Recommendations for the Selection of Cables under the Construction Products Regulation (CPR)

British Cables Association

Cables for Reaction to Fire under the Construction Products Regulation (CPR)

Background

This paper is intended to provide guidance for specifiers, designers and those who control or operate buildings where cables of all types are installed, and addresses the reaction to fire performance of cables.

Requirements for the classification of cables under the Construction Products Regulation (CPR) came into effect across Europe on 1st July 2017. At that time, BCA had released its Guide for Specifiers (first edition). This recognised the fact that the UK government had made no mandatory requirements, for instance via Building Regulations, that would determine the use of a particular class of cable in respect of its reaction to fire.

A second edition of the Guide for Specifiers was issued in April 2018 which, as with the previous version, emphasised that an absolute minimum of CPR Class E_{ca} should be adopted by users for all cables. It also strongly encouraged that more vulnerable installations should ensure that cables with particular reaction to fire properties, for instance reduced flame propagation and limited release of smoke and acidic gases, should be used. It can be reached via:

https://www.bcauk.org/application/files/8515/2335/5815/CPR_Guide_to_specifiers_-_Ed_2.pdf

Post July 2017

Since July 2017 the awareness of the CPR for cables, and its implications and possibilities, has become better understood. A consequence has been calls for a more definitive set of recommendations for specifiers, designers and those who control or operate buildings, in the absence of any official requirements or guidance. This paper attempts to provide such recommendations. In doing so it recognises a number of key aspects relating to fire safety, most of which could be applied to all products and materials that come under CPR directly, or are directly associated with them in buildings and constructions. It also acknowledges key statements and recommendations arising from Dame Judith Hackitt's report relating to the application of the Building Regulations to the fire at Grenfell Tower.

Important aspects that specifiers, designers and those who control or operate buildings should consider include:

- It is always necessary to look at the whole building, and not just treat cables in isolation;
- A major difference of approach applies across the range of buildings. At a residential level the needs of a single bungalow are far removed from those of a large residential tower block. Even in the latter, it may be that only certain circuits, for instance main electrical risers, require a higher level of fire safety performance;

- As stated by way of a generality in the Hackitt report, the temptation to use a "one size fits all" approach is to be avoided. Cables specifically are not mentioned in the Hackitt report;
- Cables represent about 1% of all building products subject to the CPR, and their contribution to the overall fire load of many buildings, as assessed by fire experts, is modest;
- Existing cables with enhanced reaction to fire performance have satisfied the market, and given improved safety and security, for over 30 years. However, such developments generally pre-date the extensive use of data cables seen today, therefore the rapid growth in their usage, and the greater volumes involved in many installations, should be taken into account;
- In larger or complex buildings, or where specific escape risks exist, there is an especial need to be sure that relevant and designated routes, and associated common assembly areas, are protected;
- The nature of the installation methods adopted, for instance fully exposed, in ducts and risers, in conduit, or buried under plaster, is an important consideration.

NOTE: Where cables enter a building from outside, such as happens with the supply of communications or power, guidance on suitable designs and procedures may be obtainable from relevant organisations such as telecommunications or electricity supply companies. For telecommunication cables such guidance may be by direct reference to EN 50174-2.

BCA is aware of all the above, but its members are experts in the manufacture and application of cables rather than in fire safety engineering. It is important therefore, especially when specifying products for larger, taller and more complex buildings, or buildings with special risks involving people, to ensure that fire safety experts take the lead role in any decision making on fire aspects. Guidance relating to such matters can be obtained via certain British Standards, for instance BS 9999, BS 9991 and BS 7974 (and its associated Published Documents (PDs)).

BCA recommendations

With all the above in mind, BCA proposes that specifiers, designers and those who control or operate buildings should, as a starting point, consider the recommendations given in the table that follows. Those who act as consultants in such matters should also take these recommendations into account.

