CPR - SAFETY AND COMPLIANCE FOR CABLES

SPECIALCAVI
WE BRIDGE PEOPLE

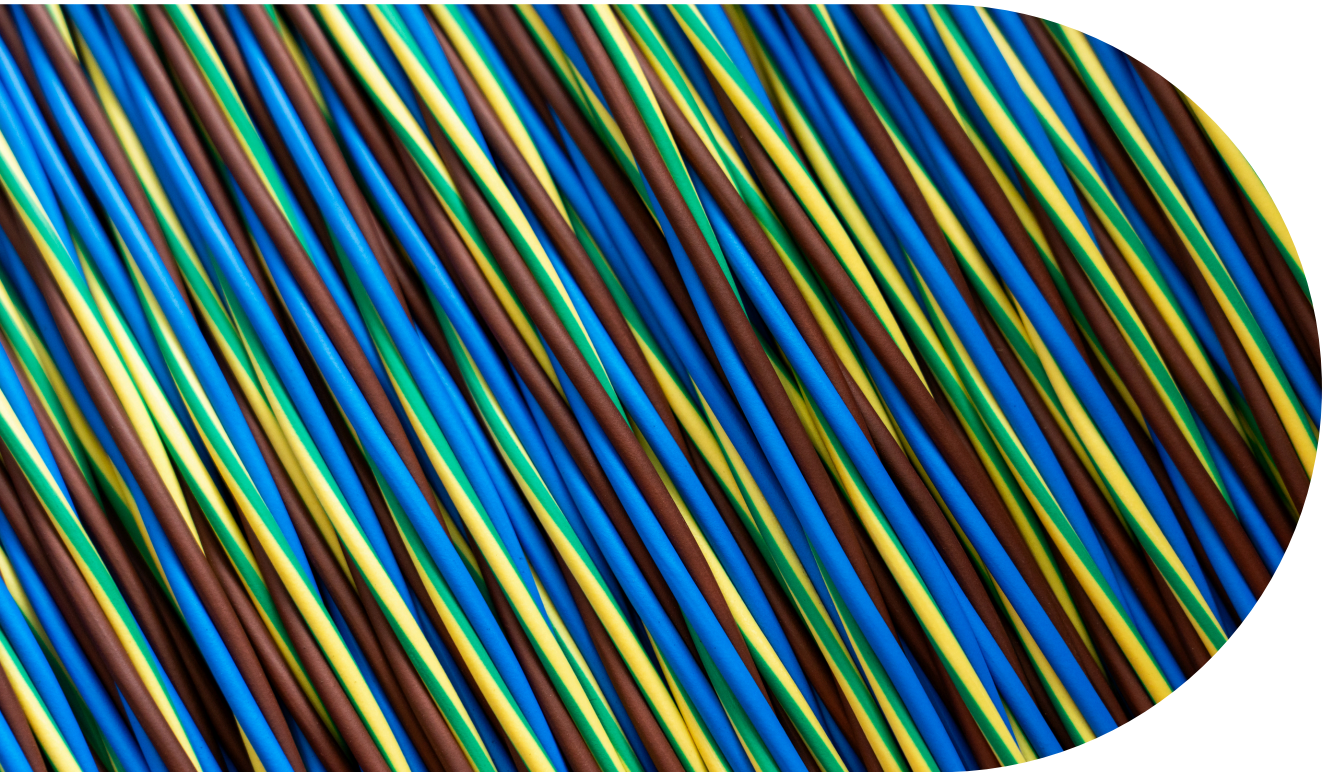
Summary

What is CPR

The CPR, acronym for **Construction Products Regulations**, is a European law that establishes harmonized requirements and the essential characteristics that all construction products, including electrical cables, designed to be permanently installed in civil engineering works must guarantee for the scope of application.

The **main objectives** of the CPR are:

- Ensure the safety of people
- Uniform product performance
- Promote free movement in the EU market



When it was introduced

The CPR came into force on April 24th of 2011; its main provisions became mandatory from July 1st, 2013. However, it is only since July 1st of 2017 that CPR became mandatory for cables, with the introduction of EN 50575. This standard requires companies that sell and distribute cables to draw up a Declaration of Performance (DoP) for the product and affix the CE marking.

Why it is important

Electrical cables, although they are not visible, cross the entire structure of a building. In case of fire they can spread flames, generate toxic fumes or thick smokes, cause short circuits that further fuel the fire.

