SHIELD® | Door

Technical

Reaction To Fire Of HPL

Fire Door Manufacture

Reaction To Fire Of Most Common High Pressure Laminates

Ignition time, fire propagation and energy contribution of the material. These three factors are measured by the amount of heat released from the material and the potential it has of contributing to the propagation of the fire. The results are represented by letters from a scale of A (inert) through to F (highly flammable).

UK BS 476 Explained – Class 1 vs. Class 0

Class 1:

This is a classification defined by BS 476 Part 7 – Surface spread of Flame. The test measures the distance and time a flame will spread across a surface.

Results Range From:

The Worst: Class 4 – i.e. longest distance and fastest of flame spread,
To the Best: Class 1 – i.e. least distance and slowest of flame spread.

A good Class 1 result would be the flame not spreading further than 165mm from the point of ignition over the total test time of 10 minutes.

Class 0:

This is not a fire test but in fact a classification from The Building Regulations 1991 – Fire Safety, Approved Doc B.
In order for a system to achieve a Class 0 rating it must meet the following requirements:

Achieve a Class 1 fire rating from BS 476 Part 7 – Surface Spread of Flame – first, then also the following:
**Achieve an index of (i = less than 12 and i1 = less than 6) from BS 476 Part 6 – Fire Propagation.

If all the above criteria are met then the material can be classified as Class 0.

* Some HPL products meet the requirements of BS 476 Part 7/ Part 6 when suitably fabricated as standard.
* Almost all HPL & Compact products can be ordered and manufactured as an FR Grade – please ask for more detail.

To Summarise

Class 1: Protects your surface from the spread of flames.

Class 0: Protects your surface from the spread of flames **AND** limits the amount of heat released from the surface during a fire.

(The decision to meet Class 1 or Class 0 classifications is usually determined by the Building Regulations Officer or Architect.)

Please Note

*Thin HPL is not a self-supporting material – it must be bonded to a suitable substrate. Manufacturers are only responsible for the HPL in isolation. Whilst we can demonstrate by way of previous test data that our composite panels can meet various fire ratings – the fire classification of the composite panel is the responsibility of the end user and may require further testing to be carried out.

**This Fire Propagation test measures the amount of heat the surface is giving off during the fire. Measurements are taken frequently throughout the 20 minute test and then calculated using a special formula to achieve an 'index rating'.
For the surface to achieve Class 0 classification the index figure that is produced after 90 seconds must be 6 or less and after the full 20 minutes must be 12 or less. The index ratings do not equate to exact temperatures but are within the specified guidelines.

The Euroclass System Explained

The Euroclass system consists of two sub systems

1: Construction products which exclude floors e.g wall and ceiling surface linings etc.
2: Another system of for flooring themselves.

Both sub systems have classes A-F of which classes A1 and A2 are non-combustible products. The new system will replace earlier national classification systems, which have formed obstacles to trade such as UK BS 476 which will be phased out over the next few years. Euroclass is wholly recognised by the UK Building Regulations and should not form any barrier to trade where fire performance is paramount.

Materials are classified by three distinct performace criteria - for example - B-s1,d0

B: Euroclass Rating
s1: Smoke Class
d0: Burning Droplet Class

Overview Of The European Reaction To Fire Classes For Building Products

(Excluding Floorings)

Euroclass	Smoke Class	Burning Droplets Class	Requirements According to EN Fire Tests			Figra	Typical Products
			Non Comb	SBI	Small Flame	W/S	
A1	-	-	✔	-	-	-	Stone/ concrete
A2	s1, s2 or s3	d0, d1 or d2	✔	✔	-	≤120	Gypsum boards (thin paper)/ fire retardant wood.
B	s1, s2 or s3	d0, d1 or d2	-	✔	✔	≤120	Gypsum Boards (thick paper)/ fire retardant wood.
C	s1, s2 or s3	d0, d1 or d2	-	✔	✔	≤250	Coverings on Gypsum Boards
D	s1, s2 or s3	d0, d1 or d2	-	✔	✔	≤750	Wood, wood-based panels
E	-	d2	-	-	✔	-	Some Synthetic Polymers
F	-	-	-	-	-	-	No Performance Determined

SBI: single burning item, main test for the reaction to fire classes for building products.
FIGRA: fire growth rate, main parameter for the main fire class according to the SBI.

High Pressure Laminates

Common Questions & Answers

1. How does the manufacture of flame retardant HPL differ from that of standard grade HPL?

Laminates are organic materials which, by their very nature, even in the standard grade, do not burn very well or rather, do not ignite easily when exposed to flames and contribute relatively little in the event of a full scale fire. There are also flame retardant HPL laminates which, unlike the standard ones, are manufactured with special additives that make them particularly flame resistant. They are used in the construction and transport industries where there are legal requirements or safety regulations. The additives are halogen free.

