportation, retail, commercial structures with significant below ground environments. Across these building types we have a large range of evacuation times and where these egress times are very long, designers and engineers need to look for alternative more innovative solutions for evacuation or protection of occupants such as reducing fire loads, lift evacuation or protect in place refuges.

Recent research has identified that in most modern buildings the use of lightweight polymeric building materials, plastic contents, synthetic foams and fabrics with high calorific values can significantly increase fire loads resulting in time temperature fire profiles significantly different and in cases well above the original parameters of the existing, early 1900’s test protocol as adopted in BS476 (ISO834-1 / EN 1363-1) and as mandated by the Building Regulations for testing of fire resistant building elements.

Underground environments can also exhibit very different fire profiles to those in above ground built environments especially in confined underground public areas like road and rail tunnels, underground shopping centers, car parks where a high fire load is present. Fire temperatures in these areas can exhibit a very fast rise time and reach temperatures well above those in standard model above ground buildings. British Standard BS5851:2010 and BS EN12485

‘FIT FOR PURPOSE FIRE RESISTANCE’ - WHOSE RESPONSIBILITY IS IT?
clearly recognise underground public areas such as car parks, loading bays and large basement storage as “Areas of Special Risk” with potential for fire temperatures to 1,200°C. In these environments more stringent requirements for fire resistance maybe needed.

Worse still... Almost all Life Safety & Fire Fighting systems depend on the reliable function of electric cables during emergency. If these essential cables fail during a fire event, the critical equipment they enable also fails. This could mean that firemen’s lfts, fire sprinklers, hydrant pumps, smoke & heat extraction and pressurization fans, emergency communication alarms and lighting systems stop working during evacuation putting occupants, emergency service workers and property at risk. It is therefore concerning that the only exception in the Building Regulations for fire resistance testing is to BS476 pts 20-24 (which may already be obsolete for many buildings) is for the very electric cables required to power all emergency life safety and firefighting systems. This contradiction allows these essential cables to be tested to alternate flame tests which have little or no relevance to real building fires and are all too often lower temperatures than required for all fire resistant elements of the building.

This testing anomaly has occurred in the Building Regulations because the BS1 cable testing standards adopted by the regulations for Protected Circuits allow this strange exception. It is interesting to note that other developed countries including America, Canada, Australia, New Zealand, Germany and Belgium have for years, required testing of these essential cables to the same fire temperature emergency protocol as every other building element, which is the same as used in BS476 pts 20-24 i.e. ISO 834-1 / EN135-1.

Today we have a much wider range of built environments so we believe adopting a “one size fits all” protocol for fire resistance testing wiring systems may not be appropriate anymore. Clearly economic factors must also come into play and as it stands, many of our current products and test regimes, including those for electric cables, may provide an adequate level of protection in small or low rise buildings where evacuation times are short. The concern is, are these same products and standards going to provide the required reliability in performance and duration for the new large high rise building configurations and mega projects and where long evacuation times are needed? It is correct to say all British Standards and indeed The Building Regulations themselves are only minimum requirements, so whilst it is often mandatory to meet this minimum code it does not preclude the design of buildings and systems with higher performances.

The professional engineers who design our buildings and systems are accountable for the successful design, regardless of whether it was the fit for purpose criteria often remains the responsibility of the project owner or installing contractor. It has been a surprise to some building owners and Fire Resistant Cables. (2004).  Richard Hosier is the Regional Manager in Asia/Pacific for the world’s largest manufacturer of mineral cables the MICC Group: www.miccltd.com Mr. Hosier has lectured at institutions and universities around the world publishing many technical papers on advanced fire safe cable design. He was the winner of the Institute of Fire Protection Officers UK technical trophy award in 2014 for his research into fire performance wiring systems and previously served on 3 Australian and New Zealand technical standards committees for fire safe wiring systems and cables.


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