The introduction of the CPR has imposed requirements considered essential for cables in the event of a fire:

1) Hygiene, health, and environment (Requirement No. 3, Annex I, CPR Regulation)

- RoHS Directive
- REACH Regulation

2) Safety in case of fire (Requirement No. 2, Annex I, CPR Regulation):

- Reaction to fire
- Fire resistance

However, non-CPR cables may still be used:

- In installations excluded from the scope of the CPR;
- Outside the European Union.

Reference technical standards

The EN 50575 standard establishes the criteria for assessing the fire reaction of cables and the related test methods. It organizes performance classes but does not impose specific limits for cables nor define technical requirements for inclusion in each class.

Standard	Brief description
UNI EN 13501-6:2023	Fire classification of construction products and building elements - Part 6: Classification using data from reaction to fire tests on power, control and communication cables
EN ISO 1716	Reaction to fire tests for products - Determination of the gross heat of combustion (calorific value)
IEC EN 50399	Common test methods for cables under fire conditions – Measurement of heat release and smoke production during flame spread tests – Test apparatus, procedures, and requirements
IEC EN 60332-1	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 – 1 kW flame test procedure
IEC EN 60754-2	Tests on gases evolved during combustion of materials from cables – Part 2: Determination of acidity (by pH measurement) and conductivity
IEC EN 61034-2	Measurement of smoke density emitted by burning cables under defined conditions – Part 2: Test procedure and requirements

THE MAIN INNOVATIONS INTRODUCED BY THE CPR FOR ELECTRIC CABLES

Standardized reaction-to-fire tests

Before the CPR, each country used its own standards to test the fire reaction of cables. In Italy, for example, CEI 20-22 II and IEC 60332-3-24 Cat. C were used, which mainly assessed the burn length.

With the CPR, harmonized tests at the European level were introduced to evaluate the fire reaction of cables, replacing previous national standards. Specifically, the EN 50399 standard was introduced for the classification of cables based on their reaction to fire, according to standardized parameters.

The main parameters of the EN 50399 test are:

- **THR1200s (Total Heat Release):** total heat released in 1200 seconds (in MJ)
- **Peak HRR (Heat Release Rate):** peak heat release rate (in kW)
- **FIGRA (Fire Growth Rate):** fire growth rate index (in W/s)
- **FS (Flame Spread):** flame spread length (in meters)

Cable performance classification

With the introduction of the CPR, electrical cables must be classified according to their reaction to fire, based on a harmonized European scale.

Seven performance classes have been defined, identified by a letter (from F to A) followed by the subscript "ca" (standing for cable), in order of increasing performance.

Class	Meaning	Performance	Tests to be carried out
Fca	Not subject to the fire non-propagation test		CEI EN 60331-1-2
Eca	Not subject to the fire non-propagation test		CEI EN 60331-1-2
Dca	Acceptable performance – no limits for fire non-propagation		CEI EN 50399
Cca	Good fire reaction – has a threshold value for fire non-propagation		CEI EN 50399
B2ca	High fire reaction – has a threshold value for fire non-propagation		CEI EN 50399
B1ca	Very high fire reaction – has a threshold value for fire non-propagation with an increased power burner		CEI EN 50399
Aca	Non-combustible		EN ISO 1176

Additional performance classes

In addition to the main classification (from Fca to Aca), the CPR includes complementary parameters that assess key aspects of fire safety:

s: SMOKE (Produzione di fumo)

Measures the quantity and opacity of the smoke generated, which can impair visibility and safety during evacuation in case of fire. Depending on the value reached, three classes are defined:

- s1 = low smoke production and slow smoke propagation (LSZH cables)
  - s1a: trasmittance ≥ 80% (EN 61034-2)
  - s1b: trasmittance between 60% and 80%
- s2 = intermediate smoke production (PVC cables by Specialcavi)
- s3 = high smoke production (not classified as s1 or s2)

d: DROP (Droplets of Flaming Particles)

Assesses the presence of flaming droplets or particles that could contribute to fire spread.

- d0 = no flaming droplets or particles (during a 20-minute test)
- d1 = presence of persistent droplets that self-extinguish within 10 seconds
- d2 = does not meet the criteria for d0 or d1

a: ACIDITY (Acidity and corrosivity of gases)

Measures the aggressiveness of gases released in terms of acidity and conductivity, which can be harmful to people and equipment.

- a1 = very low acidity (pH > 4.3 and conductivity < 2.5 µS/mm)
- a2 = low acidity (conductivity < 10 µS/mm)
- a3 = higher acidity (does not meet a1 or a2 criteria).

If the test is not performed and/or not passed, the cable falls into this class (e.g., if any cable component is made of PVC, it will typically be classified as a3).

