

EU Construction Product Regulation for Communications Cables

Dr. T. C. Tan, CommScope
B.Sc (Eng), DIC, PhD, CEng, FIET

28th March 2017

The original Construction Product Directive (CPD), 89/106/EEC, was introduced in 1989 and applies to all construction products. One of the essential requirements of the CPD relates to safety in case of a fire. A new testing and classification scheme was agreed for the implementation of the CPD and, in particular, relating to the harmonisation of reaction to fire testing of construction products. In 2006, power and communications cables permanently installed in buildings and civil works were accepted as construction products and the CPD Euroclassification for cables (2006/751/EC) was published in the Official Journal of the European Union and later in EN 13501-6.

In 2011, the CPD became the Construction Product Regulation (CPR), EU/305/2011 and became applicable from 1st July 2013 for all construction products except cables. As an EU Regulation, the CPR is directly applicable in all countries of the EU without further transposition.

Cable CPR

The classification of the reaction to fire performance of all construction products (including cables) was published in 2016 under 2016/364/EU. Note that the newly published classification scheme for cables is slightly different from that originally published back in 2006.

The launch date for the cable CPR was delayed to 1st July 2016 and the final mandatory date to establish CE marking of cables is 1st July 2017. Mandatory cable fire performance marking will be required and, for the first time in Europe, a “hierarchy” of cable fire requirements exists.

Table 1 shows the cable classification scheme. Classification criteria are mandatory requirements and additional classifications are optional requirements.

There are seven Euroclasses: A_{ca}, B1_{ca}, B2_{ca}, C_{ca}, D_{ca}, E_{ca} and F_{ca}, with A_{ca} having the highest performance and F_{ca} having the lowest. These Euroclasses reference several fire test standards—specifically EN 50399, EN 60332-1-2 and EN ISO 1716. Euroclass E_{ca} cables meet the

Class	Test methods	Classification criteria	Additional classification
A _{ca}	EN ISO 1716	PCS ≤ 2.0 MJ/kg ⁽¹⁾	
B1 _{ca}	EN 50399 (30 kW flame source) and	FS ≤ 1.75 m and THR _{1200s} ≤ 10 MJ and Peak HRR ≤ 20 kW and FIGRA ≤ 120 Ws ⁻¹	Smoke production ^{(2), (5)} and Flaming droplets/ particles ⁽³⁾ and Acidity (pH and conductivity) ⁽⁴⁾
	EN 60332-1-2	H ≤ 425 mm	
B2 _{ca}	EN 50399 (20.5 kW flame source) and	FS ≤ 1.5 m and THR _{1200s} ≤ 15 MJ and Peak HRR ≤ 30 kW and FIGRA ≤ 150 Ws ⁻¹	Smoke production ^{(2), (6)} and Flaming droplets/ particles ⁽³⁾ and Acidity (pH and conductivity) ⁽⁴⁾
	EN 60332-1-2	H ≤ 425 mm	
C _{ca}	EN 50399 (20.5 kW flame source) and	FS ≤ 2.0 m and THR _{1200s} ≤ 30 MJ and Peak HRR ≤ 60 kW and FIGRA ≤ 300 Ws ⁻¹	Smoke production ^{(2), (6)} and Flaming droplets/ particles ⁽³⁾ and Acidity (pH and conductivity) ⁽⁴⁾
D _{ca}	EN 50399 (20.5 kW flame source) and	THR _{1200s} ≤ 70 MJ and Peak HRR ≤ 400 kW and FIGRA ≤ 1300 Ws ⁻¹	Smoke production ^{(2), (6)} and Flaming droplets/ particles ⁽³⁾ and Acidity (pH and conductivity) ⁽⁴⁾
E _{ca}	EN 60332-1-2	H ≤ 425 mm	
F _{ca}	EN 60332-1-2	H > 425 mm	

(1) For the product as a whole, excluding metallic materials, and for any external component (e.g., sheath) of the product

(2) s1 = TSP₁₂₀₀ ≤ 50 m² and Peak SPR ≤ 0.25 m²/s
s1a = s1 and transmittance in accordance with EN 61034-2 ≥ 80 percent
s1b = s1 and transmittance in accordance with EN 61034-2 ≥ 60 percent < 80 percent
s2 = TSP₁₂₀₀ ≤ 400 m² and Peak SPR ≤ 1.5 m²/s
s3 = not s1 or s2

(3) d0 = No flaming droplets/particles within 1200 s
d1 = No flaming droplets/particles persisting longer than 10 s within 1200 s
d2 = not d0 or d1

(4) EN 60754-2:
a1 = conductivity < 2.5 μS/mm and pH > 4.3
a2 = conductivity < 10 μS/mm and pH > 4.3
a3 = not a1 or a2

(5) The smoke class declared for class B1_{ca} cables must originate from the EN 50399 test (30 kW flame source)

(6) The smoke class declared for class B2_{ca}, C_{ca}, D_{ca} cables must originate from the EN 50399 test (20.5 kW flame source)

PCS—gross calorific potential HRR—heat release rate
FS—flame spread FIGRA—fire growth rate
H—flame spread TSP—total smoke production
THR—total heat release SPR—smoke production rate

Table 1: Classes of reaction to fire performance for cables

minimum requirement of EN 60332-1-2. Table 2 shows the main differences between some of the test methods.

