

EN 13501-1:2007+A1:2009 (E)

Table 1 — Classes of reaction to fire performance for construction products excluding floorings and linear pipe thermal insulation products

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

^a For homogeneous products and substantial components of non-homogeneous products.
^b For any external non-substantial component of non-homogeneous products.
^c 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.
^d For any internal non-substantial component of non-homogeneous products.
^e For the product as a whole.
^f In the last phase of the development of the test procedure, modifications of the smoke measurement system have been introduced, the effect of which needs further investigation. This may result in a modification of the limit values and/or parameters for the evaluation of the smoke production.
 $s1 = SMOGRA \leq 30\text{m}^2/\text{s}^2$ and $TSP_{600s} \leq 50\text{m}^2$; $s2 = SMOGRA \leq 180\text{m}^2/\text{s}^2$ and $TSP_{600s} \leq 200\text{m}^2$; $s3 = \text{not } s1 \text{ or } s2$
^g **d0** = No flaming droplets/ particles in EN 13823 within 600 s;
d1 = no flaming droplets/ particles persisting longer than 10 s in EN 13823 within 600 s;
d2 = not d0 or d1.
Ignition of the paper in EN ISO 11925-2 results in a d2 classification.
^h Pass = no ignition of the paper (no classification);
Fail = ignition of the paper (**d2** classification).
¹ Under conditions of surface flame attack and, if appropriate to the end-use application of the product, edge flame attack.

Table 2 — Classes of reaction to fire performance for floorings

Class	Test method(s)	Classification criteria	Additional classifications
A1_{fl}	EN ISO 1182 ^a and	$\Delta T \leq 30$ °C; and $\Delta m \leq 50$ %; and $t_f = 0$ (i.e. no sustained flaming)	-
	EN ISO 1716	$PCS \leq 2,0$ MJ/kg ^a and $PCS \leq 2,0$ MJ/kg ^b and $PCS \leq 1,4$ MJ/m ² ^c and $PCS \leq 2,0$ MJ/kg ^d	-
A2_{fl}	EN ISO 1182 ^a or	$\Delta T \leq 50$ °C and $\Delta m \leq 50$ % and $t_f \leq 20$ s	-
	EN ISO 1716 and	$PCS \leq 3,0$ MJ/kg ^a and $PCS \leq 4,0$ MJ/m ² ^b and $PCS \leq 4,0$ MJ/m ² ^c and $PCS \leq 3,0$ MJ/kg ^d	-
	EN ISO 9239-1 ^e	Critical flux ^f $\geq 8,0$ kW/m ²	Smoke production ^g
B_{fl}	EN ISO 9239-1 ^e and	Critical flux ^f $\geq 8,0$ kW/m ²	Smoke production ^g
	EN ISO 11925-2 ^h : Exposure = 15 s	$F_s \leq 150$ mm within 20 s	-
C_{fl}	EN ISO 9239-1 ^e and	Critical flux ^f $\geq 4,5$ kW/m ²	Smoke production ^g
	EN ISO 11925-2 ^h : Exposure = 15 s	$F_s \leq 150$ mm within 20 s	-
D_{fl}	EN ISO 9239-1 ^e and	Critical flux ^f $\geq 3,0$ kW/m ²	Smoke production ^g
	EN ISO 11925-2 ^h : Exposure = 15 s	$F_s \leq 150$ mm within 20 s	-
E_{fl}	EN ISO 11925-2 ^h : Exposure = 15 s	$F_s \leq 150$ mm within 20 s	-
F_{fl}	No performance determined		

^a For homogeneous products and substantial components of non-homogeneous products.
^b For any external non-substantial component of non-homogeneous products.
^c For any internal non-substantial component of non-homogeneous products.
^d For the product as a whole.
^e Test duration = 30 min.
^f Critical flux is defined as the radiant flux at which the flame extinguishes or the radiant flux after a test period of 30 min, whichever is the lower (i.e. the flux corresponding with the furthest extent of spread of flame).
^g **s1** = Smoke ≤ 750 % minutes;
s2 = not s1.
^h Under conditions of surface flame attack and, if appropriate to the end use application of the product, edge flame attack.

Table 3 — Classes of reaction to fire performance for linear pipe thermal insulation products

Class	Test method(s)	Classification criteria	Additional classification
A1_L	EN ISO 1182 ^a and	$\Delta T \leq 30$ °C; and $\Delta m \leq 50$ %; and $t_f = 0$ (i.e. no sustained flaming)	-
	EN ISO 1716	$PCS \leq 2,0$ MJ/kg ^a and $PCS \leq 2,0$ MJ/kg ^b and $PCS \leq 1,4$ MJ/m ² ^c and $PCS \leq 2,0$ MJ/kg ^d	-
A2_L	EN ISO 1182 ^a or	$\Delta T \leq 50$ °C; and $\Delta m \leq 50$ %; and $t_f \leq 20$ s	-
	EN ISO 1716 and	$PCS \leq 3,0$ MJ/kg ^a and $PCS \leq 4,0$ MJ/m ² ^b and $PCS \leq 4,0$ MJ/m ² ^c and $PCS \leq 3,0$ MJ/kg ^d	-
	EN 13823	$FIGRA \leq 270$ W/s and $LFS <$ edge of specimen and $THR_{600s} \leq 7,5$ MJ	Smoke production ^e and Flaming droplets/particles ^f
B_L	EN 13823 and	$FIGRA \leq 270$ W/s and $LFS <$ edge of specimen and $THR_{600s} \leq 7,5$ MJ	Smoke production ^e and Flaming droplets/particles ^f
	EN ISO 11925-2 ^h : Exposure = 30 s	$F_s \leq 150$ mm within 60 s	
C_L	EN 13823 and	$FIGRA \leq 460$ W/s and $LFS <$ edge of specimen and $THR_{600s} \leq 15$ MJ	Smoke production ^e and Flaming droplets/particles ^f
	EN ISO 11925-2 ^h : Exposure = 30 s	$F_s \leq 150$ mm within 60 s	
D_L	EN 13823 and	$FIGRA \leq 2$ 100 W/s $THR_{600s} \leq 100$ MJ	Smoke production ^e and Flaming droplets/particles ^f
	EN ISO 11925-2 ^h : Exposure = 30 s	$F_s \leq 150$ mm within 60 s	
E_L	EN ISO 11925-2 ^h : Exposure = 15 s	$F_s \leq 150$ mm within 20 s	Flaming droplets/particles ^g
F_L	No performance determined		

^a For homogeneous products and substantial components of non-homogeneous products.
^b For any external non-substantial component of non-homogeneous products.
^c For any internal non-substantial component of non-homogeneous products.
^d For the product as a whole.
^e **s1** = $SMOGRA \leq 105$ m²/s² and $TSP_{600s} \leq 250$ m²; **s2** = $SMOGRA \leq 580$ m²/s² and $TSP_{600s} \leq 1$ 600 m²;
s3 = not s1 or s2
^f **d0** = No flaming droplets/ particles in EN 13823 within 600 s;
d1 = No flaming droplets/ particles persisting longer than 10 s in EN 13823 within 600 s;
d2 = not d0 or d1.
Ignition of the paper in EN ISO 11925-2 results in a d2 classification.
^g Pass = no ignition of the paper (no classification);
Fail = ignition of the paper (**d2** classification).
^h Under conditions of surface flame attack and, if appropriate to the end-use application of the product, edge flame attack.