

CORNING

Construction Products Regulation (CPR) White Paper

Introduction

The EU Construction Products Regulation (CPR) is a law that lays down the manufacturing conditions of a wide range of construction products and building materials. This includes power, control, and communication cables and has been described as the most significant change for a decade in the way construction products are sold throughout Europe.

This document provides guidance on the scope and provisions for the new regulation and its relation to cabling products. The document aims to clarify what the regulation is about, how and where it will be applied, when it will come into force, and how it affects Corning cables.

2016 will be a transition period before new standards within the regulation are enacted as a requirement. We will keep you informed with further notifications during this period.

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1. EU directives and regulations related to construction products

The Construction Products Directive 89/106/EEC (CPD) was created to remove technical barriers to trade in the area of construction products between member states in the European Union. The new Construction Products Regulation (EU) No 305/2011 (CPR), adopted on 9 March 2011, replaces the previous CPD. This affects:

- Manufacturers who need to design and test their products to meet new criteria within the regulation.
- The authorities of member states when specifying the requirements and applying the legislation.
- EU accredited test institutes that will issue manufacturers with a declaration of conformity to standards.
- Organisations who choose products most suitable for their intended use in buildings and construction works.

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The EU Construction Products Regulation adopted in March 2011 replaces the previous Construction Products Directive. CPR affects any organisation involved in the design, build, test, installation, and selection of construction products.

2. Construction Products Regulation (CPR) and its application to cables

CPR applies to all construction products that are produced for, or incorporated within, building and civil engineering construction works, and includes power, control, and communication cables. CPR is primarily concerned with the safety of construction products and lays down essential performance criteria, as well as the uniform assessment and testing methods. It also harmonises all construction products subject to regulatory controls for CE marking purposes.

All new cables that are to be permanently installed in buildings will need to be constructed and tested in accordance with the new regulations. This does not apply to non-permanent cable and all outdoor (duct, aerial, and direct buried) cables.

A key part of the regulation, as applied to cable, is its safety in respect to burning.

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The CPR is an effort by the EU to ensure all building materials including cables are qualified in a manner to allow easy trade regardless of manufacturer or country of origin in regards to critical requirements of health and safety.

3. Burn tests and standards applied to cable prior to CPR

Cable safety in respect to burning has been usually expressed in terms of Flame Retardant and Non-Corrosive (FRNC) and/or Low-Smoke, Zero-Halogen (LSZH™). The respective standards used are shown in the table below. The FRNC/LSZH definitions have been superseded with a new approach for cable reaction to fire under the new regulation.

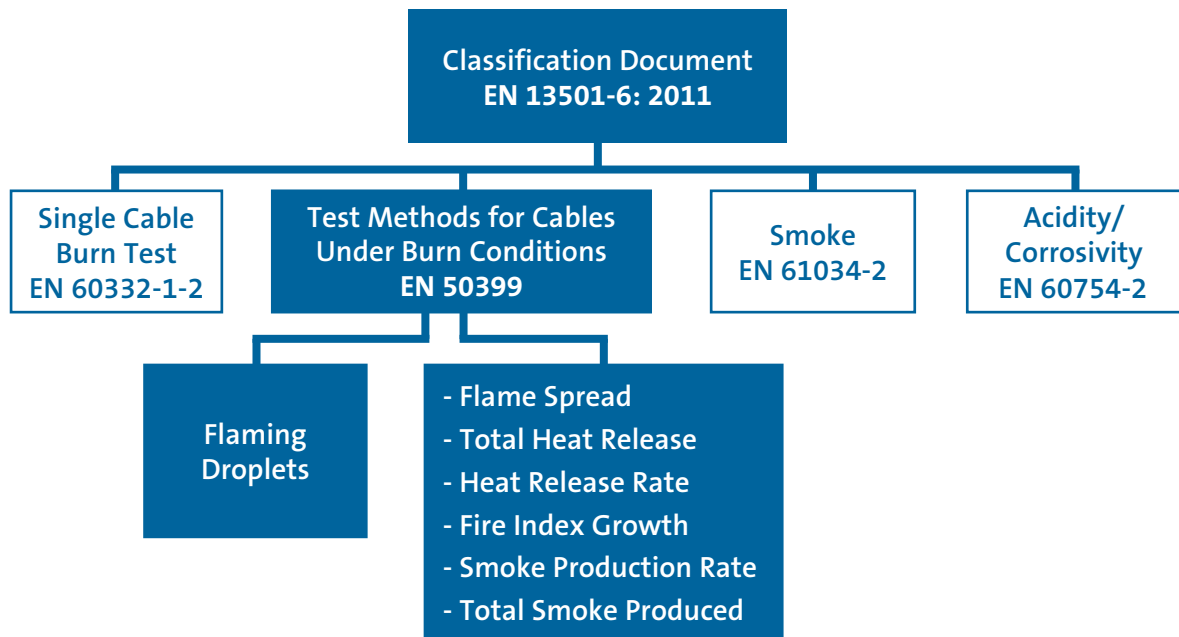
	Common Abbreviation	CENELEC	IEC
Single Cable Burn Test	FR	EN 60332-1-2	IEC 60332-1-2
Bunched Cable Burn Test	FR	EN 60332-3	IEC 60332-3
Smoke Density	LS	EN 61034-2	IEC 61034-2
Acidity/Corrosivity	NC (includes ZH)	EN 60754-2 (replaces EN 50267-2-3)	IEC 60754-2