2. What is the difference between reaction to fire and fire resistance?

Reaction to fire refers to the tests carried out on an individual material, in our case HPL. Fire resistance, however, is measured by tests on the finished article, i.e. the composite panel formed of HPL, the substrate on which the laminate itself is applied, the bonding or fixing system and any supporting structure. Typical examples of this latter type are the doors or ventilated cladding for building façades.

3. Regarding reaction to fire; are there classifications / test methods approved and accepted across Europe?

There is only a common reaction to fire classification for the whole of Europe with regard to products used in the construction industry. For all other sectors, each country has its own laws or regulations. For construction, the European Construction Products Regulations (CPR) apply, stipulating a series of health, safety and energy saving specifications. HPL laminates must also meet these requirements in order for the manufacturer to gain CE marking and market them throughout the European Community. There is also a technical standard for the railway industry, CEN TS 45545, which has not yet been approved as a harmonised standard however. In this context, therefore, local regulations still prevail.

4. Do laminates follow the CE marking rules for construction products?

Only laminates 2mm or more in thickness used in the construction industry (e.g. walls) must conform to the rules of CE marking. For all other applications, such as furniture, this specific marking iss not required.

5. In construction, are there any national regulations and markings as well as the European ones?

European regulations for construction products include a reaction to fire classification but each nation is free to adopt different minimum requirements according to the type of application. This means that based on assessments by local supervision agencies (e.g. Interior Ministries and Fire Brigades), different European classifications may be required for similar applications. In addition, public institutions and associations in each European country can establish national markings that have more stringent specifications for certain technical criteria. These are optional markings (because they would otherwise constitute an obstacle to the free movement of goods) that nevertheless become essential for the local market.

6. In construction, if there are national regulations and markings as well as the European ones, whaat is the common approach by the manufacturer?

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7. Are there special certifications for the shipbuilding industry?

Yes. In shipbuilding, there are the European MED regulations followed by shipyards for the construction or refurbishment of ships flying European flags. Manufacturers can supply IMO certified HPL products as standard in some cases or by order. Please contact Starbank for more details.

8. Are there special certifications for the transport industry?

For transport, for example in the automotive and railway industries, European technical regulations exist but product approvals and/or certifications are currently handled by national agencies and are valid locally.

9. Regarding reaction to fire; to what classification in the UK building regulations do flame retardant and standard grade laminates belong?

Flame Retardant HPL can achieve Euroclass B, that is the best performance possible for an organic material. The standard grade, however, conforms to the requirements of Euroclass D. Performance of the final composition however is the responsibility of the end user specification to the fabricator and the bonding methodology and materials used. Manufacturers are responsible for the HPL only not the final panel.

STD: Compact can achieve a maximum Euroclass C rating from 6mm thickness
FR: Compact can achieve a maximum Euroclass B rating from 6mm thickness.

For more specific details on thickness related conformity please refer to the specific range technical data sheets.

10. Regarding reaction to fire; to what classification in the UK building regulations do flame retardant and standard grade laminates belong?

If bonded to a suitable fire-retardant substrate with the proper adhesive, flame retardant HPL fulfils the requirements of Class 1 and Class 0. Where class 1 or class 0 is required for the application, it is important to specify the rating for reaction to fire.

11. Regarding reaction to fire; to what classification in American regulations do flame retardant and standard grade laminates belong?

One of the most important tests for the North American construction industry is the ASTM E 84 (Tunnel test). Flame retardant compact laminates achieve class A, which is the highest, while the standard grade achieves class B.

12. For fire doors should I use flame retardant HPL or I can use the standard grade?

Fire resistance is the ability to retain load bearing capacity (R), integrity (E) and insulation (I) properties for a defined period of time. In the construction of buildings, this is assessed for finished elements with structural functions (e.g. doors or walls) in which the HPL laminates are just one component. For fire doors, it is essential to use a structure with the required REI properties such REI 30 or REI 60 (where the numbers indicate the minutes for which the element retains these properties). If the substrate possesses the correct fire resistance properties and the adhesive is suitable, it is also possible to use the standard grade of HPL. It will be up to the door manufacturer to experiment to find the best solution.

13. If a higher fire resistance is required (e.g. REI 240) what grade of HPL should I use?

The HPL laminate is only one of the materials that make up the finished product. It will be the manufacturer who needs to test the structure consisting of different materials and then choose which laminate to use. As a general rule, in this particular case, it may be advisable to use a flame retardant laminate.

14. Does postforming HPL meet the requiremnts of the shipbuilding industry, including fire resistance?

Yes. The HGP grade (Horizontal General Purpose Postforming), if combined with a fire-retardant substrate, meets all the requirements of the IMO-MED shipbuilding regulations as regards fire resistance and heat release properties. For further information or details on specific aspects of Fire Retardancy please contact:

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