

A SPECIFICATION GUIDE TO Flame Retardant Wood Panels

Part 3: Product Testing

The performance of wood-based panels in fire can be greatly enhanced by the addition of a flame retardant during manufacture. This is the safest and most effective treatment method, and the certification and specification process is clear and simple. Flame retardants can also be applied by a third-party treater by post-impregnation or by applying flame retardant coatings to the panel's surface. However, this process is much more complex and difficult to maintain the highest standards of quality assurance and certification. *In all cases the product must be independently tested and certified to provide evidence of the level of fire protection claimed.*

Fire Test Classification

Evidence of the efficacy of the flame retardant treatment is provided by a product's Fire Test Classification Report to EN13501-1. A product's Classification Report must be produced by a government approved test organisation, often referred to as a Notified Body, competent to conduct such work. The Fire Test Classification should be included on the Declaration of Performance produced and provided by the product manufacturer. See *Chapter 1*

The Classification Report must include the following essential information:

- An unambiguous description of the material/product
- The Reaction to Fire properties of the product (its Euroclass rating)
- The product's Field of Application (details of how it can be used safely)

Product Description

Flame retardant classifications are specific to the wood-based panel product tested and will vary depending on density, thickness, wood species and end-use application. A classification for spruce, for example, at a density of 350kg/m³ should not be assumed to apply to other softwood species. Specifiers and users should avoid products where the description on the Classification report is non-specific or generalised, particularly where a product's fire performance has been enhanced by the addition of flame retardant.

Reaction to Fire Classification

The highest Reaction to Fire class for flame retardant wood-based panel products will normally be Euroclass B. It is not possible to achieve Euroclass A (non-combustible) with a natural and organic material, such as wood.

A product's 'Reaction to Fire' is measured based on fire propagation and flame spread in the presence of an ignition source and on the amount of heat produced during the test - See *chapter 1*.

Smoke production is indicated by a subscript 's', where s1 indicates very little smoke is produced while s3 indicates a significant amount of smoke is produced.

Flaming droplets are particles that can fall away from the burning surface and could initiate new fires. The release of flaming droplets is indicated by the subscript d, where d0 indicates no flaming droplets and d2 indicates a significant number of droplets.

Field of Application

The field of application will define how the flame retardant treated product was tested and therefore also the limitations for its safe use in-service. This is key to ensuring the product will perform satisfactorily once installed. It will usually include a description of any product variations that are allowed and end-use applications where the stated Euroclass performance can be achieved.

Equally importantly the field of application can include restrictions, which must be taken into account for the classification to remain valid. Typical examples include:

- **Air Gap.** Some Flame Retardant treated products must be fixed directly to a non-combustible substrate to enable them to achieve their stated Euroclass, while others may achieve their Euroclass with an air gap of a defined depth.
- **Thickness.** This is often stated as a minimum thickness, but it could be defined as a range of thicknesses.
- **Product Description.** Some classification reports refer to a manufactured product from a limited range of similar sources of a specific wood species and a limited range of acceptable densities; others may only be valid for one thickness of a single product from a specified manufacturer.

Example: If a Classification Report refers to Euroclass B-s1, d0 for 25mm thick spruce boards mounted on plasterboard without an air gap, then the product cannot be assumed to confer the same reaction to fire performance for:

- Spruce boards less than 25mm thick
- 25mm thick boards made using an alternative wood species
- Installation with an air gap behind
- 25mm thick spruce boards mounted on a backing material with a higher fire risk than plasterboard.

For further information: *Wood Protection Association Guidance Note FR 7*

A Common Misunderstanding

One of the most common misunderstandings is that Euroclass B means 1 hour fire rating, and Euroclass C means ½ hour fire rating. **There is no such product!** However, a Euroclass rated panel may form part of a fire barrier system requiring ½ hour or 1 hour fire resistance, but this system is tested to a different standard (for complete building components such as walls or floors).

Refer to chapter 1 for differences between Reaction to Fire and Fire Resistance.

Flame Retardant Processes

Where flame retardant is added to wood-based panels to ensure compliance with the regulations it is critical to ensure that the flame retardant (FR) treatment has been applied properly. The most effective way to do this is to treat the wood-based panel with flame retardants during manufacture under factory controlled conditions to ensure they meet the high levels of performance required by the regulations.