Each member country can adopt whichever Euroclass the country deems suitable. However, the following philosophy currently seems to apply:

- (a) If national regulations exist, they have to be adjusted to match the CPR.
- (b) If national regulations do not exist, there is no requirement to institute them.
- (c) The CPR may be directly applicable to certain applications such as public transport tunnels irrelevant of condition (b).

As a result, different EU countries may require cables with different Euroclassification for use in the same installation environment. For example, some countries may require Euroclass B2_{ca} cables to be installed in hospitals, whereas other countries may accept Euroclass C_{ca} cables.

Since the CPR applies only to power and communications cables permanently installed in buildings, patch cords and work area cords are excluded from the regulation.

In addition, all cables manufactured before 1st July 2017 do not need to indicate the CPR Euroclassification and can still be put on the market and installed at any time.

Test methods	Burner	Duration	Airflow	Additional
EN 60332-1-2	1 kW	1–8 mins	Convection	No backboard
EN 50399-2-2	30 kW	20 mins	8000 litres/min	Non-combustible backboard
EN 50399-2-1	20.5 kW	20 mins	8000 litres/min	No backboard

Table 2: Comparison between fire test methods

Cable CPR certification

The whole process of certification and labelling is defined in EN 50575. This standard details the fire requirements for cables permanently installed in construction works, allowing a Declaration of Performance (DoP) to be made so CE marking can be applied (either to the cables or their packaging).

EN 50575 provides three systems of attestation of conformity depending on the required Euroclasses—and this is shown in Table 3.

Euroclass	Attestation of conformity system	Comments
A _{ca} , B1 _{ca} , B2 _{ca} , C _{ca}	1+	(1) Testing to be carried out by approved Notified Bodies, which will then issue the certificate of constancy of performance for the cable, surveillance assessment and continuous evaluation of factory production control (2) The manufacturer will then issue a DoP according to the Euroclass format, e.g., C _{ca} -s1, d1, a1 and the necessary CE marking
D _{ca} , E _{ca}	3	(1) Testing to be carried out by approved Notified Bodies, which will then issue a technical report (2) The manufacturer will then issue a DoP according to the Euroclass format, e.g., D _{ca} -s1, d1, a1 and the necessary CE marking
F _{ca}	4	Self certification by manufacturer

Table 3: EN 50575 attestation of conformity systems

In addition, the Technical Specification CLC/TS 50576 defines the procedure and rules for extended application (EXAP) by which the test results for one cable construction can be extended to other cables of a similar construction. The EXAP rules described apply to EN 50399 test results used for classification in Euroclasses B1_{ca}, B2_{ca}, C_{ca} and D_{ca}, additional smoke production classes s1, s2 and s3 and flaming droplets/particles. The EXAP rules

- Permit a limited number of cables belonging to a larger “family” of cables to be fire-tested
- Eliminate the need for extensive testing of the individual cables of a cable family that can be expected to have the same fire behaviour
- Test results are interpolated for the classification—either a portion or the entire cable family
- Reduce the cost of certification

Nevertheless, it is highly likely the CPR will increase the testing and manufacturing cost of communication cables—especially for the higher Euroclasses.

Figure 1 shows the procedures for CE marking of communications cables (next page).

CommScope and CPR

CommScope has carried out extensive testing with multiple Notified Bodies for several years and is making preparation for the CPR. CommScope has an engineering team focused on having all applicable CommScope fibre and copper cable products tested and

certified for the CPR by 1st July 2017. Our testing to date shows that all current CommScope LSZH designs will meet at least the D_{ca} classification. Many will also meet the more stringent C_{ca} and B2_{ca} requirements. In the meantime, CommScope will provide advice and support to specifiers and its partners.