CPR Classes by Installation Type

The choice of CPR class for electrical cables depends on the type of building, the crowd density, and the ease of evacuation in case of fire.

The CPR does not directly impose which class must be used in a specific location: it is up to each Member State to define minimum requirements.

In Italy, the CEI UNEL 35016 standard has adopted very strict criteria (Italy is among the most stringent countries), and it never includes the Dca class.

The CPR classes provided in Italy by CEI UNEL 35016 are:

Installation Type	Location	CPR class required
High occupancy density + difficult evacuation	• Airports • Railway stations • Maritime terminals • Subways • Road tunnels longer than 500 meters • Railways longer than 1000 meters	**B2ca - s1a, d1, a1**
High occupancy density + easy evacuation	• Public buildings with high occupancy • Entertainment venues • Hospitals • Hotels • Companies and offices with more than 300 people present • Schools • Residential buildings with a fire height exceeding 24 meters	**Cca - s1b, d1, a1**
Low occupancy density + difficult evacuation	Small to medium-sized public-access buildings (under 24 meters in height), such as: • Bars • Restaurants • Waiting rooms • Medical offices	**Cca - s3, d1, a3**
Low occupancy density + easy evacuation	• Residential buildings	**At least Eca (preferably Dca)**

Fca or unclassified classes are not permitted for permanent installations in buildings.

CE marking obligation

Since July 1, 2017, with the entry into force of the CPR for cables, it has become mandatory to affix the CE marking on all cables placed on the European Union market. The marking:

- Confirms the product's compliance with the declared performance, particularly regarding reaction to fire
- Ensures transparency, traceability, and safety
- Is a mandatory condition for the commercialization of cables intended for fixed installations

Through the CE marking, the manufacturer declares that a product is consistent with its Declaration of Performance (DoP). To this end, the marking must include the following information:

- Identification number of the notified body (if required for conformity assessment);
- Name or trademark of the manufacturer or distributor;
- Reaction to fire class;
- Number of the Declaration of Performance (DoP) associated with the product;
- Intended use of the cable (e.g., "cables for fixed installations in buildings");
- Other relevant characteristics (e.g., "rated voltage", "temperature rating", etc.).

Without the CE marking, a cable cannot be legally placed on the market for fixed installations in buildings.

Specialcavi marking for a CPR-compliant cable:

<meters> CE 0987 SPECIALCAVI BALDASSARI FG16OH2R16AR16 <formation> 0,6/1kV IEC 60332-3-24 CCA-S2,D0,A3 <lot> <yeat>

In addition to the CE marking, voluntary quality marks may also be affixed to cables, provided that:

