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A1 signifies the highest level of performance, while F indicates the lowest. Each rating corresponds to a specific classification, such as: Non-Combustible, (A1) Limited Combustibility, (A2) Combustible (B-F) A1 - rated products are considered non-combustible. A2 - rated products are classified as having limited combustibility. B to F ratings indicate increasing levels of combustibility. When utilising flooring materials, they will carry a 'fl' designation, for example, A1fl. For linear pipe thermal insulation products, you'll find them marked with 'L', as in the case of A1L. Insulation that falls within Class A1 or A2-s1,d0, which represents the highest level of fire safety, is referred to as "fire rated insulation". Pic 1. Fire rating classification A1-F Pic credit: knauf.co.uk SMOKE PROPAGATION / EMISSION In the fire rating system, the 's' category specifically addresses the extent of smoke propagation or emission. It is assessed on a scale ranging from 1 (minimal/weak) to 3 (substantial). S1 - Emissions absent or very little S2 - Emissions with average volume intensity S3 - Emissions with high volume intensity Pic 2. Fire rating classification S DROPLETS / PARTICLES The 'd' element within the rating system denotes the presence of 'flaming droplets and particles' within the initial 10 minutes of exposure, categorised as D0, D1, or D2, with D0 being the best and D2 being the least favourable. The classification breakdown is as follows: d0: Indicates the absence of flaming droplets and particles. d1: Signifies some presence of flaming droplets and particles. d2: Represents a significant amount of flaming droplets and particles. It's important to note that F-rated products do not fall into any of the mentioned 'd' classifications. On the contrary, A1-rated products do not receive either a smoke emission or flaming droplet classification, as they do not contribute to the spread of a fire. Pic 3. Fire rating classification D CLASS 0 AND CLASS 1 FIRE RATINGS You may hear of products aiming for either Class 0 or Class 1 ratings. It's important to note that these labels do not necessarily reflect the product's combustibility. Rather, they specifically address the limited surface fire performance characteristics of the product. CLASS 0 Class 0 is a designation outlined in Approved Document B of the Building Regulations 1991, determined through two separate tests in British Standard BS 476. The initial test examines a surface's role in fire spread (BS 476-6), and the second assesses the movement of flames across a surface, taking into account factors like distance and duration (BS 476-7). This means that the material has met the criteria set by national standards, meeting requirements such as: Controlled Flame Spread: The material effectively prevents the spread of flames across its surface. Minimal Heat Emission: The material shows low heat release properties during combustion. 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Using this articles implies acknowledgment and agreement that Insulationgo LTD cannot be held accountable for any damages, losses, or inconveniences resulting from the use or reliance upon the information provided. This limitation of liability extends to all users of the article, including visitors, readers, and subscribers. Fire protection assessments following British Standard guidelines revolve around two key standards: 1.BS EN 13501-1, Fire classification of construction products and building elements. 2.BS 476-1 Fire tests on building materials and structures. The main test that fire rated insulation undergoes is BS EN 13501-1. The material is awarded an official fire rating classification, commonly referred to as a Euroclass rating. EUROCLASS RATING IN 2000, the European Union introduced the Euroclass system to simplify how we understand the fire performance of construction materials. The goal was to make trade easier among EU countries. 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(7) After regulation 7(1) (as renumbered) insert—“(2) Subject to paragraph (3), 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 A1, classified in accordance with BS EN 13501-1:2007+A1:2009 entitled “Fire classification of construction products and building elements. Classification using test data from reaction to fire tests” (ISBN 978 0 580 59861 6) published by the British Standards Institution on 30th March 2007 and amended in November 2009.(3) Paragraph (2) does not apply to—(a)cavity trays when used between two leaves of masonry;(b)any part of a roof (other than any part of a roof which falls within paragraph (iv) of regulation 2(6)) if that part is connected to an external wall;(c)door frames and doors;(d)electrical installations;(e)insulation and water proofing materials used below ground level;(f)intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;(g)membranes;(h)seals, gaskets, fixings, sealants and backer rods;(i)thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1; or(j)window frames and glass.(4) In this regulation—(a) “relevant building” means a building with a storey (not including roof-top plant areas or any storey consisting exclusively of plant rooms) at least 18 metres 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 hostel, hotel or boarding house); and(b) “above ground level” in relation to a storey means above ground level when measured from the lowest ground level adjoining the outside of a building to the top of the floor surface of the storey.