CPR - The EU Construction Product Regulation

EU Regulation 305/2011: Construction Products Regulation (CPR)

Purpose: Regulating performance under fire of all construction products in the EU

Published: April 2011

The latest document: COMMISSION DELEGATED REGULATION (EU) 2016/364 date 1 July 2015

Mandatory in the EU since 1 July 2017

In simple words:

As of 1 July 2017 all construction products (including cables) are allowed to be sold in the EU only if they are classified according to the CPR and labeled accordingly.

The basic standard that defines the framework for cables is EN 50575:2014: “Power, control and communication cables - Cables for general applications in construction works subject to reaction to fire requirements”.

CPR cables Classification Standard and Systems

<table>
<tr><th>Class</th><th>Main Classification</th><th>Additional Performance</th><th>Assessment System and Notified Body</th></tr>
<tr><td>Aca</td><td>EN ISO 1716
Gross heat of combustion</td><td></td><td rowspan="4">System 1+
initial type testing and initial inspection audit (IIA) and continuous surveillance audit (CSA) of factory production control (FPC) by 3rd party notified body</td></tr>
<tr><td>B1ca</td><td rowspan="4">EN 50399
Heat release
Flame spread

EN 60332-1-2
Flame propagation</td><td rowspan="4">Smoke production
(s1a, s1b, s2, s3)
EN 50399/ EN 61034-2

Acidity
(a1 , a2, a3)
EN 50267-2-3

Flaming droplets
(d0, d1 , d2)
EN 50399</td></tr>
<tr><td>B2ca</td></tr>
<tr><td>Cca</td></tr>
<tr><td>Dca</td><td rowspan="2">System 3
initial type testing by 3rd party notified testing laboratory;
FPC by manufacturer</td></tr>
<tr><td>Eca</td><td>EN 60332-1-2
Flame propagation</td><td></td></tr>
<tr><td>Fca</td><td></td><td></td><td>System 4
Performance not determined</td></tr>
</table>

CPR cables Classification Details According to EN 13501-6:2014

Class	Test method	Classification criteria	Additional classification	
B2ca	EN 50399	FS ≤ 1.5 m; and	Smoke production	s
		THR_{1200s} ≤ 15 MJ	Flaming droplets	d
		Peak HRR ≤ 30 kW	Acidity (of smoke)	a
		FIGRA ≤ 150 W/s		
	EN 60332-1	H ≤ 425 mm		
Cca	EN 50399	FS ≤ 2.0 m		
		THR_{1200s} ≤ 30 MJ		
		Peak HRR ≤ 60 kW		
		FIGRA ≤ 300 W/s		
	EN 60332-1	H ≤ 425 mm		
Dca	EN 50399	FS > 2.0 m		
		THR_{1200s} ≤ 70 MJ		
		Peak HRR ≤ 400 kW		
		FIGRA ≤ 1300 W/s^{-}		
	EN 60332-1	H ≤ 425 mm		
Eca	EN 60332-1	H ≤ 425 mm	None	
Fca	No performance determined		None	

FS = **Fire Spread** during EN 50399 test.
THR_{1200s} = **Total Heat Release**: Integrated heat value during EN 50399 test duration (1200sec).
Peak HRR = Peak **Heat Release Rate** value during EN 50399 test.
FIGRA = **Fire Growth Rate** index. A complex calculation done according to EN 50399 Annex G.
H = Flame spread during EN 60332-1 flame test.

CPR data cables Classification According to EN 13501 Optional levels

After the tests made according to EN 50399 and EN 60332-1 are completed the cable can be classified.

The complete classification is done as shown on the right whereas:

The **s1 and s2** values are set based on TSP and Peak SPR limits specified in EN 13501, measured according to EN 50399. s1<s2.
s3 indicates that smoke production was not tested.
Additional light transmission measured according to EN 61034-2:
s1a: Light transmission >80%
s1b: Light transmission Between 60% and 80%.
s1: Light transmission according to EN 61034-2 not tested

d= Droplets formation - limits specified in EN 13501, measured according to EN 50399:
d0: No flaming droplets/particles occur within the 1200 sec test.
d1: Flaming droplets/particles not persisting longer than 10 sec within the 1200 sec test.
d2: No performance is declared or product does not comply with the d0 and d1 criteria.

a=Acidity level tested according to EN 50267–2-3 Conductivity and pH:
a1 and a2: Limits specified in EN 13501. a1<a2.
a3: Conductivity and pH not tested or does not comply with a1 and a2.

TSP = Total Smoke Production (of light-obscuring smoke) in m^2
Peak SPR = Peak Smoke Production Rate in m^2/sec.

