

The Euroclassification of reaction to fire performance of construction products and related test methods

Background to the European approach

There are currently a large number of different tests used across the EU for assessing the reaction to fire performance of construction products. The variation and differences between these existing national tests means that translation or comparison of performance of a product when assessed by different methods is impossible. Additionally these test methods are linked to the relevant national regulatory requirements so pan-European changes are not easy.

A new system has been developed which was negotiated with the national fire regulators of the EU countries by the European Commission. This is based on a classification system with a supporting set of test methods. These classes are given in tables 1 and 2; table 2 relates to floorings and all other construction products are covered in table 1. This classification now has a legal basis by being published in the Official Journal of the European Communities (OJ L 50, 23.2.2000, p. 14).

A single reference scenario has been used as basis for the classification system, this is a fire initiating in a small room and growing to reach flashover. The large scale reference test to represent this scenario is ISO 9705, the room corner test, and the relevant part of this method will be published as an EN.

The new European classification system

A European standard is being prepared which will include the European classification system. It is expected that this will be finalised and implemented as BS EN 13501-1 at the beginning of 2001.

The classification of a product as a result of a reaction to fire test will be included in a classification report, which will be issued in addition to the test report. It will be this classification report which will be used in support of fire performance against a product standard, for example for CE marking; or for use in claiming compliance with requirements in AD-B for products or parts of works. It should be noted that this is a change from the existing UK system.

For products which fall into the combustible class, the potential contribution of a product to a fire does not only depend on its intrinsic properties and the thermal attack, but also to a large extent on its end use application, where possible, in the construction. Therefore the product should be tested so as to simulate its end use application. Consequently a product being used in different end use applications may have different classifications relating to these applications. This end use application mainly includes aspects such as the orientation of the product and how the product is fixed e.g. on a substrate or with an airgap.

For products which would by their nature be expected to give the highest level of performance and that are largely inert, their performance in a fire can be determined from their physical properties. For these products, their end use application does not, in general, affect their fire performance and therefore products are assessed in tests which evaluate only the individual component materials from which the products are manufactured.



The proposed new European test methods

Introduction

The following test methods are being circulated for final approval in CEN and it is anticipated that they will be implemented as British Standards at the beginning of 2001. These will be European Standards (ENs or EN ISOs) adopted, unchanged, as British Standards. These European Standards will also be adopted, unchanged, in all EU countries. This means that BS EN ISO 1182 will have technical and editorial equivalence with DIN EN 1182 and NF EN 1182.

Before testing, product specimens should be prepared and conditioned and, where relevant, mounted in accordance with the relevant test methods and product standards. Ageing and washing procedures, if required by the product standard, are carried out in accordance with the relevant product standard.

Non-combustibility test (EN ISO 1182) - see Information Sheet 4 for more details

This test identifies products that will not contribute significantly to a fire, regardless of their end use.

The test is relevant for the classes A1, A2, A1_{FL} and A2_{FL}.

Calorific value (EN ISO 1716) - see Information Sheet 5 for more details

This test determines the potential maximum total heat release by a product when complete combustion occurs, regardless of its end use.

The test is relevant for the classes A1, A2, A1_{FL} and A2_{FL}.

Single burning Item test (EN 13823) - see Information Sheet 6 for more details

This test evaluates the potential contribution of a product to the development of a fire, under a fire situation simulating a single burning item in a room corner near to that product.

The test is relevant for the classes A2, B, C and D

Ignitability (EN ISO 11925-2) - see Information Sheet 7 for more details

This test evaluates the ignitability of a product when exposed to a small flame.

The test is relevant for the classes B, C, D, E, B_{FL}, C_{FL}, D_{FL} and E_{FL}.

Burning behaviour of floor coverings, using a radiant heat source (EN ISO 9239-1) - see Information Sheet 8 for more details

This test evaluates the critical radiant flux below which flames no longer spread over a horizontal surface.

