CPR

New EU regulation for construction materials

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Construction Products Regulation (CPR)

The European Union, with the aim of improving the safety of buildings, has created a construction products classification system in agreement with their fire behaviour, which is common for the whole of Europe within the Construction Products Regulation (CPR).

The Institutions’ concern to protect people against fire is fully shared by Cables RCT and by the cable industry in general, and thus cables with low smoke and toxic gas emission have been developed. These cables give more time to evacuate in the case of fire and are less harmful for the protection teams, facilitating rescue tasks.

The CPR, with its new product classification system and the quality control requirements entailed by this classification, represents an important step towards improving the performance of cables and their safety level, moving forward along the path that the cable industry has been setting for the last few years.
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Likewise, Cables RCT, within its continuous improvement process, reserves the right to modify its technical specifications without prior notice.

Who does the application of the CPR affect?

The players involved in the application of the CPR are the manufacturers, the dealers, the installers and engineering companies, as well as the competent Authorities of the EU member states.

Manufacturers and dealers are obliged to manufacture and market the products in agreement with the standards indicated in the CPR. Furthermore, manufacturers must make a “Declaration of Performance” (DoP), ratifying that the product meets the performance set by the CPR for a certain Euroclass. Products must be identified with marks and tags that show their classification. Finally, these properties and compliance with them must be validated by an independent body, the so-called Notified Bodies and Laboratories.

The competent authorities of each member state are responsible for determining the conditions that the materials of each national territory must satisfy, establishing the safety levels that must be reached in agreement with the type of construction or installation, and verifying that the products marketed or installed satisfy the respective application requirements.

Installers, engineering companies and end users are obliged to select the appropriate products in agreement with the construction, and they must satisfy the requirements established by the national authorities. Where appropriate, importers must also adopt all the necessary measures to ensure that the products they place on the market are in agreement with CPR requirements and with the mandatory national requirements.

**What is the Construction Products Regulation (CPR)?**

The Construction Products Regulation* CPR, is the European legislation that establishes the basic requirements and essential harmonised characteristics that all products designed to be permanently installed in construction works must satisfy within the EU application scope.

Due to its legal nature, all social agents affected must directly comply with it: administration, manufacturers, dealers, users, etc. All the existing regulations and legislation in the European Union must be adapted before its entry into force to the harmonised technical specifications.


**What is the objective of the CPR?**

There are different legislations for cables at European and national levels that result in different safety levels. The CPR regulation introduces new classification criteria and common classes, the so-called Euroclasses, for the entire European space, creating a common language and a classification, assessment and certification system for all member countries, for construction products. With regards to fire behaviour, it permits establishing common standards to carry out assessment comparisons in equivalent conditions, guaranteeing the veracity of the information the products subject to this regulation.
Why are cables affected by the CPR?

The CPR Regulation defines as construction product all those products designed to be permanently incorporated into construction works, in the broadest sense, not only considering building but also civil engineering works.

Cables have been considered as construction products, and they are the only electrical products classified as construction products. Therefore, power, telecommunications, data and control cables are included. Cables designed for connecting appliances or for internal wiring of equipment or electrical appliances, and all those cables that are not used as cables for construction are excluded.

What characteristics must the cables satisfy with respect to the CPR?

The CPR regulates and establishes the characteristics that construction materials must satisfy with respect to fire. Therefore, the cables are only affected by the safety specifications in the case of fire (resistance and reaction to fire) and hazardous substances (emission and content). The other technical characteristics are defined in the regular standards.

The fire reaction of a cable has three relevant aspects: firstly, the contribution to fire propagation by the heat given off in the actual combustion of the cable and by the burning particles given off; secondly, the amount and transparency of the smoke emitted; and finally, the acidity of the gases given off.

We can define fire resistance as the capacity of a cable to maintain the electrical service of an installation during a fire. The greater fire resistance of a cable, the easier it will be to keep the emergency services in operation and therefore, permit evacuation. The standard that will develop this aspect is still in its draft phase.

Finally, the declaration of hazardous substances, their emission and content, indicates which components and in what proportion they are emitted in normal conditions of use, not of fire, by the cables, in order to preserve the environment. The fact that the content of hazardous substances has been taken into account will be indicated in the DoP of each product, although no criteria have yet been defined to determine them.

By way of conclusion, of the three aspects contemplated by the CPR, the most relevant one at this time is fire reaction, and including but not limited to the declaration of hazardous substances. The fire resistance aspect is still legal development pending.
Since when must the CPR be applied to cables?