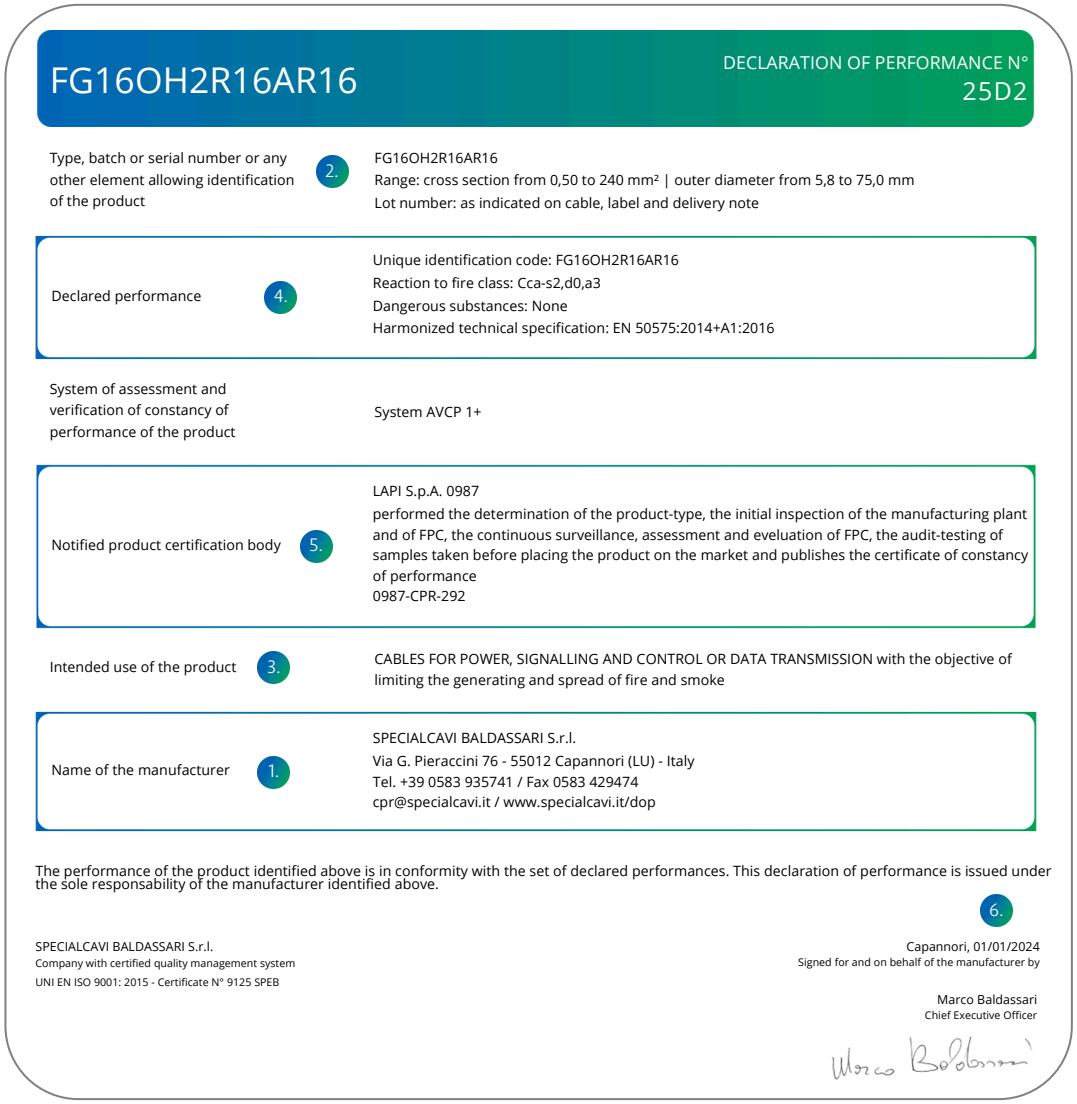
- They do not replace or cause confusion with the CE marking;
- They do not certify compliance with the essential requirements of the CPR;
- They serve a different purpose, such as guaranteeing quality, safety, or compliance with national standards.

Among the voluntary marks are the *HAR mark* (Harmonized Approval for Cables), a European voluntary mark certifying cable compliance with harmonized CEI standards and the *IMQ mark* (Italian Institute for the Quality Mark), one of the most recognized marks in Italy for the certification of safety and quality of electrical products

Declaration of Performance (DoP)

The **Declaration of Performance** is a mandatory document that every manufacturer must prepare for each product or product family subject to the CPR.

The DoP must also be a public document, easily accessible, prepared regardless of the declared performance level, retained by the manufacturer for 10 years, available for every cable placed on the market, provided in paper or electronic format, and written in the languages of the countries where the cable is sold.



FG16OH2R16AR16

DECLARATION OF PERFORMANCE N°
25D2

Type, batch or serial number or any other element allowing identification of the product	2.	FG16OH2R16AR16 Range: cross section from 0,50 to 240 mm² | outer diameter from 5,8 to 75,0 mm Lot number: as indicated on cable, label and delivery note
Declared performance	4.	Unique identification code: FG16OH2R16AR16 Reaction to fire class: Cca-s2,d0,a3 Dangerous substances: None Harmonized technical specification: EN 50575:2014+A1:2016
System of assessment and verification of constancy of performance of the product		System AVCP 1+
Notified product certification body	5.	LAPI S.p.A. 0987 performed the determination of the product-type, the initial inspection of the manufacturing plant and of FPC, the continuous surveillance, assessment and eveluation of FPC, the audit-testing of samples taken before placing the product on the market and publishes the certificate of constancy of performance 0987-CPR-292
Intended use of the product	3.	CABLES FOR POWER, SIGNALLING AND CONTROL OR DATA TRANSMISSION with the objective of limiting the generating and spread of fire and smoke
Name of the manufacturer	1.	SPECIALCAVI BALDASSARI S.r.l. Via G. Pieraccini 76 - 55012 Capannori (LU) - Italy Tel. +39 0583 935741 / Fax 0583 429474 cpr@specialcavi.it / www.specialcavi.it/dop

The performance of the product identified above is in conformity with the set of declared performances. This declaration of performance is issued under the sole responsability of the manufacturer identified above.

6.

