MEDITE® SMARTPLY®
INNOVATIVE TIMBER PRODUCTS

A SPECIFICATION GUIDE TO
Flame Retardant Wood Panels

Part 1: Terminology and the fundamentals of fire

Flame retardant wood panels have been developed specifically for use in fire-rated applications where a **Euroclass B** or a **Euroclass C** material is required under the Building Regulations. This chapter explains the terminology used in their specification...

The stages in the development of a fire

When a fire breaks out every second counts. The more slowly a fire spreads the more time occupants will have to evacuate the area and the greater the opportunity to fight the fire and limit its damage.

The terminology used to describe the fire performance of a wood panel is related to the stages of a fire's development and growth. These are:

1. Ignition: when oxygen and a fuel source are ignited they combine in a chemical reaction to form a fire

2. Spread and growth: the fire is established, the heat it generates results in combustion of surrounding fuel sources; if the fire continues to increase in temperature and size it will eventually reach flashover

3. Flashover is when the flammable contents of a room or building simultaneously ignite. The fire is at its hottest at this point and is consuming all available fuel sources

4. Decay: The fourth stage of a fire is its eventual decay, which happens after all the available fuel has been consumed and its temperature drops. This document does not cover this stage.

In the early stages of a fire, when the fire is becoming established, it is the **Reaction to Fire** properties of a material that will determine how it will contribute to the fire's development. Once a fire is established, containment is the priority and the **Fire Resistance** of construction elements, such as walls and floors, in resisting the passage of fire is then the focus.

Reaction to Fire

A material's reaction to fire determines how quickly it will burn and to what extent it contributes to the growth of the fire. There are a series of standardised tests to measure the contribution a particular material will make to a fire's development and spread. The tests measure:

- **Ignitability:** How readily will a wood panel ignite and catch fire
- **Spread of flame:** Once ignited how readily will flames spread across the panel's surface
- **Heat release:** When alight, how much heat energy does the panel release
- **Smoke production:** What quantity of smoke and combustion gases will the panel generate
- **Flaming droplets:** Will the panel disintegrate and produce burning debris which might fall and ignite other surfaces?

A wood panel's reaction to fire performance, including when used as flooring, is determined using the following European and ISO Standards:

- **BS EN 13823:** Reaction to fire tests for building products. Building products excluding floorings exposed to the thermal attack by a single burning item
- **BS EN ISO 11925:** Reaction to fire tests. Ignitability of products subjected to direct impingement of flame. Single-flame source test
- **ISO 9239-1:** Reaction to fire tests for floorings - Part 1: Determination of the burning behaviour using a radiant heat source

Euroclasses

The results from the reaction to fire tests are used to determine a material's fire performance classification.

The European Standard BS EN 13501 defines seven levels (Euroclasses) of fire performance with products classified A1. A2, B, C, D E and F. Class A1 is the best performing with a product assessed as making no contribution to a fire; if a product is Class F, it is an indication that it does not meet the criteria of any class or that the material has not, or cannot, be tested.

Table 1: European fire test classes

Class	Definition
A1	Non contribution to fire
A2	Negligible contribution to fire
B	Very limited contribution to fire
C	Limited contribution to fire
D	Medium contribution to fire
E	High contribution to fire
F	Easily flammable

Enhanced Euroclass classification

The Euroclass definition can also contain information about the amount of smoke and burning droplets produced when a material burns.

Smoke

Smoke inhalation kills: it can obscure vision, create disorientation and cause asphyxiation. Limiting smoke emission is a key aspect of fire safety so alongside the overall Euroclass classification, additional detail is provided in the form of a subscript for the amount of smoke a burning material will produce.

The three additional classifications are:

- **s3:** high intensity of smoke production
- **s2:** average smoke production
- **s1:** no or low smoke production

Flaming particles

While wooden products char in a fire, some construction products, like those made of polystyrene for example, can melt and ignite to form flaming droplets which can initiate new fires. For that reason the classification system ranks the rate of release of flaming droplets.

