



Wood Protection Association

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## External Timber Cladding and Fire

Key facts and information for specifiers and suppliers

### Key fact

Timber is approved as a suitable material for external cladding under UK Building Regulations and where these regulations call for enhanced fire performance, tried and tested flame retardant treatment processes are available to provide it.

### Supplementary facts:

1. Timber cladding is not new, it has a long history of use.
2. The fire performance of wood is well understood. Years of experience in the use of timber cladding on all types of buildings combined with rigorous fire test requirements in BS and EN Standards has enhanced this understanding.
3. Building Regulations in all parts of the UK approve the use of solid timber or wood panel rain-screen external cladding and stipulate the situations when improved fire performance properties are required.
4. Whatever materials are used for the external wall structure of a building, this is just one factor that contributes to overall compliance with the fundamental requirement of Building Regulations to allow the occupants of a building sufficient time to escape in a fire.
5. The WPA publishes a detailed Specification Manual and Check List of the essentials concerning the flame retardant protection of wood and panel products used in construction, both of which are free to download.

Read the article below for more comprehensive information.

### FLAME RETARDANT ENHANCED TIMBER CLADDING

Timber is a long-established building material and its performance in fire is well understood. Over years of use a significant amount of testing has been carried out to develop and strengthen that understanding. Additionally, the testing regimes required under British and European Standards to assess performance have evolved and are suitably onerous and rigorous.

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. In the critical early stages, it is the **reaction to fire** properties of the various materials and substrates exposed that are important - ignitability, smoke and gas generation, particle release and subsequent spread of flame across the material surface.

Once the fire is more developed, then containment becomes the top priority with the use of compartmentalisation as a common strategy in building design and construction. At this stage, it is the **fire resistance** ratings of building elements such as walls, floors and fire doors that then becomes critical.

The data obtained from testing the reaction to fire properties of a material results in that material being given a Euroclass performance rating – see Table 1 for definitions. For wood, testing is specific to the species and thickness of the component and Euroclass B or Euroclass C are the typical performance ratings of flame retardant enhanced wood products (N.B. BS 476 Class 0 or 1 are derived from older UK national test methods and though accepted as alternatives in Building Regulations few materials are now available with these classifications). The fire resistance rating of a building element is normally expressed in minutes of fire containment.

The reaction to fire properties of most wood based materials can be enhanced by factory applied, quality controlled flame retardant treatments and this is particularly relevant to applications such as cladding on the outside of building, where retarding ignition and reducing the rate of any subsequent spread of flame across the surface in the early stages of a fire is critical.

## **BUILDING REGULATIONS**

Building Regulations are intended to ensure that a reasonable standard of life safety is provided in case of fire. The appropriate use of timber products can play a critical part in improving the performance of buildings in fire and in extending the time available to occupants to exit the building.

**Approved Document B** in Building Regulations covers fire safety in dwellings. It states that *‘The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regards to the height and position of the building.’*

In many domestic situations timber cladding can be used without the need for fire treatment. The requirement for treatment with a flame retardant depends on building height, boundary distances and the size of the cladding area being considered. Approved Document B makes a clear distinction for the requirements for buildings with boundaries less than 1000mm and those with boundaries greater than 1000mm and provides guidance on what are acceptable unprotected areas within each category.

For UK buildings over 18m tall, timber cladding must achieve a Euroclass B-s2, d2 standard. Therefore, it must be protected by an appropriately tested and certificated flame retardant product. There are stringent testing requirements under European Standards for such products. Application under quality assured factory controlled conditions is essential. Unless the timber cladding is to have a suitable, maintained coating, the flame retardant must be leach resistant and suitable for exterior use.

The WPA publishes a free manual listing suitable flame retardant treatments for applications where external cladding is to be given a decorative/protective coating and where it is to be left uncoated [www.wood-protection.org/publications](http://www.wood-protection.org/publications)

## FIRE TESTING

Untreated timber is generally regarded as Euroclass D, s2, d0. Its performance can be upgraded to Class C (Limited contribution to a fire) or B (Very limited contribution to a fire) with a suitable flame retardant pre-treatment.

**Table 1: Relationship between classes and reference fire situations**

Extract from BS EN 13501-1:2007+A1:2009 section A4.2

<b>Euroclass</b>	<b>For all construction products excluding flooring</b>
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) or no contribution in any stage of the fire (A1).

Note 1. For classes A2 to D there are additional classes for smoke development s1, s2 or s3, and the amount of burning droplets emitted d0, d1 or d3 (e.g. A2-s1, d0) see below:

### Additional classes for smoke development

s1	The structural element may emit a very limited amount of combustion gases
s2	the structural element may emit a limited amount of combustion gases
s3	no requirement for restricted production of combustion gases

### Additional classes for burning droplets

d0	burning droplets or particles are not emitted from the structural element
d1	burning droplets or particles may be released in limited quantities
d2	no requirement for restriction of burning droplets and particles

## ASSURING FR PRODUCT & TREATMENT QUALITY

The Wood Protection Association (WPA) operates two complementary, independent quality schemes to verify flame retardant treated wood has been treated/manufactured appropriately for its end use. These are:

- 1 a flame retardant product approval scheme and
- 2 a treatment process quality assurance scheme called WPA Benchmark FR

The flame retardant product approval scheme involves the in-depth review of fire test data on particular flame retardant formulations by an independent panel of experts and, where found satisfactory, the subsequent approval of those formulations.

'WPA Benchmark FR', is a quality scheme based on an independent audit and quality assurance check for companies applying these formulations or building them in at the time of panel manufacture.

WPA also offers a 'help desk' for specifiers and users of flame retardant treatments and treated products which provides independent expert advice on the appropriate and correct specification of flame retardant treatments and how to select approved products and treaters. This information is also available via the WPA website via [www.wood-protection.org/fire-protection](http://www.wood-protection.org/fire-protection). Informative publications such as our concise Specifiers FR Checklist and the full WPA FR Technical Manual are also available from the website to download free of charge.

**Wood enhanced using WPA Approved products applied by Benchmark FR approved applicators under factory controlled conditions has been in service for a wide range of applications for many years and can be used with confidence.** For peace of mind always ask for:

- Fire test certification relevant to the service environment (fixings, air gaps etc), wood species and thickness in question. Do not accept approximations.
- Proof of WPA Product Approval status.
- Process/manufacture quality assured under the WPA Benchmark FR Scheme
- Evidence of treatment, where applicable, and confirmation of specification applied.
- Guidance on the safe and effective use of the FR enhanced wood product.

*NOTE: During all phases of a fire, a product's performance will depend not only on its material properties but also on details such as fixings, joints and fasteners. Whilst it is not common, timber panels are occasionally used as the decorative face of a composite cladding system which also incorporates other elements behind that face, such as insulation and/or moisture barrier membranes. In such cases, the performance of the whole system in fire should be tested by an appropriate fire test laboratory such as BRE or Exova.*

ENDS

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