

WPA fire protection factsheet No.2

Fire protection terminology

Understanding Combustibility

Reaction to fire testing

There are four recognised stages in the development of any fire: Ignition, Spread and growth, ‘Flashover’ into a fully developed fire and Eventual decay. During the early stages, when a fire is still becoming established the important factors are

- **Ignitability** – how readily will a material ignite and catch fire?
- **Spread of flame** – once ignited, how quickly will flames spread across the surface of that material?
- **Heat release** – once alight, how much heat energy will be generated by the burning material, which will contribute to the further growth of the fire?
- **Flaming droplets** – will the burning material disintegrate and produce burning droplets or debris which might fall onto and ignite other surfaces?

These factors are elements of a material’s **REACTION TO FIRE** properties, all of which can be measured, tested and enhanced by a WPA approved flame-retardant product and quality assured application system. Reaction to fire test results are expressed as Euroclass classifications to EN 13501-1.

Euroclass	For all construction products excluding flooring
Class F	Products for which no reaction to fire performances are determined or which cannot be classified.
Class E	Products capable of resisting, for a short period , a small flame attack without substantial flame spread.
Class D	Products capable of resisting, for a longer period , a small flame attack without substantial flame spread.
Class C	As D but satisfying more stringent requirements and showing limited lateral spread of flame under thermal attack by a single burning item (SBI).
Class B	As C but satisfying more stringent requirements and showing very limited lateral spread of flame under thermal attack by a single burning item (SBI)
Class A	As B for SBI reaction plus no significant contribution to fire load and growth (A2 – limited combustibility) or no contribution in any stage of the fire (A1 – non-combustible).

Terminology

A term which is commonly misunderstood and misused is Combustibility. For clarification, we need to refer to the official definition used in EN standards and building regulations.

For a material to be classed as either non-combustible or of limited combustibility it must achieve Class A1 or A2 in testing (see table above). A limited lateral spread of flame classification does not infer any resistance to combustibility, it is solely a measure of the rate of spread of a flame across the surface under defined conditions.

Using this classification system, any material rated Class B or lower is therefore classed as Combustible, albeit to varying degrees. This is very relevant, for example, to the recent government consultation on banning the use of combustible materials for use as cladding on high rise buildings. Should this policy be adopted, only Class A materials would comply.

Implications

Untreated wood-based materials normally have a Euroclass D or E rating. Depending on the system and loading used, this may be enhanced to Class B or C by the addition of a flame retardant.

Flame retardant treatment will enhance the reaction to fire properties of wood-based materials, reducing ignitability and consequent spread of flame - slowing down the development of the fire and allowing significantly more time for the occupants of a building to escape and for the fire to be extinguished.

Whilst it is not possible to enhance any organic substrate, including wood-based materials, to a Class A rating, flame retardant enhanced wood-based materials enhance safety, add value and are fit for purpose for many applications, such as cladding for low to medium rise buildings (in compliance with Building Regulations), cedar shingles, roof structures, internal panelling, sheathing, exhibition stands and timber in public spaces.

Summary

For a material to be classed as either **Non-combustible or of Limited Combustibility** it must achieve Euroclass A1 or A2 in **reaction to fire** testing. Any material rated Class B or lower is therefore classed as **Combustible**, albeit to varying degrees.

Whilst it is not possible to enhance any organic materials to a Class A rating, **flame retardant enhanced wood-based materials enhance safety, add value and are fit for purpose** for many applications.

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