For flaming droplets the three additional classifications are:

- **d0:** No dripping
- **d1:** slow rate of dripping
- **d2:** high rate of dripping

Flooring

Floors have their own Euroclass rating for reaction to fire tests which are indicated by an "fl" subscript. The reason being is that flooring materials are tested in a horizontal position (all other construction materials are tested vertically) to measure the spread of flame using a radiant heat source according to the standard ISO 9239: Reaction to fire tests for floorings. Materials are awarded an A to F classification and a smoke classification subscript.

Identifying a product's fire performance

Reaction to fire tests for SMARTPLY MAX FR B have been undertaken by independent notified body Efectis in its accredited laboratory.

MEDITE SMARTPLY's 11mm - 18mm thick SMARTPLY MAX FR B boards have the classification: B_{fl} - s1 when used for flooring, wall, ceiling, and roof applications. In other words:

- When used for walls the panels have a Euroclass B and so contribute to a fire to a minor extent; they have average levels of smoke production and produce zero dripping.
- When used for flooring the panels will make a limited contribution of a fire, with little of no smoke production

National Standards

Some older products in production pre-2013 may still have a National Classification.

Prior to the introduction of the harmonised European standards, national classification systems were common. In England and Wales, for example, British Standard (BS 476) was used to determine the surface spread of flame for building materials. This had four performance Classes: 1 to 4.

National tests fell out of favour and many manufactures stopped using them for new products after the CE marking of materials for use in construction became mandatory in 2013. The reason for that is that a manufacturer has to produce a Declaration of Performance, which can only be determined using European Standards, before a material can be CE marked.

It is important to note that the testing systems for national standards is different to the European test regime, so for panel to be rated under both classification systems it has to have been tested in accordance with each test regime.

Combustibility

There can be some confusion about the use of the term non-combustible related to construction products. For a material to be classed non-combustible it must be Euroclass A1 or Class A2. Any material rated Class B or lower is, by definition, combustible.

All wood panel products are therefore combustible, even those manufactured incorporating Flame Retardant. That is because a flame retardant treatment will enhance the panel's reaction to fire properties to limit the spread of flame and slow development of the fire, but it does not mean that the product is non-combustible.

Note: TRADA's Wood Information Sheet WIS 2/3-3 Flame-retardant treatments for timber products provides additional detail on fire test evidence.

Service Environment

In some situations, it is required that the durability of the reaction to fire performance of a product be declared against the environmental conditions in service. Three service classes are defined in the structural design code BS EN 1995-1.

The Wood Protection Association categorises flame retardant formulations into Type INT1, INT2 and EXT. Each type is distinguished by properties that make them suitable for particular service classes. The variation in these properties is largely due to the nature of the chemicals used in the formulations and the complexity of chemical reaction required in formulating them. The WPA FR Types align with those defined in BS EN16755 'Durability of reaction to fire performance'.[1]

WPA FR Type BS EN 16755	Service Class BS EN 1995	Conditions	Examples	Conditions
INT 1	1	Moisture content in materials corresponding to 20°C rh <65% for most of the year.	Timber in buildings with heating and protected from damp: Internal walls, internal floors and warm roofs	The common feature is that the FR wood-based product is sensitive to high humidity; prolonged exposure may result in salt efflorescence and/or migration.
NT 2	2	Moisture content in materials corresponding to 20°C and a rh <85% for most of the year.	Ground floor structures where no free moisture is present, cold roofs, swimming pools and fully protected external uses.	Treated wood or wood-based panel is far less sensitive to high or fluctuating humidity and can therefore be used in practically all interior and semi-protected external situations.
EXT	3	Conditions leading to higher moisture content in materials than in SC 2	Cedar shingles and unprotected exterior cladding	The treated wood product can be used in all interior and above ground exterior situations.

The interior classifications, Service Class 1 and Service Class 2, apply for the lifetime of the wood product provided the product is only used in the intended service class.

Resistance to fire

While Reaction to Fire is the measurement of how a material will contribute to the early stages of a fire, after flashover when the fire at its hottest it is the ability of construction elements to contain the fire and prevent it from spreading that is critical. Resistance to Fire is the ability of a construction element to continue to perform in a fire over a specified period of time. Fire resistance is also classified under the the European Standard BS EN 13501.