Engineered wood-panel products, such as OSB and MDF for example, can have flame retardants incorporated into the panel during manufacture. This has several advantages:

- Because the treatment is integral in the product it will not be removed by processes such as machining or finishing. This type of treatment is likely to be more permanent in service than post-treatments or surface applied coatings.
- Incorporating the treatment throughout the thickness of the product, should ensure that cutting the product post-manufacture will not normally reduce its fire performance. Note: It is the responsibility of the end-user or component fabricator to verify (by test) the performance of a finished product for a specific application, for example a veneered, laminated or deep-routed product or product with holes such as acoustic panels or peg boards.
- Factory production control can ensure the quality of product is constantly maintained. The incorporation of a flame retardant under factory conditions will allow the process and manufacture to be included in third-party certification.
- Products such as MDF, which cannot be vacuum pressure impregnated post production, can have their reaction to fire performance enhanced during manufacture.
- Wood-based panel products can be CE marked for structural and non-structural use ex-works, allowing easy specification and ensuring compliance with the Construction Products Regulation (CPR).

WPA Benchmark FR

For additional peace of mind, the Wood Protection Association (WPA) has introduced a quality scheme for structural wood-based panel products whose reaction to fire classification has been enhanced by incorporation of flame retardant chemicals as part of the manufacturing process. **SMARTPLY MAX FR EUROCLASS B** is approved under this scheme, and is suitable for permanent structural use in buildings.

The scheme relates to the factory process used to apply a WPA Benchmark Approved formulation flame retardant treatment during the manufacturing process, where that process is subject to factory production control process overseen by a notified body. The scheme provides independent third-party auditing and verification that the WPA Benchmark Approved flame retardant has been correctly applied. The product should carry the CE mark and be accompanied by a valid Declaration of Performance when it leaves the factory. This is a legal requirement under the CPR when a manufacturer places a product on the market.

Details of the WPA Benchmark FR scheme are available at www.thewpa.org.uk

Note: It should not be assumed that, because the fire performance of a wood-based panel product is enhanced by flame retardant treatment, there is a reduced requirement for good design and workmanship. The flame retardant treatment or products recommended for various end use situations are complementary to good design, workmanship and site practice – not a substitute for them.

Site-applied Flame Retardant Coatings: A Warning

The emerging use of site-applied coatings to timber panel products, as opposed to the incorporation of flame retardants during the manufacture of timber panel products, is a significant concern.

It is absolutely essential that fitness for purpose is verified prior to the use of any coating purporting to offer extensive fire protection performance. That's because products intended to be brush-or spray-applied to timber panel products on site can be superficially applied with little or no factory control. Often there is no real external verification of quality control or evidence of fire performance specific to the type, size and installation configuration of the timber elements for which long-term fire protection is required.

It is worth noting **the application of flame retardant products on construction sites is not approved by the WPA because it is almost impossible to ensure quality control.**

Specifiers and contractors should also be aware that in recent years site-applied FR coatings have appeared in the UK with 'Declarations of Performance' (DoP), CE Marked, Construction Products Regulations (CPR) compliance claims and application choices that make them appear an attractive alternative to products added during manufacture.

However, although a can of flame retardant for site-application could be CE marked and have a DoP, this information would be in conjunction with a European Technical Assessment (ETA) in accordance with ETAG 028. It is not the same as a DoP in accordance with a Harmonised European product standard such as EN 13986. Therefore, the DoP and ETA should be supported by EN 13501-1 test

evidence. Even then, it is vital to ensure that the coating is applied correctly on site (Note: it is very difficult to apply an even thickness of coating with a brush, roller or spray on a construction site. Also, there may be excessive moisture or dust on surfaces which can affect adhesion of the coating to the substrate)

By contrast, flame retardants incorporated during manufacture under quality-assured factory-controlled conditions will be underpinned by a substantial body of test data, third-party accreditation, Declarations of Performance and CE Marking. Evidence of the efficacy of the FR enhancement will be found in the Classification Report issued by the accredited test organisation.

Vacuum impregnated flame retardant wood panel products

Timber and sheet materials can be impregnated with flame retardants under controlled conditions in an industrial vacuum pressure timber plant, followed by drying to return the material to an acceptable or specified moisture content.

MDF is not suitable for post manufacture pressure treatment. Furthermore, post-manufacture pressure treatment with flame retardant can destroy the structural integrity of an OSB panel. As a consequence, applying flame retardant chemicals using vacuum pressure treatment to a CE marked product invalidates its CE mark, even though the CE mark can often remain visible after treatment.

Wood-based panel products which have a CE mark applied prior to pressure treatment will require a new DoP to be issued after treatment to declare the panel's improved reaction to fire classification and to take account of any change in the panel's structural properties that may have occurred as a consequence of the treatment. This activity will require the involvement of a Notified Body.

Compatibility of FR timber products and treatments with additional coatings

Any additional coating applied to a timber panel that has a proven fire performance will likely affect this performance. The addition of a decorative coating such as varnish, paint or veneer, for example, can often decrease a panel's performance in fire tests so new test evidence must be gained to prove that the new composite product will still achieve the required performance.

For more information on **MEDITE SMARTPLY**
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