“Full Text HerePoint 7 outlines the key criteria that must be met for a product to be used as external wall cladding. It specifically mentions that the material that is used as external cladding for relevant buildings above 18m in height must have a European Classification (see below) of A2-S1-d0 or higher. In this context, point (4) subsection ‘a’ outlines the meaning of the phrase ‘relevant buildings’ which states that ‘relevant buildings’ refers to a building more than 18m above ground level which contains a storey which contains (1) one or more dwellings; (2) an institution for residential purposes (with certain exceptions). Institutions in this instance refers to residential areas, schools, care homes, hospitals, sheltered accommodation, student residences and other institutional accommodation buildings. In order to comply with building regulations, measures to subdue the spread of fire to other parts of a building must be taken. In terms of components and coatings for the walls and ceilings, there are two key measures of fire testing. These measures are concerned with; 1. Reaction to Fire - Retardancy Reaction to Fire (Retardancy) is the measurement of the ability of a material to resist or prevent the passage of fire from one area to another. 2. Reaction to Fire and Structural Integrity Reaction to Fire - structural Integrity is the measurement of how a material will contribute to the fire being able to develop. When deciding on the correct coating system to provide fire protection to a combustible material such as timber, it is essential that the products meet the standards set out by the new Euroclass System for the fire safety classification of building materials. The test methods are totally new and involve exposing the product to direct flame and is called the Single Burn Test or SBI Test. This test is designed to simulate the flame exposure that would be experienced by material lining the walls of a room when a “wastepaper basket” ignites next to the wall in the corner of a room. The test measures a Fire Growth Rate (FIGRA), the heat energy contribution to the fire from the product. The result is categorised on a Fire Growth Rate Index. A second measurement is taken to calculate the volume of smoke produced by the fire and categorised according to a Smoke Growth Rate (SMOGRA) index. Finally, the test also measures oxygen consumption as well as carbon dioxide and carbon monoxide production. These gas concentrations help identify the heat release and the burning characteristics of the tested products. The Standards to the Euroclass system are referred to as: European standard EN 13501-1 reaction to fire classification with parts BS EN 13823: 2010+A1:2014 single burn test (SBI) and BS EN 11925-2:2010 single flame ignitability test (SFI). Classification of individual products To provide guidance to the user/specifier regarding the performance of a particular product under test, information is provided by the following process: There are seven Reaction to Fire classes. A1 - The Product is classed as a Non-Combustible A2 Limited Combustibility B Combustible materials - Very Limited contribution to fire C Combustible materials - Limited contribution to fire D Combustible materials - Medium contribution to fire E Combustible materials - High contribution to fire F Combustible materials - Easily flammable These classes are further divided to provide information on a product's tendency to produce smoke and flaming droplets / particles based on the results of the SBI Test. Smoke Generation Smoke generation is measured for Reaction to Fire classes A2 to D. Smoke emission classifications are not provided for products with an E or F overall rating. There are three smoke intensity levels: s1 - Emissions absent or very little s2 Emissions with average volume intensity s3 Emissions with high volume intensity Fire Generation Burning droplets/particles can inflict skin burns and cause further spread of fire. Burning droplets/particles are measured for Reaction to Fire classes A2 to E. E-rated products receive no. There are three classes of burning droplets: d0 - No burning droplets d1 Slow dripping droplets d2 High/Intense dripping droplets As an example: Our Envirograf Fire Protection Coatings have been tested to this new standard with the resulting highest classification. B/S1/d0 This translates to: B - Combustible materials - Very Limited contribution to fire s1 - Smoke emissions absent or very little d0 - No burning droplets Classification according to European Standard EN-13501-1 DEFINITIONCONSTRUCTION PRODUCTS Non-combustible materials: No contribution to fire A1 Limited combustibility A2 - s1 d0 A2 - s2 d0 A2 - s3 d0 A2 - s1 d1 A2 - s2 d1 A2 - s3 d1 A2 - s2 d2 A2 - s3 d2 Combustible materials: Limited contribution to fire B - s1 d0 B - s2 d0 B - s3 d0 B - s1 d1 B - s2 d1 B - s3 d1 B - s1 d2 B - s2 d2 B - s3 d2 Combustible materials: Minor contribution to fire C - s1 d0 C - s2 d0 C - s3 d0 C - s1 d1 C - s2 d1 C - s3 d1 C - s1 d2 C - s2 d2 C - s3 d2 Combustible materials: High contribution to fire E - d2 Combustible materials: Easily flammable F Reaction to fire and structural integrity is the measurement of how a material will contribute to the fire being able to develop. 30 and 60 Minute Fire Integrity Fire-resistant materials and coatings are specifically developed to meet a particular level of fire protection. A surface /r building component that has been treated correctly will be protected from the effects of a fire by a protective system that has been tested to remain intact and protect the building component for at least 30, 60, 90 or 120 minutes, dependent upon which level is chosen. Fire protection components and coatings are normally used on structural elements of a building and services that run through designated firewalls to help maintain its integrity during a fire. These treated areas also allow the emergency services more time to control the outbreak of a fire and can delay the spread of a fire to other adjoining rooms and buildings. Testing the reaction to fire The test method measures the ability of a material (intumescent) to prevent the penetration of fire through a structure (for example doors or floor joists that bear the overall floor load) to maintain its structural integrity. The test is run in accordance with BS 476 Parts 20-23 (1989) and components are given classifications with specific periods of time achievements, such as 30 or 60 minutes integrity. Typically, coatings and building components use intumescent materials to meet these standards. Fire protection assessments following British Standard guidelines revolve around two key standards: 1.BS EN 13501-1, Fire classification of construction products and building elements. 