It is important to understand that resistance to fire is a property of a particular construction element, such as a fire compartment wall, and not the materials it is constructed from. Such elements are often constructed from a combination of several materials; it is the performance of this specific combination of materials and their fixings that must be tested by exposing them to levels of heat that they would be subject to in an actual fire to determine the element's fire resistance.

Fire resistance is a measure of one or more of the following in minutes:

- Resistance to collapse or load-bearing capacity, denoted by R
- Resistance to fire penetration (integrity), which is the element's ability to resist the passage of gases into the protected area. It is denoted by E
- Resistance to the transfer of heat from the fire side of an element to the unexposed side, denoted by I

1 WPA Guidance Note: WPA FR 3

A construction element's REI rating identifies its fire resistance. A wall construction might, for example, be classified EI60; that means the wall has certified integrity (E) and insulation (I) performance for 60 minutes.

As with reaction to fire tests, the fire resistance tests are harmonised across Europe.

The The European Standards for testing fire resistance are:

- BS EN 1363-1 Fire resistance tests. General requirements
- BS EN 1364-1 Fire resistance tests for non-load-bearing elements. Walls
- BS EN 1365-1 Fire resistance tests for load-bearing elements. Walls
- BS EN 1365-2 Fire resistance tests for load-bearing elements. Floors and roofs

For further information

TRADA WIS wood-based-panel-products-and-timber-in-fire.pdf

Wood Protection Association Guidance notes FR1, FR2 and FR3

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Part 2: Regulatory Controls

UK Building Regulations.

The Building Regulations set standards for the design and construction of buildings to ensure the safety and health of people in or about those buildings.

Across Europe, each state has its own Building Regulations relating to fire. In the UK, the section of the Building Regulations that deal with Fire is different in each of the various UK jurisdictions: In England it is Approved Document B, similarly in Wales; in Scotland it is the Building Standards Technical Handbook Part 2; in Northern Ireland – Technical Booklet E Fire; and in Ireland it is Technical Guidance Document B Fire Safety.

While the title of each document is different, the regulations are similar in that that they all require products to achieve a defined level of fire performance in specific areas of buildings.

In all cases the fire performance of wood-based panels is assessed on European test evidence (EN). The European Standard BS EN 13501 defines seven levels (Euroclasses) of fire performance with products classified A1, A2, B, C, D, E and F – *see Chapter 1 – Terminology and the fundamentals of fire.* In particular, wood-based products with flame retardant properties always need to be classified according to BS EN 13501-1, which provides the reaction to fire classification test procedures for all construction products and building elements.

The Building Regulations for the various UK jurisdictions require materials with Euroclass C reaction to fire performance for walls and ceilings in rooms with internal floor area >4m² and Euroclass B in higher risk areas such as escape routes and staircases.

MEDITE SMARTPLY flame retardant MDF and OSB both have a reaction to fire classification (Euroclass) B. As such, these wood-based panel products will satisfy all the requirements for Euroclass B and the lower reaction to fire Euroclass C applications. This simplifies specification and installation on site.

There are many other building applications, such as the construction of furniture, joinery and other non-structural uses, where materials with increased fire performance are required, either by building regulations or other local requirements, or personal design preferences and **MEDITE SMARTPLY** flame retardant MDF and OSB are suitable for many of these applications.

In addition to the Euroclasses, some country regulations also accept National Standards for older pre-2013 products still in production – *see Chapter 1*

The use of wood-based panel products in external wall constructions

In England, changes to Regulation 7(2) of the Building Regulations following the fire at Grenfell Tower, now explicitly states that for certain new high rise buildings (and those with a material change of use) only non-combustible materials can be used in the construction of an external wall or specified attachment to that wall, including balconies, if that building contains a room for residential purposes at least 18m above ground level.