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The FRNC/LSZH approach to cable safety and burning has been superseded by a new approach in the CPR regulation.

4. The standards that define the new CPR burn rate classifications of cable

EN 13501-6 is the leading standard within CPR and lays down the new test methods and performance criteria that must be met for a particular classification of cable. It contains new standards for burn classification as well as older standards.



While the bunched test does not appear in the diagram above, tests according to the EN 50399 are conducted in a bunched configuration. The list below explains what each standard measures:

- Burning behaviour of single cables (EN 60332-1-2) measures the flame spread of a cable under exposure to an open flame.
- Smoke production of burning cables (EN 61034-2) measures the opacity/translucency of the smoke produced by a burning cable. Opaque smoke may prevent occupants to safely escape buildings.
- Acidity levels produced by burning cables (EN 60754-2) measures the acidity or corrosiveness of the gas produced by a burning cable. Such gases are poisonous to occupants and may damage equipment or materials in the building.
- Burning behaviour of bunched cables (EN 50399) measures the reaction of bunched cables in the early stages of a fire, under direct exposure to a 20.5 kW flame source (Scenario 1) and a 30 kW flame source (Scenario 2).

The parameters that are measured include: flame spread (FR), total heat release (THR), heat release rate (HRR), fire index growth rate (FIGRA), total smoke produced (TSP), smoke production rate (SPR), and the number of droplets of flaming material.

In addition there is another standard that applies to a new class of cables that are incombustible:

- The oxygen bomb calorimeter (EN ISO 1716) measures the heat flow while a material burns. A material that releases high heat while burning may ignite other materials. All polymers are combustible, while materials/cables that meet the new Aca cable are incombustible.

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EN 13501-6 is the leading standard within CPR defining the test methods and performance criteria that must be met for a particular classification of cable.

5. The new classifications of cable under CPR

The CPR covers seven classes of cable, from A_{ca} to F_{ca}, that are allocated on the basis of the heat release and flame propagation criteria. There are three supplementary classes for each of the additional requirements, such as smoke production/emission (s), acidity (a), and flaming droplets (d).

- A_{ca} – cables made out of non-combustible materials
- B1_{ca}, B2_{ca}, C_{ca}, D_{ca}, E_{ca} – relevant for cables made out of combustible materials
- F_{ca} – cables that have no fire protection at all

The ca subscript denotes a cable product. How these classifications relate to performance in a fire situation is shown in the table below:

Fire Situation	Class	Performance
Fully developed fire in a room	A _{ca}	No contribution to fire
	B _{ca}	Very limited contribution to fire
Single burning item in a room	C _{ca}	Limited contribution to fire
	D _{ca}	Acceptable contribution to fire
Small fire attack on a limited product area	E _{ca}	Acceptable reaction to fire
	F _{ca}	No requirement

The standards and parameters that must be met for each classification are shown in the table below. It should be pointed out that the requirements for class A_{ca} and B1_{ca} are very stringent and currently cannot be fulfilled by cables consisting of thermoplastic halogen-free materials.