2.BS 476-1 Fire tests on building materials and structures. The main test that fire rated insulation undergoes is BS EN 13501-1. The material is awarded an official fire rating classification, commonly referred to as a Euroclass rating. EUROCLASS RATING IN 2000, the European Union introduced the Euroclass system to simplify how we understand the fire performance of construction materials. The goal was to make trade easier among EU countries. 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CLASS 1 Conversely, Class 1 is a more limited classification derived solely from the test outlined in BS 476-7. This classification denotes a surface with intermediate fire performance regarding flame spread. It confirms that the material has undergone fire testing and complies with the specified criteria in national standards, including: Controlled Flame Spread: The material has a limited capacity for flame spread across its surface. Moderate Heat Emission: The material exhibits moderate heat release characteristics during combustion. Moderate Smoke Generation: The material produces an acceptable level of smoke when exposed to combustion. Class 1 is typically specified for materials used in general building scenarios, where a lower degree of fire resistance is deemed sufficient based on the specific context and regulations in place. \*Insulationgo LTD strives to keep the content accurate and up-to-date, but we cannot be held responsible for any mistakes or exclusions. 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At Cedral we know that your home is a haven, and we recognise that protection and safety is paramount for you and your family. We are aware how important it is to understand the characteristics and features of building materials for your projects. Cedral has a long-standing commitment to ensuring our fibre cement facades and roofs comprehensively meet the fire performance classification A2-s1,d0 to EN 13501-1:2018. You may also have seen references to the controversial Class 0 in recent years. Here we explain all of the fire classification ratings and what they mean, including Class 0 and why you should avoid it. By the end of this blog, you will see why Cedral is one of the most reliable choices when it comes to the safety and protection of your home. The European standard of fire safety is the Euroclass system, recognised as the standard of fire safety across Europe. It was introduced by the European Union in 2000 to remove trade barriers between member states and ensure consistent quality levels. It classifies the reaction to fire (the behaviour of materials when exposed to heat or fire) and evaluates multiple aspects such as ignitability, flame spread, heat release, smoke production and tendency for producing flaming droplets and/or particles. The European standard is EN 13501-1, which is met by all Cedral materials. The European classification ranks construction materials in seven classes according to their fire behaviour - A1, A2, B, C, D, E and F. It also classifies these materials with regard to smoke development - s1, s2 and s3 - and the formation of flaming droplets/particles - d0, d1, d2. A1 refers to non-combustible materials, A2 is very limited combustibility, while B, C and D range from limited to medium combustibility and E and F designate a high contribution to fire. 's' refers to the total smoke emitted during the first 10 minutes of exposure to fire. s1 materials produce little or no smoke, s2 emit quite a lot of smoke and s3 produce substantial smoke. The 'd' part of the classification covers the number of flaming droplets and particles that are produced within the first 10 minutes of fire exposure, with d0 designating no droplets, d1 some droplets and d2 quite a lot of droplets. Cedral's A2-s1, d0 fire performance classification for our facades and roofs means our products are classed as of limited combustibility. They emit little or no smoke for the first 10 minutes they are exposed to fire and produce no flaming droplets or particles. Cedral materials do not contribute to the formation or spread of a fire. Read more about fire classifications UK fire classification Class 0 indicates the surface spread of flames and not the combustibility of the material itself when involved in a fire. It was introduced in the UK Building Regulations on fire safety in 1991 and remained in place after the Euroclass system was introduced in 2000, even though Class 0 does not demonstrate the same performance as the Euroclass system. For example, combustible materials can achieve a Class 0 classification Class 0 is an old, out-of-date national product classification and should not be used to determine the fire safety of building materials because it says nothing about the combustibility of the material in a fire. If you would like more information on fire safety and/or fire classifications for buildings, get in touch. Whether you're an architect, designer or contractor, our dedicated technical and specification team offer expert help on choosing products to meet the demands of the current fire performance stipulations. We can support your project from the initial design concept through to build completion and beyond. Study our technical documents or contact us directly here. Choose safety, choose Cedral - find out more