$B2_{ca}$-s1a,d0,a1	$B2_{ca}$-s1a,d1,a1	$B2_{ca}$-s1a,d2,a1
$B2_{ca}$-s1a,d0,a2	$B2_{ca}$-s1a,d1,a2	$B2_{ca}$-s1a,d2,a2
$B2_{ca}$-s1a,d0,a3	$B2_{ca}$-s1a,d1,a3	$B2_{ca}$-s1a,d2,a3
$B2_{ca}$-s1b,d0,a1	$B2_{ca}$-s1b,d1,a1	$B2_{ca}$-s1b,d2,a1
$B2_{ca}$-s1b,d0,a2	$B2_{ca}$-s1b,d1,a2	$B2_{ca}$-s1b,d2,a2
$B2_{ca}$-s1b,d0,a3	$B2_{ca}$-s1b,d1,a3	$B2_{ca}$-s1b,d2,a3
$B2_{ca}$-s1,d0,a1	$B2_{ca}$-s1,d1,a1	$B2_{ca}$-s1,d2,a1
$B2_{ca}$-s1,d0,a2	$B2_{ca}$-s1,d1,a2	$B2_{ca}$-s1,d2,a2
$B2_{ca}$-s1,d0,a3	$B2_{ca}$-s1,d1,a3	$B2_{ca}$-s1,d2,a3
$B2_{ca}$-s2,d0,a1	$B2_{ca}$-s2,d1,a1	$B2_{ca}$-s2,d2,a1
$B2_{ca}$-s2,d0,a2	$B2_{ca}$-s2,d1,a2	$B2_{ca}$-s2,d2,a2
$B2_{ca}$-s2,d0,a3	$B2_{ca}$-s2,d1,a3	$B2_{ca}$-s2,d2,a3
$B2_{ca}$-s3,d0,a1	$B2_{ca}$-s3,d1,a1	$B2_{ca}$-s3,d2,a1
$B2_{ca}$-s3d0,a2	$B2_{ca}$-s3,d1,a2	$B2_{ca}$-s3,d2,a2
$B2_{ca}$-s3,d0,a3	$B2_{ca}$-s3,d1,a3	$B2_{ca}$-s3,d2,a3

B2ca-s1a,d0,a1 is the best classification available for CCC.

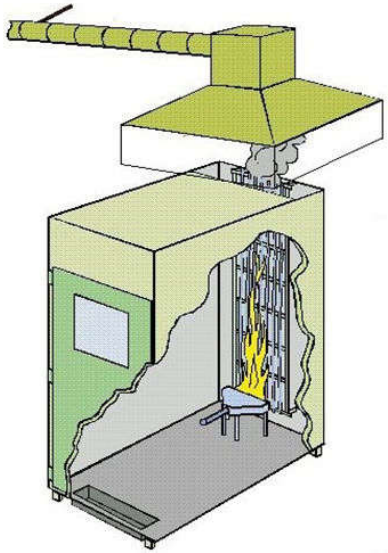
CCC=Copper Communications Cables

CPR Relevant standards

- EN 13501 - Classification
- **EN 50399 - Heat release and smoke production**
- IEC/EN 60332-1: Flame propagation
- IEC/EN 60754: Acidity of gas release
- IEC/EN 61034: Light transmission due to smoke

EN 50399 test procedure:

- **Several cable samples, fixed side by side on a cable ladder**
- **Fire application time: 20 minutes (1200 seconds)**
- **Exhaust gases are analyzed for temperature and oxygen/carbon dioxide content (which gives information about the heat release)**
- **A light source & sensor in the exhaust pipe measures the smoke density**
- **The occurrence of flaming droplets is recorded**



CPR Certificates, DoP and Classifications Reports

The different CPR classes are tested, classified and announced differently:

Class B2ca & Cca:

Based on formal certificates issued by a System 1+ NB (Notified Body) following a plant survey and complete testing program.

Class Dca:

Based on Classification Report issued by a System 3 NB following a plant survey and complete testing program and on self-declared DoP issued by the cable producer available online in all relevant local languages.

Class Eca:

Based on flame test report (IEC 60332-1) issued by a System 3 NB and on self-declared DoP issued by the cable producer available online in all relevant local languages.

Class Fca:

Based on self-declared DoP issued by the cable producer available online in all relevant local languages.
Note: This class includes outdoor cable that cannot pass IEC 60332-1 flame test or other cables that are not intended to be used in civil manned constructions.

All cables sold in the EU, without exception, must be labeled with a CPR label, enabling a clear classification according to one of the above classes.

Recommended installation locations per class

The CPR has no mandate to dictate what cable class should be installed in the different locations.
This decision can be made by states, municipalities and building designers.

The following can serve as generic guidelines:

CPR	Recommended locations
B2ca	Sensitive public buildings such as schools and kindergarten, hospitals, shopping malls, airports, high-rise residential and/or commercial buildings, railways & bus stations, tunnels and similar places. In France, the Netherlands, Spain and Italy, high risk buildings such as hospitals or high-rise buildings with large numbers of occupants require a minimum class of B2ca,d1,a1. European Commission Regulation 1303/2014 'Safety in railway tunnels', states a minimum requirement of B2ca-s1a,do, a1.
Cca	The minimum classification for any building with human occupancy. BS 6701 (Telecommunications Equipment and Telecommunications Cabling – Specification for installation, operation and maintenance) recommends that the minimum class for all installation cables is Cca-s1b,d2,a2.
Dca	The minimum classification for storage places and similar buildings without human occupancy.
Eca	Suitable only for single-cable installations in small buildings without human occupancy.
Fca	Suitable only for outdoor installation.

Implementing the CPR outside the EU

Although the CPR is mandatory only in the EU, several non-EU countries have started implementing it using this readily available tool to increase building safety.
The major effort of designing horizontal LAN cables that are clearly classified according to their safety level has been done.
Cable manufacturers, such as HCS, have spent substantial amounts of effort and money, and now classified cables are available.
Ignoring this classification is unreasonable and very short-sites, as building safety is always a priority and should never be ignored and as sooner or later the CPR will become mandatory in most advanced non-EU countries.

The CPR classification has two major advantages over any previous flame and safety tests:

- Providing accurate values for flame spread, smoke generation and opacity, acid smoke release and flaming droplets and most importantly, total heat release and heat release rate, which are essential for calculating the building stability in case of fire.
- Test reports and certificates are issued by EU Notified Bodies, which provide non-biased reports, supervised by formal EU representatives, ensuring both reports and certificates are valid and correct.

Bottom line:
The EU CPR is a robust tool, readily available, enabling building designers to substantially increase safety and save human lives and property.

Thank you.