

GUIDANCE NOTE

Ref: WPA FR 2

Issue 4: June 2024

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 not capable of resisting, for a short period, a small flame attack without substantial flame spread.
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 and not showing excessive fire growth under thermal attack by a single burning item (SBI).
Class C	As D but satisfying more stringent requirements on fire growth, heat release and limited lateral spread of flame under thermal attack by a single burning item (SBI).
Class B	As C but satisfying more stringent requirements on fire growth and heat release under thermal attack by a single burning item (SBI).
Class A	For A2, as B (SBI test only) with extra test evidence for no significant contribution to fire load and growth (limited combustibility). For A1, different test evidence for no contribution to the fire (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.

Understanding Fire Protection Terms

Combustibility

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 treatments enhance the reaction to fire properties of wood-based materials – reducing ignitability, fire growth, heat release and consequent spread of flame. This slows down the development of the fire and allows significantly more time for 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.