

GUIDANCE NOTE

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Understanding Fire Protection Terms

Combustibility

Reaction to Fire Testing

There are four recognised stages in the development of any fire: **Ignition, Spread and Growth, Flash point** 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?
- **Smoke production** – how much smoke will be generated by the burning material?
- **Flaming droplets** – will the burning material disintegrate and produce burning droplets or debris which might fall onto and ignite other surfaces?

All these factors are elements of a material's **reaction to fire** properties, all of which can be measured and tested and if necessary enhanced by a WPA Benchmark approved flame retardant treatment 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.

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Using this classification system, any material rated **Class B** or lower is therefore classed as **Combustible**, albeit to varying degrees.

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.

It is not possible to enhance any organic substrate, including wood-based materials, to a Class A rating. However flame retardant treated wood-based materials increase safety, add value and are fit for purpose for many applications, including 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 treated wood-based materials enhance safety, add value and are fit for purpose for many applications.