General Guidance to specifiers, designers and those who control or operate buildings for minimum classes of cable for Reaction to Fire

Cable Type	Installation condition/specification	Low risk installations	Installations where improved fire performance of cable is required	
		Typically, PVC cable	Typically, Low Fire Hazard cable e.g. LSHF [(a)]	
		Flame propagation	Heat release & flame propagation	Smoke emission, flaming droplets & acidic gases [(b)]
Power	*Cable often installed in high density bunches*	E_{ca}	C_{ca}	s1 d2 a1
Building Wire	*Cable installed singly or pairs in low density*	E_{ca}	D_{ca}	s2 d2 a1
Data and Telecom	*BS 6701 (Specification for data and telecom cabling installation)*	E_{ca}	C_{ca} [(c)]	s1b d2 a2 [(c)]

(a) Low smoke, halogen-free cables (LSHF) have a variety of descriptions such as LSOH, OHLS, LSNH, LSZH etc).

(b) Details of the significance of the additional classifications for smoke (s), flaming droplets (d) and acidity (a) can be found in *EN 13501-6: Fire classification of construction products and building elements - Part 6: Classification using data from reaction to fire tests on electric cables.*

(c) Applicable to high densities of cable, which are defined in BS 6701 as “Installation cables”, and are typically installed in hidden or inaccessible locations.

Supporting evidence

These recommendations are a minimum, and try to reflect, in a simplified way, the huge variation in building types, installation methods, and types of cable. Low risk installations, being typically where cables are run in very small numbers, have historically been safe provided they meet the flame propagation requirement of the Bunsen burner test (BS EN 60332-1-2). This equates to class E_{ca}. Where higher fire risks exist, or may feasibly exist in the future, especially where large bunches of cable are installed, the minimum recommendations are for higher classes, with the additional options of restricting evolution of smoke and acidic gases, plus a category relating to flaming droplets.

In respect of the assessment of risk some key determinants should be noted. These are:

- Regardless of cable type, there are buildings and installations that should be readily identifiable as low fire risk. Here it should be acceptable, as per much safe practice already established, to utilise cables with Class E_{ca}. Such installations and their cables will be identified as being required to meet the single cable flame propagation test to BS EN 60332-1-2, which directly equates to Class E_{ca}.

- Limits on the flame spread of cables mounted in groups, bunches or other larger quantities may be required. Historically this has been determined using the relevant part, typically Part -24, of BS EN 60332-3 vertical ladder test, but under CPR the test has been significantly modified as BS EN 50399. The minimum class at which grouped cables are tested in this way is Class D_{ca}, but this class does not apply any limit to flame spread. A level of assurance against flame spread starts at Class C_{ca}. Cable manufacturers can give more advice on the flame spread behaviour of specific cables.

- By their nature, many modern installations of communication cables (including copper data and fibre optic), especially data cables for IT establishments and data centres, involve large bunches. BS 6701 gives some guidance on this, leading to its recommendation to use cables meeting Class C_{ca}. Whilst the standard has a definition of the relevant circumstances, the market has not yet fully accommodated this approach. Additional care and advice, including from fire safety experts and from cable manufacturers, may assist.

- Under CPR, the additional requirements relating to the evolution of smoke and acid gas, plus the possibility of flaming droplets, are not available at Class E_{ca}, as these parameters are not tested. The minimum class to have these additional characteristics available is Class D_{ca}. as they arise from the BS EN 50399 test. Cable manufacturers can give more advice on the emission of smoke, acidic gases and burning droplets by specific cables.

Caveats

Amongst many other things, the Hackitt report says "*Primary responsibility for ensuring that buildings are built to the correct standards and are fit for purpose must rest with those who commission the work and those who design and build the project. Responsibilities must not be dispersed through the chain as they are now.*"

All the above BCA recommendations and explanations are on the assumption that the cable that is finally installed will be the one originally specified, and that such buildings will be under the ongoing care of competent and responsible individuals over their lifespans.

Disclaimer

All the above information reflects our understanding of the current position and is, to the best of our knowledge and belief, correct and reliable. In case of doubt, specifiers, designers and those who control or operate buildings should seek their own advice regarding the interpretation of the Construction Products Regulation, it being the primary regulatory source, and also the MHCLG.

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