The European Union has established the following calendar to apply the CPR (related to fire reaction and emission of hazardous substances):
- Start of the transitional period of co-existence between current requirements and the CPR: 10 June 2016
- Full validity: 1 July 2017

Which are the Euroclasses of the CPR that apply to cables?

The European Union has created a single and uniform classification criterion in the whole of Europe (a common language) to define the fire reaction performance of cables. Hence, some classes have been defined*, using classification criteria in agreement the amount of heat emitted in presence of fire.

Likewise, it contemplates that the manufacturer, lacking requirements related to fire reaction, can use the “Undetermined performance” option (Euroclass Fca).

*(EU) Delegated Regulation 2016/364, of 1 July 2015, on the classification of fire reaction properties of construction products.

---

<table>
<thead>
<tr>
<th>Euroclass</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aca</td>
<td>No reaction</td>
</tr>
<tr>
<td>B1ca</td>
<td>Very low reaction, Non-flame propagator, Non fire propagator (1.75m) Very low heat emission</td>
</tr>
<tr>
<td>B2ca</td>
<td>Low reaction, Non-flame propagator, Non-fire propagator (1.5m) Low heat emission</td>
</tr>
<tr>
<td>Cca</td>
<td>Reduced reaction, Non-flame propagator, Non-fire propagator (2m) Reduced heat emission</td>
</tr>
<tr>
<td>Dca</td>
<td>Improved reaction, Non-flame propagator Improved heat emission</td>
</tr>
<tr>
<td>Eca</td>
<td>Basic reaction, Non-flame propagator</td>
</tr>
<tr>
<td>Fca</td>
<td>Undetermined</td>
</tr>
</tbody>
</table>
What does the Euroclass initial mean?

The designation of the fire reaction characteristics of electrical cables is based on a code that indicates their performance. This code specifies the Euroclass and, if applicable, additional classifications.

Digit 1

Fire propagation and heat emission performance, cable class \((A_{ca}, B1_{ca}, B2_{ca}, C_{ca}, D_{ca}, E_{ca}, F_{ca})\).

- **A\(_{ca}\)** They do not contribute to the fire.
- **B\(_1\)ca - B\(_2\)ca** Minimum contribution to the fire.
- **C\(_{ca}\) - D\(_{ca}\) - E\(_{ca}\)** Combustible, they contribute the fire, from lower to higher contribution.
- **F\(_{ca}\)** Undetermined contribution properties.

Digit 2

Smoke emission properties \((s1, s1a, s1b, s2, s3)\).

This classification provides information about the opacity of the emitted smoke \((s\): smoke).

- **s1** Little smoke production and slow smoke propagation.
  - **s1a** Transmittance >80%.
  - **s1b** Transmittance >60% and <80%.
- **s2** Average smoke production and propagation.
- **s3** None of the above.

Digit 3

Burning droplets/particles \((d0, d1, d2)\).

This classification provides information about the dripping of burning material during the fire \((d\): droplet).

- **d0** No burning droplets or particles.
- **d1** No burning droplets or particles that last more than 10 seconds.
- **d2** None of the above.

Digit 4

Acidity performance \((a1, a2, a3)\) in addition applying the test described in standard UNE-EN 50267-2-3.

This classification provides information about the emission of acid gases during the fire \((a\): acidity).

- **a1** Conductivity < 2.5 \(\mu\)S/mm and pH > 4.3.
- **a2** Conductivity < 10 \(\mu\)S/mm and pH > 4.3.
- **a3** None of the above.

We will thus obtain as many Euroclasses as combinations are possible between the previously mentioned classification criteria, bearing in mind that classes \(A_{ca}, E_{ca}\) and \(F_{ca}\) are only designated by the digit 1 (class) as they do not have additional classification criteria.

This classification system ranks equally in all European Union countries.
## Euroclass classification

<table>
<thead>
<tr>
<th>Classes</th>
<th>EN ISO 1716</th>
<th>EN 50399</th>
<th>EN 50399</th>
<th>EN 60332-1-2</th>
<th>EN 50399</th>
<th>EN 61034</th>
<th>EN 50399</th>
<th>EN 60754-2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Calorific value</td>
<td>Heat emission and fire growth rate</td>
<td>Non-fire propagation</td>
<td>Non-flame propagation</td>
<td>Smoke production</td>
<td>Smoke transmittance</td>
<td>Burning droplets and particles</td>
<td>Acidity</td>
</tr>
</tbody>
</table>

