



CPR: EUROPEAN CONSTRUCTION PRODUCTS REGULATION

EURO CLASSES FOR FIRE BEHAVIOUR OF CABLES

TKF CONNECTIVITY SOLUTIONS

European construction products regulation (CPR)

The social importance of fire safety is increasing. People spend a great deal of time in buildings, unaware of the dangers that are present with respect to fire. And that, even though approximately 90 percent of all fires that break out every year occur in buildings. Ensuring quality in the use of building materials is, therefore, essential.

In 2011, the EU decided to convert the Directive on fire behaviour of construction products into a regulation, the CPR (Construction Products Regulation). The aim of this CPR is to provide reliable information on fire safety and performance of products in various situations. For cables, this means that these are tested with respect to their fire properties. The fire behaviour must be classified according to Euro classes and no longer according to the current fire standards for cables.

The European standard EN 50575 states requirements for the fire behaviour of cables used in electro-technical installations in buildings and in both architectural and civil engineering works, which have entered into force on 1 July 2016. A transition period of 1 year has been set thereafter. The implementation, and the establishment of performance levels by regulatory authorities, must take place separately in each Member State. In this document, we inform you about the most important topics related to implementation in the Netherlands:

- Euro classes for the fire behaviour of cables
- Risk assessment for buildings and legislation
- Fire tests
- CE-marking and certification
- Portfolio TKF

Euro classes for fire behaviour of cables

In the new CPR, cables are classified in Euro fire classes. The following seven fire classes have therefore been established, corresponding to classes construction products:

- A: No contribution
- B1: Minimum contribution
- B2: Very limited contribution
- C: Limited contribution
- D: Average contribution
- E: High contribution
- F: Undetermined

The relationship between Euro classes and the fire behaviour is determined in NTA 13501-6. This standard provides numerous combinations for the different aspects. Here it also applies that it must be determined nationally, which Euro classes one wishes to prescribe.

In the standard NEN8012, the number of classes for the Netherlands is limited to four aspects concerning fire behaviour. In addition to a contribution to a fire, additional classes have also been included, namely smoke development (s), flaming droplets (d) and the corrosiveness / acidity level of combustion gases (a).

The figure below shows the relation between Euro classes and fire behaviour in the Netherlands.

Risk assessment for buildings and rules

In the Netherlands, the requirements of the CPR are incorporated in the new NEN8012, which replaces NTA8012. NEN8012 is applicable to types of cables in (electrical) installations according to NEN1010. NEN8012 concerns the fire behaviour of cables in case of fire, so as to limit the formation and development of fire and smoke. The standard is used to determine the fire class.

The new NEN1010, the new Construction Decree of 2012 and this NEN 8012 together form a solid basis for increasing and ensuring the fire safety of buildings in the Netherlands.

In NEN8012, fire classes are determined on the basis of:

Use function:

- The importance of limiting consequential damage;
- Aspects that are important for the escape of persons (e.g. smoke development);
- Aspects that affect the spread of fire (e.g. burning falling parts);
- Aspects that affect the outbreak of a fire.

In this way, NEN 8012 provides two methods for determining the fire classes and additional classes, should be applied in the specific situation »

Relation Euro classes and fire behaviour

Euro classes	Fire propagation & heat release	Smoke development s = smoke	Flaming droplets d = droplets	Corrosiveness / acidity level of combustion gases a = acidity
Aca	None			
B1ca	Barely			
B2ca	Very limited	s1 (minimal)	d1 (limited)	a1 (low)
Cca	Limited	s1 (minimal)	d1 (limited)	a1 (low)
Dca	Average	s3 (strong, no requirements)	d2 (strong, no requirement)	a3 (strong, no requirements)
Eca	High	-	-	-
Fca	Not determined			

In fact, it is a risk analysis. The two methods that are described in NEN8012 are:

- A step-by-step plan by means of a flow chart, which is based on functional use and consequential damage.
- A risk analysis using a risk graph. This risk graph divides cables into fire class and the additional criteria, namely smoke class, flaming droplets and the corrosiveness / acidity of the combustion gases.



The aspects on which cables are retested are:

- Fire propagation
- Smoke generation (total and peak)
- Heat generation (total and peak)
- Flaming droplets

Risk of fire	Designation score in risk graph and the minimum and maximum value of the risk of fire	Classification of the cable
Low	1-6	E _{ca}
Medium	7-11	D _{ca} - s3, d2, a3
High	12-19	C _{ca} - s1, d1, a1
Very high	20-22	B2 _{ca} - s1, d1, a1

Source: NEN8012 Table 4 - Classification of the cable depending on the fire risk (Scale 1-41)

It is recommended to apply the methodology in consultation with the client.

Fire tests

Due to the change in classification and testing methods, the new EN50399 standard applies for fire tests. According to the applicable CPR rules, cables that fall under these rules must be tested again. The number of aspects with respect to which fire contribution is assessed, is thereby extended. That means that not only results over a given period, but also peak results are examined.

Heat generation and burning falling parts are new aspects on which cables must be assessed. These additional criteria assist in better mapping out the risks concerning clearance and evacuation, such as flashover, disorientation and ignition of clothing. An integrated approach is enforced with the new EN 50399. These tests are applicable to cables, which fall in Euro classes Dca, Cca, and B2ca.