The amended Regulation 7(2) states:

'...building work shall be carried out so that materials which become part of an external wall, or specified attachment of a relevant building are of European Classification A2-s1,d0 or Class A1 standard (non-combustible)...where a 'relevant building with a storey (not including roof-top plant areas or any storey consisting exclusively of plant rooms) at least 18m above ground level and which –

i) contains one or more dwellings;

ii) contains an institution; or

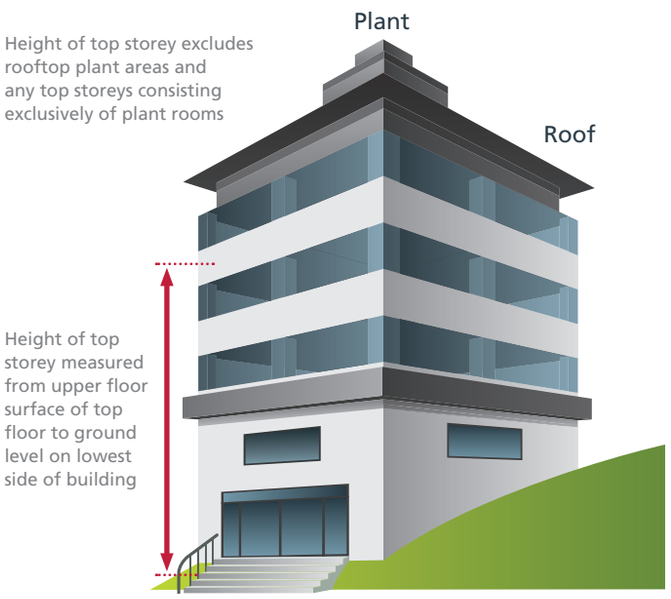
iii) contains a room for residential purposes (excluding any room in a hotel or boarding house)'.

Relevant buildings (where there is a storey at least 18m above ground level) are defined as: Residential flats/rooms (excluding any room in a hostel, hotel or boarding house), hospitals, care homes, sheltered housing and schools which are built as part of the government's centrally delivered build programmes. A specified attachment includes balconies.

For such relevant buildings the use of non-combustible materials in the external wall apply to all faces, above and below 18m down to ground level. In other words, combustible materials including wood-based panel products cannot be used in the external wall construction of such residential buildings. However, for buildings that are not classed as 'relevant', either because they are non-residential or because the residential rooms are below the 18m threshold, there is currently no significant change to the requirements, so timber and wood-based panel products can be used in the external wall construction.

What is meant by a storey at least 18m above ground level?

The height of the building is to be measured from the lowest ground level adjoining the outside of an external wall to the finished floor surface of the top occupied space.



Note: As of December 2020, the above section on The use of timber panel products in external wall constructions applies to England only and currently not to Wales, Northern Ireland or to the Republic of Ireland.

Readers should also note that: In England, the use of combustible materials in and on the external walls of specific types of high-rise buildings and attachments, such as balconies and solar shading, is (as of December 2020) currently under review. Readers are advised to refer to the latest version of the consultation review from the Ministry of Housing, Communities & Local Government for the current requirements.

In Scotland, rules are different. As of December 2020, restrictions on the use of combustible products in external wall construction apply only to the wall cladding and attachments, such as balconies and solar shading, and not to construction of the internal structural wall. Again, readers are advised to refer to the latest version of the Building Standards Technical Handbooks for the current situation.

Construction Products Regulations and CE Marking

The Construction Products Regulation 2011 (CPR) is a European Union regulation harmonising performance information on construction products across the EU. Not all products are currently regulated but for those that are it is mandatory for them to carry a CE mark; this is done in conjunction with a Notified Body and involves testing in accordance with European fire test methods.

Wood-based panels are covered by harmonised European standard, *EN 13986:2004+A1:2015 Wood-based Panels for use in Construction - Characteristics, evaluation of conformity and marking* and are therefore required to be CE marked by the manufacturer as a declaration that the product complies with the essential requirements of the relevant European Health & Safety and Environmental legislation.

Before a CE mark can be placed on a wood-based panel and the panel placed on the market the manufacturer must draw up a Declaration of Performance (DoP) for the product.

Declaration of Performance

The Declaration of Performance provides specifiers with verified information on the performance of a product. Where a reaction to fire performance is claimed this must be declared on the DoP. A fire classification report will provide details of actual performance in tests and must be from a third-party test laboratory. The purchaser of a Euroclass rated product should have a copy of the Declaration of Performance (DoP) produced and provided by the manufacturer.