### Contribution to the development of fire

- **Aca**
- **B1ca**
- **B2ca**
- **Cca**
- **Dca**
- **Eca**
- **Fca**

### Additional classification

(only for classes B1ca, B2ca, Cca, and Dca)

<table>
<thead>
<tr>
<th></th>
<th>s1</th>
<th>s1a</th>
<th>s1b</th>
<th>d0</th>
<th>a1</th>
</tr>
</thead>
<tbody>
<tr>
<td>s2</td>
<td>d1</td>
<td>a2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>s3</td>
<td>d2</td>
<td>a3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Classification criteria

- **Eca**
  - **s1b**
  - **d1**
  - **a1**

**Classification a1**
Reduced acidity and corrosiveness of emitted gases with conductivity < 2.5 µS/mm and pH > 4.3

**Classification d1**
No burning droplets/particles that persist for more than 10 seconds.

**Classification s1b**
Reduced emission of smoke and transmittance of over 60% and less than 80%.

### Example

**Class Eca**
It satisfies the non-flame propagation test, without additional classifications.

**Class Cca**
- **s1b**
- **d1**
- **a1**

**Classification a1**
Reduced acidity and corrosiveness of emitted gases with conductivity < 2.5 µS/mm and pH > 4.3

**Classification d1**
No burning droplets/particles that persist for more than 10 seconds.

**Classification s1b**
Reduced emission of smoke and transmittance of over 60% and less than 80%.

**Class Cca**
It satisfies the non-flame propagation test, with the requirement of non-fire propagation and with emitted heat limits for this class.
How are cables assessed and verified externally?

The harmonised standard requirements vary depending on the fire reaction class declared, so there are different Assessment and Verification of Constancy of Performance (AVCP) systems according to the enclosed table, which are more demanding for the upper Euroclasses. These systems are based on the participation of entities not associated with the manufacturer which, according to the name of the CPR, will be the Notified Body and the Notified Laboratory.

All the assessment and verification of constancy of performance systems require the manufacturer to carry out internal quality controls as well as to prepare the Declaration of Performance for each product. There are three assessment and verification of constancy of performance systems:

**1+**
This is the maximum requirement level and corresponds to Euroclasses Aca, B1ca, B2ca and Cca. A Notified Body must inspect and be responsible for the surveillance, assessment and control of the production, as well as control the execution of initial sample and monitoring tests by the Notified Laboratory. The frequency of the monitoring tests is the highest.

**3**
This level corresponds to Euroclasses Dca and Eca. The manufacturer must perform initial verification and monitoring tests on the products with a Notified Laboratory, but the participation of a Notified Body is not compulsory.

**4**
This level corresponds to Euroclass Fca. For the manufacturer, only the preparation of the Declaration of Performance is mandatory, and it corresponds, therefore, to the lowest requirement level.

Consequently, depending on the fire reaction class declared, there are different assessment and verification of constancy of performance systems, which are summed up in the following table:

### Applicable Euroclass

<table>
<thead>
<tr>
<th>Verification elements</th>
<th>1+</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment and verification of constancy of performance systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factory production control</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Additional tests on samples taken from factory, in agreement with the determined test plan</td>
<td>M</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Determination and test of the standard product by tests, calculation or tabulated values</td>
<td>NB</td>
<td>NL</td>
<td>M</td>
</tr>
<tr>
<td>Initial factory inspection and factory production control</td>
<td>NB</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Factory monitoring inspection and factory production control</td>
<td>NB</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tests on samples taken before the product is launched onto the market</td>
<td>NB</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**NB** Notified Body  |  **NL** Notified Laboratory  |  **M** Manufacturer

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Different European organisations have requested and obtained recognition as Notified Body or Laboratory, and manufacturers can hire any one of them. In Spain, the external Notified Body is AENOR and the external Notified Laboratory is CEIS (Centre for Tests, Innovation and Services).

Application scheme of the CPR

\[ A_{ca} \cdot B1_{ca} \cdot B2_{ca} \cdot C_{ca} \cdot D_{ca} \cdot E_{ca} \cdot F_{ca} \]

More additional classifications, if applicable (smoke, acidity and droplets/particles)

- Legislation
- User
- Manufacturer

AVCP
Assessment and Verification of Constancy of Performance

Manufacturer plus the intervention of:
- Notified Body: A_{ca}, B1_{ca}, B2_{ca}, C_{ca}
- Notified Laboratory: D_{ca}, E_{ca}
- Nobody: F_{ca}

DoP
Declaration of Performance

Manufacturer

EC Marking
Not on the cable but in the packaging

Manufacturer

What is the declaration of performance “DoP”?