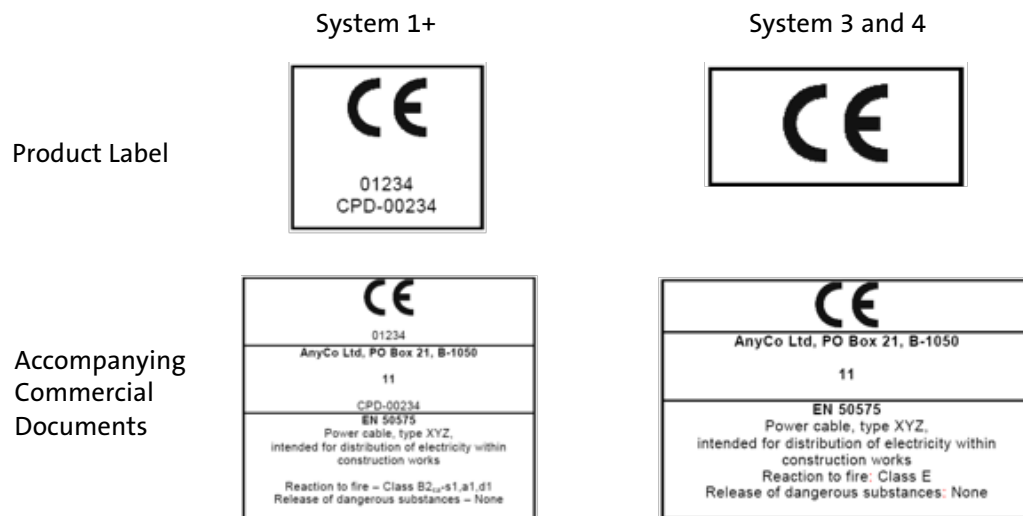
	Classification	A _{ca}	B1 _{ca}	B2 _{ca}	C _{ca}	D _{ca}	E _{ca}	F _{ca}
Standard		EN ISO 1716	FIPEC Scen2	H/mm	H/mm	H/mm	–	–
EN 60332-1-2	H/mm		≤ 425	≤ 425	≤ 425	≤ 425	≤ 425	
EN 50399	FS/m		≤ 1.75	≤ 1.5	≤ 2.0			
	THR _{1200s} /MJ		≤ 10	≤ 15	≤ 30	≤ 70		
	HRR/kW		≤ 20	≤ 30	≤ 60	≤ 400		
	FIGRA/Ws-1		≤ 120	≤ 150	≤ 300	≤ 1300		
	Flaming droplets TSP/SPR		d0, d1, d2 s1, s2, s3	d0, d1, d2 s1, s2, s3	d0, d1, d2 s1, s2, s3	d0, d1, d2 s1, s2, s3		
EN 61034	Smoke production		s1a, s1b	s1a, s1b	s1a, s1b	s1a, s1b		
EN 60754	Acidity		a1, a2, a3	a1, a2, a3	a1, a2, a3	a1, a2, a3		

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There are seven classifications of cable that specify their performance criteria in the case of a fire. Class A_{ca} and B1_{ca} are very stringent and currently cannot be fulfilled by cables consisting of thermoplastic halogen-free materials.

6. CE marking of cables

Products complying with the new regulation will have CE marking that indicates the cable is both rated according to the standard EN13501-6 and conforms to the fire safety characteristics. An EU-accredited test institute will issue manufacturers with a declaration of conformity according to the new regulation, which is the basis for the CE mark. The discussion about the CE marking is still ongoing. First examples are shown below:



Cables and/or their packaging and/or their labelling shall be marked with:

- An indication of origin consisting of the manufacturer's name or trademark, or (if legally protected) the identification number
- The product description or code designation
- The classification of the cable in relation to reaction to fire. This includes the main and all applicable additional classification characteristics in the form "class B2s1a1d1"

In addition, cables and/or their packaging and/or labelling may also be marked with the following elements:

- Any information required by other standards relevant to the product
- The year of production
- Voluntary certification marks
- Any additional information as desired by the manufacturer provided that it does not conflict with, nor confuse any of the other required markings

When applied on the cable, the CE marking shall be applied by printing, indenting, or embossing on the sheath or in the case of unsheathed cables on the insulation.