The following overview shows the Euro classes which are applicable in the Netherlands, including the various tests and the associated requirements.

Euro class fire risk		Self-extinguishing EN 60332-1-2	Limited fire spreading EN50399	Smoke development EN50399	Flaming droplets EN50399	Toxicity of fumes EN 60754-2				
		FS (m)	THR (MJ)	Peak HHR (kW)	FIGRA (W/s)	TSP (m ²)	Peak SPR (m ² /s)	s/1200s	Cond (µS/m)	pH
Low	E _{ca}	pass	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Medium	D _{ca} - s3,d2,a3	pass	n.a.	≤ 70	≤ 400	≤ 1300	n.a.	n.a.	n.a.	n.a.
High	C _{ca} - s1,d1,a1	pass	≤ 2	≤ 30	≤ 60	≤ 300	≤ 50	≤ 0,25	≤ 10	< 2,5 > 4,3
Very high	B2 _{ca} - s1,d1,a1	pass	≤ 1,5	≤ 15	≤ 30	≤ 150	≤ 50	≤ 0,25	≤ 10	< 2,5 > 4,3

FS Vertical fire spread
THR Total heat released
Peak HHR Maximum value of the heat released
FIGRA Indication of heat increase

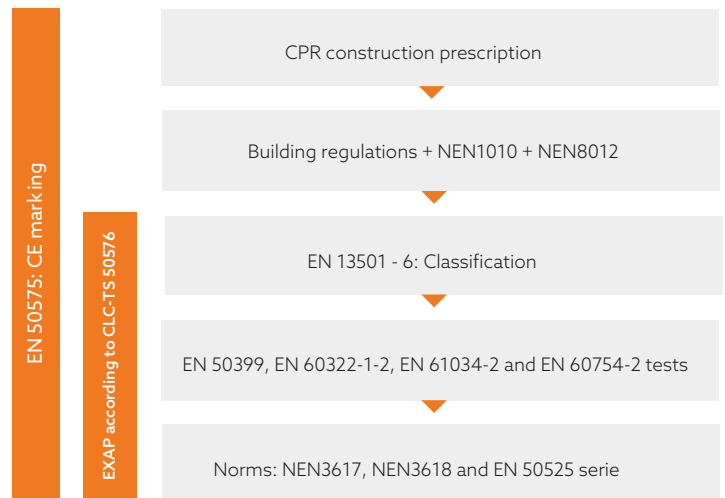
TSP Total smoke development
Peak SPR Maximum value of smoke development
Cond Corrosiveness of combustion gases
pH Degree of acidity of combustion gases

CE marking and certification

Fire safety is of great social importance and, because self-certification does not provide sufficient guarantees for quality and continuity, one has opted for fire-resistant cables through the application of an ACVP System (Assessment and Verification of Constancy of Performance).

This represents an independent product release and quality control. Depending on the level of fire safety, type testing, factory inspections and random sampling can be carried out by an independent testing institute. It is therefore mandatory as of 1 July 2016 that the product bears a CE marking and, additionally, a declaration of performance (DoP).

In the adjacent figure, we have also included the relevant standards, regulations and the connection between them.



Portfolio TKF

In recent years, both internally and externally, TKF has been intensively involved in the development of these standards. Meanwhile, preparations have also been made for an implementation.

In the upcoming period, the certification process will be gone through with approval authorities. The following overview shows TKF's portfolio, classified according to the new Euro classes.

Fire class	Energy and installation cables	Flexible cables	Telephone and data cables
Bca	Twenskaplus YMzKmbzh series for <u>very high risk</u>		Fibre optic cable serie LTC S-CS-HFFR
	Twenskaplus YMzKasmbzh series for <u>very high risk</u>		Signal cables fire resistant
	Installation cables fire resistant		
Cca	Twenskaplus YMzKmbzh serie for <u>high risk</u>	LiHH & LiHCH series	Fibre optic cable serie LTC -S-FR
	Twenskaplus YmzKasmbzh series for <u>high risk</u>		
	Instalflex mbzh series		
Dca	YmzK series medium voltage		
	Twenskaplus YmvKmb series	ÖPVC series	Twenkacom series
	Twenskaplus YmvKasmb series	VMvLmb series	JYY en JY(st)Y series
	Instalflex mb series		Communication cables
Eca	YMvK series medium voltage		Norm 88
	XMvK	VMvL series	Norm 45
	VD series		
	ZD series		
	YmvK series distribution cables		

Overview of relevant standards

In the overview below, you can find all relevant standards, which are listed by their titles and as referred to in this whitepaper.

Norm	Title description
NEN8012	Limitation of damage resulting from fire from and via the electrical leads in the electric installation
NEN EN 50399	Electric leads - normal testing methods for reaction to fire - measuring the escaping heat and smoke development to leads during the fire spreading test - Test temperature, procedures, results.
NEN EN 50575	Electric leads for supply and electric leads and fibreglass leads for control or communication - Electric leads and fibreglass leads for general use in construction works for which fire performance requirements apply
CLC/FprTS 50576	Electric cables - Extended application of test results

Questions?

Do you have any questions or comments? Please feel free to contact our sales department or the contact persons indicated below.

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