The test is relevant for the classes A2_{FL}, B_{FL}, C_{FL} and D_{FL}.

Class	Test method(s)	Classification criteria	Additional classification
A1	EN ISO 1182 (1) and	$\Delta T \leq 30^\circ\text{C}$; and $\Delta m \leq 50\%$; and $t_f = 0$ (i.e. no sustained flaming)	-
	EN ISO 1716	$PCS \leq 2,0 \text{ MJ/kg}$ (1) and $PCS \leq 2,0 \text{ MJ/kg}$ (2) (2a) and $PCS \leq 1,4 \text{ MJ/m}^2$ (3) and $PCS \leq 2,0 \text{ MJ/kg}$ (4)	-
A2	EN ISO 1182 (1) or	$\Delta T \leq 50^\circ\text{C}$; and $\Delta m \leq 50\%$; and $t_f \leq 20\text{s}$	-
	EN ISO 1716 and	$PCS \leq 3,0 \text{ MJ/kg}$ (1) and $PCS \leq 4,0 \text{ MJ/m}^2$ (2) and $PCS \leq 4,0 \text{ MJ/m}^2$ (3) and $PCS \leq 3,0 \text{ MJ/kg}$ (4)	-
	EN 13823	$FIGRA \leq 120 \text{ W/s}$ and $LFS < \text{edge of specimen}$ and $THR_{600s} \leq 7,5 \text{ MJ}$	Smoke production(5) and flaming droplets/particles (6)
B	EN 13823 and	$FIGRA \leq 120 \text{ W/s}$ and $LFS < \text{edge of specimen}$ and $THR_{600s} \leq 7,5 \text{ MJ}$	Smoke production(5) and flaming droplets/particles (6)
	EN ISO 11925-2(8) exposure = 30s	$F_s \leq 150\text{mm}$ within 60s	
C	EN 13823 and	$FIGRA \leq 250 \text{ W/s}$ and $LFS < \text{edge of specimen}$ and $THR_{600s} \leq 15 \text{ MJ}$	Smoke production(5); and flaming droplets/particles (6)
	EN ISO 11925-2(8) exposure = 30s	$F_s \leq 150\text{mm}$ within 60s	
D	EN 13823 and	$FIGRA \leq 750 \text{ W/s}$	Smoke production(5); and flaming droplets/particles (6)
	EN ISO 11925-2(8) exposure = 30s	$F_s \leq 150\text{mm}$ within 60s	
E	EN ISO 11925-2(8) exposure = 15s	$F_s \leq 150\text{mm}$ within 20s	Flaming droplets/particles (7)
F	No performance determined		

- (1) For homogeneous products and substantial components of non-homogeneous products
- (2) For any external non-substantial component of non-homogeneous products
- (2a) Alternatively, any external non-substantial component having a $PCS \leq 2,0 \text{ MJ/m}^2$, provided that the product satisfies the following criteria of EN 13823, $FIGRA \leq 20 \text{ W/s}$, and $LFS < \text{edge of specimen}$, and $THR_{600s} \leq 4,0 \text{ MJ}$, and s1 and d0
- (3) For any internal non-substantial component of non-homogeneous products
- (4) For the product as a whole
- (5) s1 = $SMOGRA \leq 30\text{m}^2/\text{s}^2$ and $TSP_{600s} \leq 50\text{m}^2$; s2 = $SMOGRA \leq 180\text{m}^2/\text{s}^2$ and $TSP_{600s} \leq 200\text{m}^2$;
s3 = not s1 or s2
- (6) d0 = No flaming droplets/ particles in EN 13823 within 600s;
d1 = No flaming droplets/ particles persisting longer than 10s in EN 13823 within 600s;
d2 = not d0 or d1;
Ignition of the paper in EN ISO 11925-2 results in a d2 classification
- (7) Pass = no ignition of the paper (no classification);
Fail = ignition of the paper (d2 classification)
- (8) Under conditions of surface flame attack and, if appropriate to the end-use application of the product, edge flame attack.