SPECIALCAVI BALDASSARI S.r.l.
Company with certified quality management system
UNI EN ISO 9001: 2015 - Certificate N° 9125 SPEB

Capannori, 01/01/2024
Signed for and on behalf of the manufacturer by

Marco Baldassari
Chief Executive Officer

According to Annex III of the CPR Regulation, the DoP must include:

1. identification of the manufacturer
2. identification of the product
3. use of the product
4. cable performance
5. notify body identification number
6. date and signature of the manufacturer

All Declaration of Performance of Specialcavi products are available online:
www.specialcavi.it/dop

Mandatory labelling

Each cable subject to the CPR must be accompanied by a clear, legible, and indelible label or marking on the packaging, allowing its compliance to be identified.

If it is not possible to display this information directly on the cable due to space limitations, it must be present on the label, reel, drum, box, or packaging.

The information to be included on the label is:

1. Name and location of the manufacturer
2. CE marking
3. N° of identification of the CE Notified Body
4. Cable designation code
5. European CPR reference standard
6. DoP number
7. Reaction to fire class
8. Year of first production with CE marking
9. Intended use of the product according to the European Standard
10. Production lot for traceability

AVCP Systems

The AVCP system (Assessment and Verification of Constancy of Performance) defines the level of control required to ensure that the declared performance of a cable remains consistent over time. AVCP systems also define the degree of involvement of Notified Bodies (third-party organizations):

AVCP 1+ System

It is mandatory for classes Aca, B1ca, B2ca, and Cca. It includes the following requirements:

- ***initial type testing*** by a Notify Body, which takes a sample at the time the prototype is produced
- ***ongoing surveillance*** of the manufacturing process
- ***biannual inspection visits***, during which the Notified Body performs document checks on raw materials, verifies ISO 9001 compliance (including conformity and complaints), and inspects instrument calibration
- ***annual full-scale testing*** on at least one certified cable
- ***triennial inspection*** with random sampling from the warehouse for each certificate under System 1+

AVCP 3 System

It applies to Dca and Eca classes. It includes:

- initial product testing by a notified laboratory
- no ongoing surveillance

AVCP 4 System

It applies to Fca class. It includes:

- a self-declaration by the manufacturer
- no involvement of third-party bodies

Example of CE Declaration

FG16OH2R16AR16

EN /EU DECLARATION OF CONFORMITY
DE /EU KONFORMITÄTSERKLÄRUNG FR
/DECLARATION UE DE CONFORMITÉ IT
/DICHIARAZIONE DI CONFORMITÀ UE

CE

EN /Issuer's name and address
DE /Emittenten name und anschrift
FR / Nom et adresse de l'émetteur
IT / Nome e indirizzo dell'emittente

Specialcavi Baldassari S.r.l.
Via G. Pieraccini, 76 - 55012 Capannori (LU) - IT

EN / This declaration of conformity is issued under the unique responsibility of the manufacturer.
DE / Diese Konformitätserklärung ist unter der einzigartigen Verantwortung des Herstellers ausgestellt.
FR / Cette déclaration de conformité est établie sous la responsabilité unique du fabricant.
IT / La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del produttore.

EN / Type designation
DE / Typenbezeichnung
FR / Désignation de type
IT / Denominazione del tipo

FG16OH2R16AR16

EN / The product is in conformity with the European Directive
DE / Das Produkt ist in Übereinstimmung mit der EU-Richtlinie
FR / Le produit est conforme à la Directive Européenne
IT / Il prodotto è conforme alla Direttiva Europea

Low voltage directive: 2014/35/EU
RoHS: 2011/65/EU and 2015/863/UE
REACH: REGULATION N°1907/2006
CONSTRUCTION PRODUCT REGULATION: CPR EU 2011/305

EN / The product to which this declaration relates complies with the following normative references:
DE / Das Produkt, auf das sich diese Erklärung bezieht, stimmt mit den folgenden normativen Verweisen überein:
FR / Le produit auquel se réfère cette déclaration est conforme aux références normatives suivantes:
IT / Il prodotto a cui questa dichiarazione si riferisce è conforme ai seguenti riferimenti normativi:

Conductor	CEI 20-29 EN IEC 60228
Insulation and sheath	CEI 20-11
Product standard	CEI 20-13 P.Q.A.
CPR standard for reaction to fire	EN 50399
Reaction to fire class	EN 50575:2014+A1:2016 Cca-s2,d0,a3
Flame retardant	IEC 60332-1-2 IEC 60332-3-24 (Cat C) IEC 60332-3-25 (Cat D)
Low temperature resistant	EN 60811-504+505+506
Presence of water	HD 60364-5-54:2009 [AD7]

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Capannori, 01/01/2025
Alleingeschäftsführer / Chief Executive Officer
Administrateur unique, / Amministratore unico

Marco Baldassari

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