The DoP should include:

- third-party laboratory's name and address and Notified Body number
- product name
- product description
- references to any test reports and extended application documents that it is based on
- the product's Euroclass rating
- field of application (including applicable product variations, limitations and end use applications)

Routes to CPR Compliance

The straightforward route:

Where flame retardant is added to wood-based panels in the factory during the manufacturing process, such as for **SMARTPLY MAX FR Euroclass B OSB** and **MEDITE PREMIER FR MDF**, the manufacturing process will be subject to factory production control (accredited by a notified body). This ensures that the product will carry a CE mark accompanied by a DoP which will include the improved reaction to fire class when it leaves the factory. In this case, the responsibility for the performance of the product is borne by the manufacturer and is therefore the simplest and clearest route to compliance for the specifier, reseller or end user.

The complicated route:

Increasing a wood-based panel's reaction to fire performance after manufacture is permitted under the CPR, however it is a very complex process and requires a thorough understanding of the supply chain and technical and legislative requirements.

Where distributors of non-flame retardant wood-based panels choose to send the material to a third party treater for post-manufacture flame retardant treatment before selling that treated stock on the open market, the distributor takes on the responsibilities of the manufacturer (because the product has been altered since leaving the factory, and the distributor becomes the party placing the FR product on the market). Unfortunately, in this case, the treater bears no legal responsibility for the product performance in use, despite having altered the products original performance – both fire and structural related properties).

Specifiers should be aware that the pressure impregnation of CE marked structural-use wood panels with a flame retardant post-manufacture will almost inevitably alter the structural integrity of the panels and invalidate the original DoP and associated CE mark. If the treated panels are not subsequently retested and a new DoP issued, then that material must be reclassified as non-structural and the DoP amended accordingly. Alarmingly, this is a very misunderstood and common occurrence which presents very serious legal and moral consequences, and therefore the 'straightforward' route is highly recommended.

Because the distributor is placing the post-manufacture treated product on the market for the first time, the distributor must take responsibility for the DoP. Both distributor and third-party treater must operate factory production controls accredited by a notified body in order the maintain the traceability that underpins the DoP an CE mark.

Caution: Site-applied flame retardants

The surface application of flame retardants on site depends on the correct application and film thicknesses being achieved. When coatings are applied by brush or spray on site, it is rarely possible to guarantee application quality and confidence in the application's effective performance. For this reason, the Wood Protection Association will only approve such systems when applied under factory controlled conditions.

Fire Performance During Construction

The Construction (Design and Management) Regulations require the designer to consider safety in their choice of materials and how they are assembled in the building process to ensure that inherent risks are designed out wherever possible.

In a completed building, the timber components are protected from the effects of fire by internal linings and external claddings. During construction however, the temporary exposed timber frame structure may present a risk of fire spread across the site, creating a safety risk to site operatives and property beyond the site boundaries.

For buildings under construction there are no building regulations that provide technical guidance to determine what the safe fire space separation should be to existing buildings outside of the site boundary. Within the site, the contractor has the ability to control works and escape routes for the site labour, for which there are training and guidance available. Despite the lack of regulation in this area, the Structural Timber Association has implemented its own set of comprehensive design guidance, testing criteria and product approval scheme for its members and suppliers, thereby improving the fire safety of medium-rise timber frame buildings during construction (see link below for more information).

Advice on minimising the impact of fires during construction includes:

- The Structural Timber Association's *16 Steps to Fire Safety* **www.structuraltimber.co.uk**
- The Health and Safety Executive's *HSG168 Fire safety in construction* **www.hse.gov.uk/pubns/books/hsg168**
- The Structural Timber Association's Design *guide to separating distances during construction* **www.structuraltimber.co.uk**
- TRADA's *Fire safety on timber frame construction sites* **www.trada.co.uk**

SMARTPLY MAX FR Euroclass B OSB is suitable for use either entirely or supplementarily in Category A, B or C builds as outlined in Structural Timber Association's "Design guide to separation distances during construction construction – Product Paper 4". The categorisation level depends on wall and floor/ceiling construction details.

FSC® Certification

Wood stores carbon safely and easily facilitates energy efficient designs in comparison to many other building materials. By using Forest Stewardship Council® (FSC®) certified materials, businesses can meet their project needs and satisfy their customers' desire for sustainability.