The manufacturer must prepare a Declaration of Performance (DoP). The declaration of performance is a legal document that must be placed at the disposal of the public, in which the manufacturer identifies the product and its programmed use, indicating the performance of the cable respect to its essential characteristics, which are currently, safety in case of fire (fire reaction according to UNE-EN 50575) and the emission of hazardous substances, although this is not assessed as currently there is no harmonised technical specification.

Therefore, the manufacturer assumes the responsibility for the product conformity to the declared performance.

Cables RCT will adopt the following actions respect to the DoP document:

- A DoP will correspond to each marketed product, with an alphanumerical identification.
- These declarations of performance will be accessible free of charge on our website
- The DoP will contain the following information:
  - Manufacturer’s name.
  - Product code.
  - Traceability.
  - Use of this product.
  - AVCP System.
  - Notified Body.
  - Declared performance and respective standards.
  - Date and manufacturer’s stamp.

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What does the EC marking look like?

The EC marking symbol must be fixed in a visible, legible and indelible manner on the packaging used to market the cables, and it must be accompanied by additional information that is indicated in the harmonised standard. It is not compulsory for the marking to appear on the cable.

Manufacturer's name and registered address, or identification mark.

Fire reaction performance class

European standard applied as it is named in the Official Journal of the European Union (OJEU)

CE marking.

Example of tagging with EC marking for a class Cca cable, is:

| The last two digits of the year when the marking was made for the first time |
| Identification of the Notified Body (99 corresponds to AENOR) |
| Identifying logo for Cables RCT products with a CPR rating |
| Reference number of the Declaration of Performance (DoP) |
| Unique identification code of the standard product |
| Use foreseen for the product as indicated in the applied European standard |

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November 2016
Which standards are applicable for the CPR?

**UNE-EN 13501-6**
Fire classification of construction products and building elements. Part 6: Classification using data obtained from reaction to fire tests on electric cables.

**UNE-EN 50575**
Power, control and communication cables. Cables for general applications in construction works subject to reaction to fire requirements.

**UNE-CLC/TS 50576**
Electric cables. Extended application of test results.

**UNE-EN 50399**
Common test methods for cables under fire. Heat release and smoke production measurement on cables during flame spread test. Test apparatus, procedures, results.

**UNE-EN 60332-1-2**
Test methods 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.

**UNE-EN 61034-2**
Measurement of smoke density of electric cables burning under defined conditions. Part 2: Test procedure and requirements.

**UNE-EN 60754-2**
Tests on gases evolved during combustion of materials from cables. Part 2: Determination of acidity (by pH measurement) and conductivity.

Will the CPR will be applied equally in Europe?

The spirit the CPR has been created with criteria in the whole of Europe and therefore it should be applied equally in any country. Each Member State has the criterion just to decide on which of the Euroclasses will be applied to a specific product in that country.

The measurement and assessment criteria will therefore be equal in each country but different Euroclasses may be established for the same product in different countries.

Will the CPR bring about important modification in cables?

Yes, as the assessment criteria of the CPR are more demanding than current criteria and thus will require the variation and readjustment of compounds and parameters which will make the cables be very different, even though their name does not change. The Euroclass must be marked on the sheath of the cable.
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November 2016
New EU regulation for construction materials
REGULATION (EU) no. 305|2011 - CPR

- **A<sub>ca</sub>** No reaction
- **B<sub>1ca</sub>** Very low reaction.
  - Non-flame propagator
  - Non-fire propagator (1.75 m)
  - Very low heat emission
- **B<sub>2ca</sub>** Low reaction.
  - Non-flame propagator
  - Non-fire propagator (1.5 m)
  - Low heat emission
- **C<sub>ca</sub>** Reduced reaction.
  - Non-flame propagator
  - Non-fire propagator (2m)
  - Reduced heat emission
- **D<sub>ca</sub>** Improved reaction.
  - Non-flame propagator
  - Improved heat emission
- **E<sub>ca</sub>** Basic reaction.
  - Non-flame propagator
- **F<sub>ca</sub>** Undetermined

Cables for every day,
cables for life

www.cablesrct.com
We keep you up to date

We will inform you of everything related to the new CPR on our website:
www.cpr-cables.com

Besides, you can download our cables Declaration of Performance through the product section on our website and access all technical documentation visiting:
www.cablesrct.com