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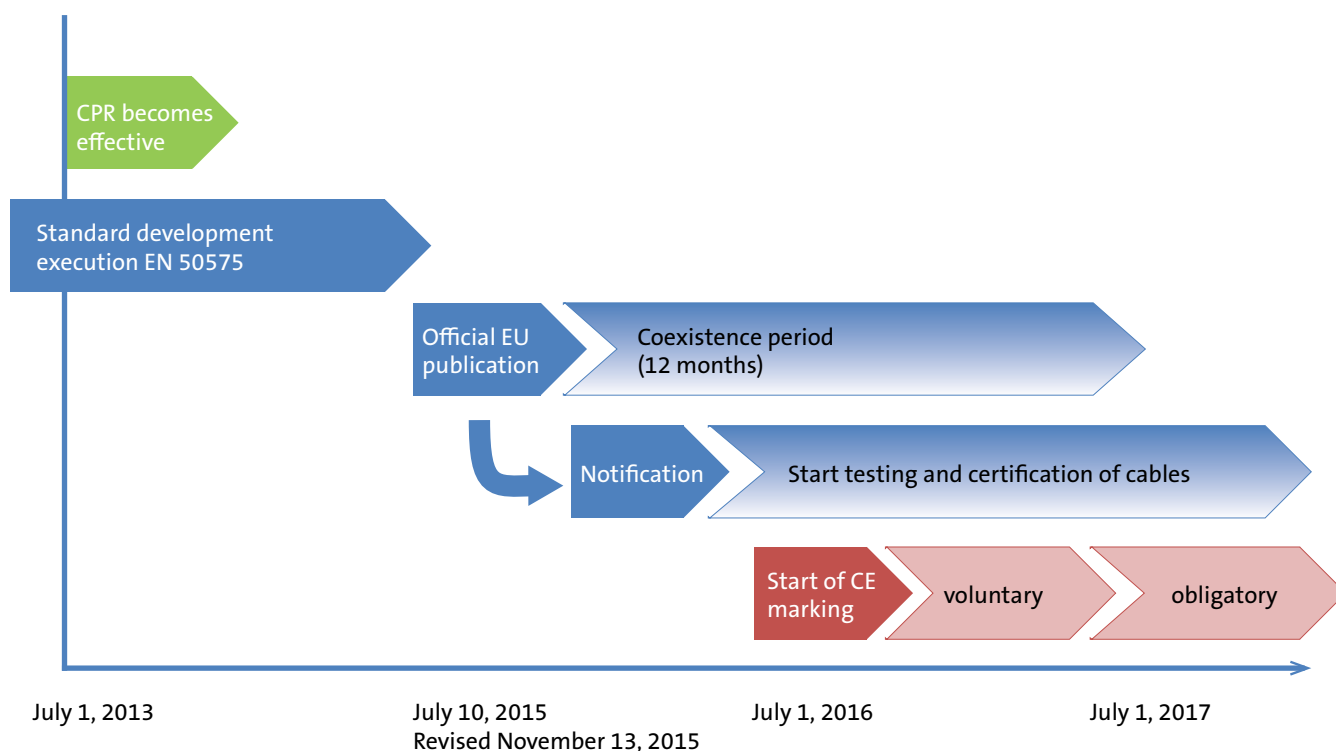
Products complying with the new regulation will have CE marking that indicates the cable's rating in reaction to fire. The CE marking can be printed on the cable and/or on the package.

7. Expected dates for the CE marking of cabling products in compliance with CPR

Although the CPR is currently legislated by the EU, the related standards defining the cable reaction to fire tests are still being ratified. CENELEC has drafted two key standards:

- Power, control, and communication cables EN 50575. This standard covers cables for general applications in construction works. It specifies the reaction to fire performance requirements, test and assessment methods, including the procedure of CE marking.
- Fire classification of construction products and building elements EN 13501-6. Part 6 covers the cable classification using data from reaction to fire tests on cables and provides guidance to fire classification procedures for cables.

The official publication from July 2015 has been revised on 13th of November 2015. There will be a transition period starting 1st of July 2016 in the member countries before these standards are enacted as a requirement, including the need for CE marking. Obligatory CE marking will start 1st of July 2017.



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Obligatory CE marking will start 1st of July 2017.

8. Conforming with the regulation

An accredited test institute (the notified body) defined by each EU member state will assess whether a product meets certain predefined standards and then issues a declaration of conformity. The assessment can include inspection and examination of a product, its design and manufacture, and the rating of the product according to its performance in respect to the appropriate CPR standards. With the declaration of conformity, the manufacturer has to label the product with the CE mark, which is required for distribution and sale of the product within the EU at the end of the coexistence period.

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An accredited test institute will assess the product and issue a declaration of conformity. Manufacturers will only then be able to apply the appropriate CE mark to sell the product within the EU after marking became obligatory.

9. National regulations in addition to CPR

It is the responsibility of each EU member state to enforce the CPR regulations and any necessary national designations. For instance, if we take a look at Germany, the situation on national designations is as follows:

- The “old” rules defined by the MBO (Musterbauordnung) and MLAR (Muster Leitungsanlagen Richtlinie) are still valid and have to be fulfilled.
- The correlation between the new EU classes of cables (B2ca to Fca) and the German DIN classes (B1, B2, B3) has yet to be established.
- The federal state governments of Germany must decide which classes of cable are required for specific applications, for example each state must define which cables are recommended for each type of building (occupants) and special areas within a building (e.g. evacuation routes).
- At the same time, the German cable industry wants to make these designations more stringent and consistent to increase safety in case of fire and allow streamlined product offerings.

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Existing national designations (e.g. DIN in Germany) will still be valid. The transition or development of national designations in addition to CPR may need to take place in a number of countries.

10. Further information

You can visit the European Commission, Enterprise and Industry website for more information on the legislation and further FAQs on CPR:

- Legislation: http://ec.europa.eu/growth/sectors/construction/product-regulation/index_en.htm
- FAQs: http://ec.europa.eu/growth/sectors/construction/product-regulation/faq/index_en.htm

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Please regularly visit the Corning website for future updates.
www.corning.com/opcomm/cpr

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