

# Overview of Fire certification

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### Introduction:

Fire safety requirements are regulated in the individual building regulations. This legislation classifies the use of construction materials of which a building has been made of as well as all the materials that are used to cover walls, ceilings or floors, both internally as externally. The ultimate goal of the legislation is to secure the possibility for safe evacuation for occupants from an enclosed area, in case of hazardous situations caused by fire.

Throughout the EU there have been a large number of different tests used for assessing the reaction to fire of products. These variations across individual member states mean that comparison of the performance of a product when assessed by different methods can be extremely complicated. This leads not only to barriers in acceptance and in pan-European trade of construction products but also creates confusion. To eliminate possible inconvenience and to dispense with national emotions, the Construction Products Regulations (CPR, effective April 2011) has been implemented to replace Construction Products Directive (89/106/EEC). The harmonized classification regarding reaction to fire is set out in EN 13501-1:2018. The end result is supposed to be that all national classification systems should be replaced by harmonised European standards. This procedure has been initiated and will in due time be finalised. Each European country will be required to incorporate CPR in national building regulations.

### Testing:

There are two aspects of fire tests which need to be determined;

- Resistance to fire;  
Measurement of the capability of a product or material to resist fire.
- Reaction to fire properties;  
Measurement of behaviour and contribution of the material to the progress of fire and to the further spread of it.

To obtain classification of reaction to fire performance in accordance with EN 13501-1 two tests have to be conducted:

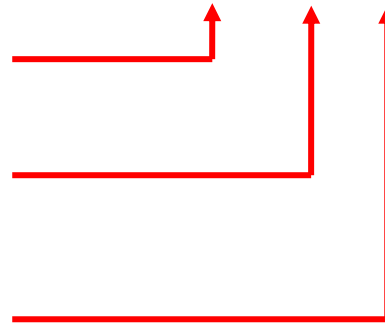
- Determination of the ignitability properties of the product by direct small flame impingement according to EN ISO 11925-2:2010
- Determination of the reaction to fire properties of the product when exposed to the thermal attack by a single burning item according EN ISO 9239-1:2010

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After execution of both tests, the material will be classified, for example as:

### Reaction to fire classification: **B – s1, d0**

- Main indicator; fire classification.  
From highest rating A1 via A2, B, C, D, E to F being the lowest level of performance.
- Additional indicator; smoke production.  
From highest classification s1 via s2 to s3 being the lowest level of performance.
- Additional indicator; burning droplet forming.  
From highest classification d0 via d1 to d2 being the lowest level of performance.



### Comparison of different classifications:

Each national reaction to fire classification is tested by use of different measurements or methods. Direct comparison of individual national tests or classification with the European classification is very difficult. Different matrices exist and many have a slightly different interpretation. When a product achieves a certain fire classification, it does not mean that it automatically obtains the comparable European (or other national) rating.

The matrix on page three shows, **in our opinion**, a good overview of dominant existing classifications, their ratings and their correspondance to the European reaction to fire classification.

Overview of European and most commonly used national performance classes;

- European: EN 13501-1:2018
- German: DIN 4102-1,1998 (often referred to as “B1” which is in fact a classification)
- French: NF P92-507:2004 (often referred to as “M1” which is in fact a classification)
- UK: BS 476-6:1989 +A1:2009 and BS 476-7:1997

When requesting a fire certification, the customer should always ensure that it covers the requirement for their specific application. Furthermore, the classification is only applicable for the product which is mentioned on the corresponding classification document.

With regards to self adhesive products; they will be applied onto a dedicated substrate or overposted on top of another self adhesive film. Combinations of products should, if required, be tested as one product to determine the reaction to fire. When mounted together, two materials with for example a “B – s2,d1” classification do not automatically result in an end product with the same classification.

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Euroclass	German	No Smoke No droplets		Euroclass	French	Euroclass	UK (Engl., Wales, N.I.)
EN 13501-1	DIN 4102-1			EN 13501-1	NF P92-507	EN 13501-1	BS 476/6 BS 476/7
A1	A1	✓	✓	A1	non combustible	A1	non combustible
A2 - s1,d0	A2	✓	✓	A2 - s1,d0 A2 - s1/s2/s3/, d0/d1	M0 M1	A2 - s1/s2/s3/, d0/d1/d2	limited combustible
B/C - s1,d0	B1	✓	✓	B - s1/s2/s3/, d0/d1	M2	B - s1/s2/s3/, d0/d1/d2	Class 0
A2/B/C - s2/s3/, d0			✓	C - s1/s2/s3/, d0/d1		M2	C - s1/s2/s3/, d0/d1/d2
A2/B/C - s1, d0/d1		✓					
A2/B/C - s3, d2							
D - s1/s2/s3/, d0	B2		✓	D - s1/s2/s3/, d0/d1	M2	D - s1/s2/s3/, d0/d1/d2	Class 3
D - s1/s2/s3/, d1/d2				D - s1/s2/s3/, d0/d1	M4 (no droplets)		
E				E	M4	E	
F	B3			E - d2 F		F	

Euroclass:		Classification for smoke or droplets:	
A1	Not inflammable	s1	No smoke
A2	Almost not inflammable	s2	Limited smoke production and smoke increase
B	Very difficultly inflammable	s3	No limitation on smoke production required
C	Moderately inflammable		
D	Well inflammable	d0	No droplets allowed
E	Very inflammable	d1	No droplets for longer than certain time given
F	Extremely inflammable	d2	No limitation on droplets required

If in above table is indicated for example “B/C – s1/s2/s3, d0/d1/d2”, it means that any combination of those Euroclass/smoke/droplet ratings is possible.

The threefold classification result is only applicable for;

- vertical applications, both free hanging as well as mounted on a non-combustible substrate.
- horizontal applications applied to or suspended at ceilings.

Materials designed as floorcoverings usually have a twofold classification, indicated with the affix “ff” and without information on droplet forming, for example “Bff- s2”

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