FSC® certification is an internationally-recognised standard that assures buyers of wood-based products, including those with flame retardant properties, that the timber used is a result of environmentally and socially responsible forestry management.

All **MEDITE SMARTPLY** MDF and OSB products have received the FSC®'s chain of custody certification, covering not only the supply of raw materials but also its manufacturing and distribution processes. Chain of custody certification provides a guarantee to consumers that the product not only comes from a well-managed forest but has passed through a secure environmentally friendly channel from its origin in the forest right through to the time it is installed by the end-user. Only products from FSC®-certified forests can be labelled with the 'tick and tree' logo.

For more information on **MEDITE SMARTPLY**
visit: **www.mdfosb.com**
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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 products '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 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 re-duced requirement for good design and workmanship. The flame retardant treatment or products recommended for various end use situations are com-plementary 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**
visit: **www.mdfosb.com**
Call: **+44 (0) 1322 424900**

MEDITE® SMARTPLY®
INNOVATIVE TIMBER PRODUCTS

A SPECIFICATION GUIDE TO
Flame Retardant Wood Panels

Part 5: The features and benefits of **SMARTPLY MAX FR B OSB** and **PREMIER FR MDF**

SMARTPLY MAX FR B OSB

SMARTPLY Oriented Strand Board (OSB) is the versatile, cost effective and environmentally friendly alternative to plywood. It is manufactured by compressing precisely engineered strands of wood with moisture resistant and formaldehyde free resins at high temperature to create an incredibly strong and versatile panel.

SMARTPLY MAX FR Euroclass B-s2,d0 OSB/3 combines structural integrity with the highest fire rating possible for a wood-based panel. It is manufactured and CE Marked ex-works in accordance with the harmonised European standard EN 13986, ensuring it is fully compliant with the Construction Products Regulation (CPR) and EU law.

Features and benefits

- Outstanding Reaction to Fire performance. The panels innovative in-line manufacture enables the water-based flame retardant chemical to be added to the wood strands at the same time as the resin during the manufacturing process, thereby locking the fire performance into the panel as a homogenous and permanent feature.
- Product range: Available as Euroclass B-s2,d0 in 11, 15 and 18mm thick metric sized panels which are suitable for wall sheathing, flooring and ceiling applications, as well as multiple other end uses.
- Guaranteed quality. Building-in the flame retardant during manufacture is the only way to guarantee the quality and performance of the product in end-use applications, because it does not rely on additional processing by other parties (post-treatments can destroy the structural properties and negate the original CE mark attached to the product).
- Consistent performance. Unlike coatings, laminates, or other surface treatments, **SMARTPLY MAX FR B** is homogenous throughout its thickness, thereby providing superb robustness, flatness, ease of use and consistency in performance for the entire lifetime of a building.
- Suitable and certified for permanent structural applications. Unlike pressure treated wood panels that have not been re-tested and CE marked after treatment, **SMARTPLY MAX FR B** is suitable and certified for permanent structural applications in buildings.
- Independently tested & certified. All product testing and classification reports, plus 'certification of constancy of performance' CE certificate are issued by an independent Notified Body under Attestation of Verification of Constancy of Performance (AVCP) Level 1. The documents are available on request to anyone in specifying or purchasing **SMARTPLY MAX FR B** panels.
- Predictable fire performance. Wood burns - fact! However, the rate at which wood burns in a fire is very predictable and therefore it is a very easy material to design safely into building structures. When wood burns its surface chars in a natural process called pyrolysis (decomposition due to high temperatures), which helps to protect wood beneath the char layer. Design charring rates for wood-based panels are calculated in accordance with EN 1995-1-2 Eurocode 5: Design of timber structures - Part 1-2: General - Structural fire design.
- Flame retardant technology. The flame retardant chemical integral in **SMARTPLY MAX FR B** works by a chemical reaction that's triggered when the flame retardant panel comes into contact with a flame or high temperatures. The chemical works by promoting early char formation, effectively producing a progressively thicker insulated char layer which slows down the

charring rate with time , which in turn helps to prevent the product from igniting and contributing to the fire's growth. It is a well-known fact that preventing ignition in the early stages of a fire's development is the safest, cheapest and most effective form of fire prevention. Independently tested charring rates are available on request for calculation by qualified fire engineers only.

