

Flame Retardant Standards for Building Membranes

INTRODUCTION

Building membranes are used in roof and wall installations to ensure long-term protection to the building envelope. Breather membranes offer water repellent properties combined with high water vapour permeability to control condensation within the building's interior. Air and vapour control layers improve the building's air tightness and prevent moisture within the building's warm air from reaching the insulation layer and forming interstitial condensation. Specialist membranes with additional characteristics, such as high UV resistance, ventilation control and energy efficiency, are also beneficial for the building's long-term protection.

British and international building standards specify flame retardant materials for specific installations and structures. Flame retardant additives are incorporated in the materials or added as a coating to make them flame retardant; it is the formulation, quality and amount of these additives that determine which flame retardant tests the material will pass and what standards to which they will comply.

A flame retardant material is one that self-extinguishes; it does not mean that it is flame proof. Flame retardant materials are resistant to catching fire, reduce flammability, and inhibit, suppress or delay the production of flames. Flame proof materials are ones that are not liable to catch fire or be damaged by fire and are not readily ignited or burned by flames.

In 2002, to harmonise the classification of the reaction to fire for building materials, the European Commission introduced the Euro Fire Class System, based on EN ISO 13501-1.

STANDARDS

Internationally recognised British and European standards

EN ISO 13501-1 Fire classification of construction products and building elements. Classification using test data from reaction to fire tests (EU).

BS 476 PART 6 Fire tests on building materials and structures. Method of test for fire propagation for products (UK)

BS 476 PART 7 Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products (UK)

DIN 4102 Reaction to fire tests– Ignitability of building products subjected to direct impingement of flame (Germany).

EN ISO 13501-1 STANDARDS

FIRE BEHAVIOUR

Class A1 – highest level non-burnable

Class A2 – non-burnable materials

Class B – inflammable materials

Class C – normal flammable

Class D – normal flammable

Class E – normal flammable

Class F – not classified materials

SMOKE DEVELOPMENT

Class S1 – very limited smoke

Class S2 – limited smoke

Class S3 – no demands on smoke

BURNING DROPLETS

Class d0 – no droplets or particles

Class d1 – limited burning droplets

Class d2 – no demands on droplets

Highest level for flame retardancy

B-s1, d0

Euro Fire Class System and National Fire Class Systems*

Euro Class EN ISO 13501-1	UK BS 476 Parts 6 & 7	Germany DIN 4102
Class A1	NA	A1
Class A2	Class 0	A2
Class B	Class 0	B1
Class C	Class 1	B1
Class D	Class 1	B2
Class E	Class 2	B2
Class F	Class 3	B3

*Indicative purposes only; test methods and standards vary



FLAME RETARDANCY TESTS

To meet the requirements for EN ISO 13501-1, the Euro Fire Class System, two test standards must be passed.

EN ISO 11925-2 Single Flame Source Test “Reaction to fire tests for building products—Part 2: Ignitability when subjected to direct impingement of flame.” The method specifies a test for determining the ignitability of products by direct small-flame impingement under zero impressed irradiance using vertically oriented test specimens.

Although the method is designed to assess ignitability, this is addressed by measuring the spread of a small flame up the vertical surface of a specimen following application of a small (match-sized) flame to either the surface or edge of a specimen for either 15s or 30s. The determination of the production of flaming droplets depends on whether or not the filter paper placed beneath the specimen ignites.

Pass standard:

- Flame spread (Fs) must be <150mm within 60s (when exposure time is 30s)

EN 13823 (SBI) Single Burning Item (SBI) Test “Reaction to fire tests for building products—Building products excluding floorings exposed to the thermal attack by a single burning item.” a method of test for determining the reaction to fire behaviour of building products (excluding floorings) when exposed to the thermal attack by a single burning item (a sand-box burner supplied with propane). The specimen is mounted on a trolley that is positioned in a frame beneath an exhaust system. The reaction of the specimen to the burner is monitored instrumentally and visually. Heat and smoke release rates are measured instrumentally and physical characteristics are assessed by observation.

Pass standards:

- Fire Growth Rate Index (FIGRA) must remain below 120 W/s
- Total Heat Release (THR) in the first 600s of exposure must be <7.5MJ
- Lateral Flame Spread (LFS) must not reach the edge of the specimen the flame spread (Fs) must be <150mm within 60s

UNITED KINGDOM BUILDING REGULATIONS

Building regulation in England covering fire safety matters within and around buildings are specified in Approved Document B (Fire Safety) Volume 1 (dwellinghouses) and Volume 2 (buildings other than dwelling houses). The documents specify the minimum standards (BS 476 and EN ISO 13501-1) for all materials used in the construction, with specific installation requirements. The full document is available online: www.gov.uk.



Single Burning Item Test apparatus for EN 13823

CE marking



CE Marking on a product is a manufacturer's declaration that the product complies with the essential requirements of the relevant European health, safety and environmental protection legislation. It is required for construction products is produced for incorporation in a permanent manner in construction works, including both buildings and civil engineering works. CE Marking shows that:

- the manufacturer has checked that the products meet EU safety, health or environmental requirements
- is an indicator of a product's compliance with EU legislation
- allows the free movement of products within the European market