Reference standards

- EN 50399: Common test methods for cables under fire conditions—Heat release and smoke, production measurement on cables during flame spread test—Test apparatus, procedures, results
- EN 13501-6: Fire classification of construction products and building elements—Part 6: Classification using test data from reaction to fire tests
- EN 50575: Power, control and communication cables—Cables for general applications in construction works subject to reaction to fire requirements
- EN 50576: Electric cables—Extended application of test results
- EN 60332-1-2: Tests on electric and optical fibre cables under fire conditions—Part 1-2: Test for vertical flame propagation for a single insulated wire or cable—Procedure for 1 kW premixed flame
- EN ISO 1716: Reaction to fire tests for building products—Determination of the gross heat of combustion (calorific value)
- EN 61034-2: Measurement of smoke density of cables burning under defined conditions. Test procedure and requirements
- EN 60754-2: Test on gases evolved during combustion of materials from cables. Determination of acidity (by pH measurement) and conductivity

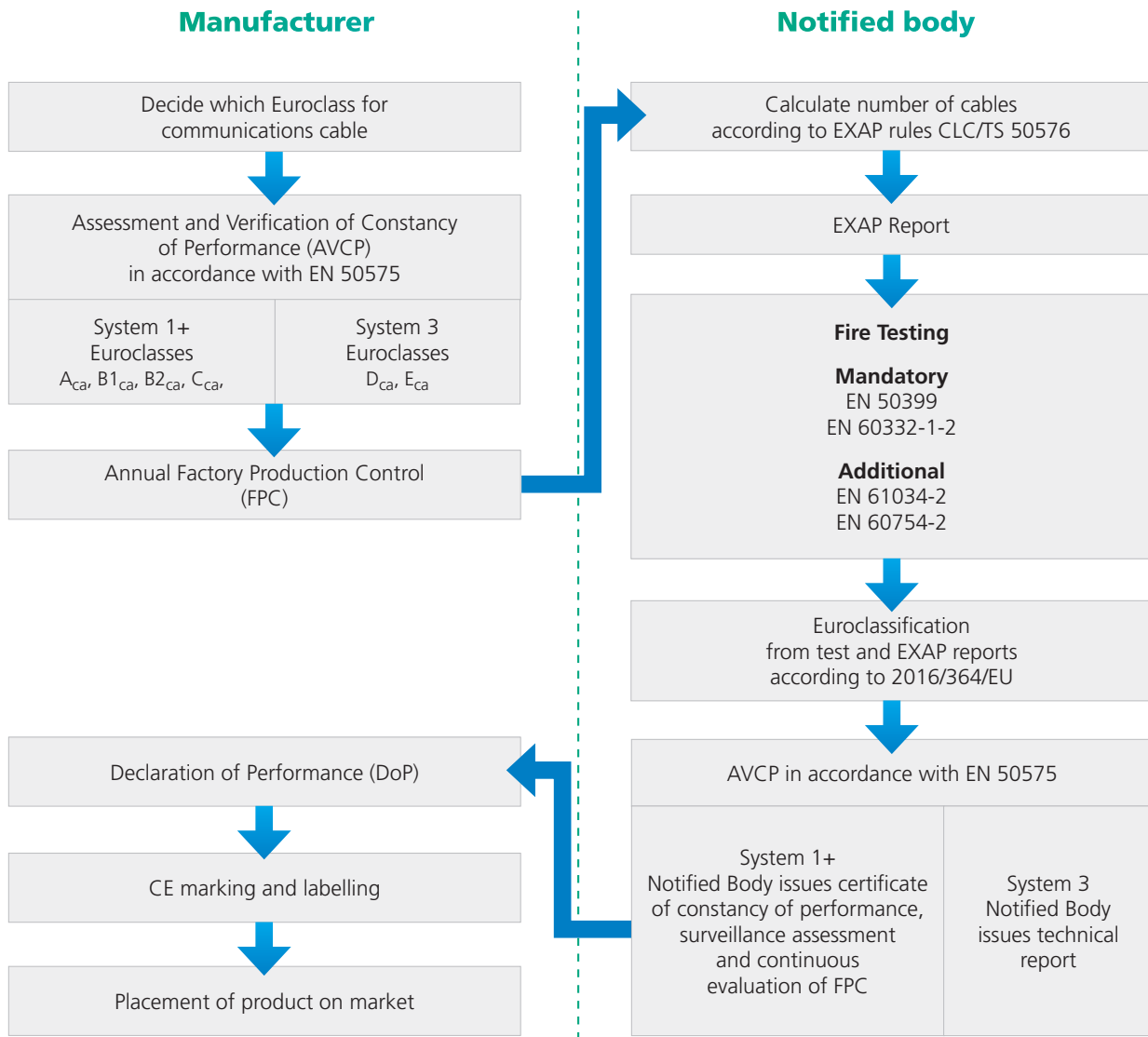


Figure 1: Procedures for CE marking of communications cables



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WP-111686.1-EN (11/18)