- Slow burn-through rate. By promoting charring of the surface of the panel, the flame retardant protects the wood strands in the OSB panel. Because the flame retardant treatment is homogeneous throughout the panel, protection is continuous which slows down the rate at which the panel will burn-through. FR wood-based panels are not certified as providing "30 minutes" or "60 minutes". This terminology refers to Fire Resistance of a building element or component (refer to part 3 of this Fire Guide for further information).
- No additional edge treatments required. Since the wood strands are treated during manufacture, no additional flame retardant edge treatments are required when the panel is cut. In addition, light sanding of the surface of the panel will not affect its reaction to fire performance because the flame retardant treatment is consistent through the panel thickness. However, excessive sanding of wood panels is not recommended as it may affect other essential characteristics in use.
- Safe and non-toxic. Zeroignition® flame retardant technology used in the manufacture of **SMARTPLY MAX FR B** is a completely safe and non-toxic. Zeroignition® is borate-free and does not contain any substances of very high concern (SVHCs) and whose use is restricted under the REACH regulation for controlling chemicals in Europe.
- Suitable for both dry and humid interior applications. **SMARTPLY MAX FR B** is suitable for structural use in both Service Class 1 (dry interior) and Service Class 2 (humid interior) applications
- Aesthetically pleasing. Unlike liquid pressure treatments, the **SMARTPLY MAX FR B** panels are dry, flat and stable with no nasty residues or sticker marks on the surface and unlike plywood veneers, the surface of OSB does not contain knots or repair plugs, which can loosen and fall out during treatment
- Environmental Product Declaration. An EPD is available for download on www.mdfosb.com. The product is considered Carbon Negative to our factory gate (A1-A3). Biogenic Carbon is reported separately to facilitate independent verification and prevent double counting of biogenic carbon in whole life carbon LCA studies for building projects.
- FSC® certified. **SMARTPLY MAX FR B** is made using sustainable, fast-growing timber from forest-thinnings of predominantly new-growth spruce and pine, including the tree tops which are unsuitable for conversion into sawn timber products. As with all MEDITE SMARTPLY products, **SMARTPLY MAX FR B** is FSC® certified.

Applications

SMARTPLY MAX FR B is an innovative wood-based panel independently certified for the most demanding structural applications in permanent constructions where enhanced reaction to fire performance is required such as for wall sheathing, flooring and roofing. It is also commonly used in non-structural applications and interior fit-outs.

Applications include:

- Timber frame construction
- Light gauge steel construction and offsite modular construction systems
- Furniture, shop fitting and general joinery
- Exhibition stands, film sets and stage construction
- Fire protection during construction through compliance with the performance requirements of the Structural Timber Association's Design Guide to Separating Distances During Construction

MEDITE PREMIER FR MDF

The excellent machining qualities of MDF make it the perfect material for a huge variety of applications.

MEDITE PREMIER FR (Flame Retardant) MDF panels have led the market since they were invented in the mid 1980's and are highly regarded for their consistency in quality and performance in fire rated applications where a Euroclass B flame retardant panel is required under Building Regulations or other relevant technical requirement.

Features and benefits

- Flame retardant MDF
- Euroclass B
- Treated throughout thickness enables deep routing and edging
- Easily identified – pink colour indicator in the core identifies the product as **FR MDF** which prevents misuse.
- Smooth surface
- Consistent quality and thickness
- Excellent machining qualities
- FSC® certified.
- Low Emissions. Complies with the stringent European E1 standard on Formaldehyde and also complies with the lower formaldehyde levels required by CARB phase 2.

Applications

MEDITE PREMIER FR MDF Euroclass B and C panel products are suitable for use as:

- Wall linings
- Partitions
- Display panels
- Ceilings
- Suitable for use in internal dry conditions (Service Class 1 as defined in Eurocode 5 and Use Class 1 as defined in EN 335).

Note: **MEDITE PREMIER FR MDF** products are not suitable for external or structural applications, or where exposure to water or high relative humidity may be encountered.

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