Fire Resistance - An introduction

The following Tables of fire resistance are based upon BS EN 1996-1-2: 2005.

The Tables are only valid for walls complying with BS EN 1996 Part 1-1, Part 2 and Part 3. For walls designed in accordance with BS 5628, fire resistance values can be confirmed with our Technical Department.

Under BS EN 1996-1-2 masonry members must be considered against various criteria in relation to their fire resistance for standard fire exposure, these being:

R – Mechanical resistance
E – Integrity
I - Insulation
M – Mechanical impact (not relevant in the UK)

The form and function of the masonry walls in relation to their nominal fire exposure criterion, are as follows:

Loadbearing only – Criterion R
Separating only – Criterion E1
Separating and Loadbearing - Criterion REI

The thicknesses given in the Tables below are for masonry alone, excluding finishes. For each specification, the top rows of figures are for walls without applied finishes or just a thin render/parge coat.

The values in brackets are for walls having an applied finish of gypsum premixed plaster to BS EN 13279-1 or plaster type LW or T, in accordance with BS EN 998-1.

Plaster is assumed to be at least 10mm thick, and in the case of a single leaf wall this is required to both sides, or in the case of a cavity wall, it is assumed to be on the fire exposed face.

Note - A cement/sand render is not considered to increase the fire resistance of the wall.

Lightweight aggregate units include Ashlite, Fibo 850, and Lignacite.

Dense aggregate units include Lignacrete and products in the Facing Masonry ranges (Original, Premier, Sahara, etc).

Group 1 units – all Lignacite Ltd solid units and 100mm cellular units.

Group 2 units – all Lignacite Ltd cellular units of 140mm width and above, all hollow units.

Please note that the minimum wall thickness shown in the tables may not always correspond to an available size, so it is advisable to check the relevant Product Data sheet for size availability.

*Table 3.1 - Dense and lightweight aggregate concrete masonry: minimum thickness of **non-loadbearing separating walls** (criteria E1) for fire resistance classifications.*

Material properties: gross density p (kg/m³)	**Minimum wall thickness t_f (mm) for fire resistance classification E1 for time $t_{fi,d}$ (mins) of :**					
	30	60	90	120	180	240
Group 1 units						
Mortar: general purpose						
Lightweight aggregate: 400 ≤ p ≤ 1700 (Ashlite, Fibo 800, Lignacite)	50	70	75	75	90	100
	(50)	(50)	(60)	(70)	(75)	(75)
Dense aggregate: 1200 ≤ p ≤ 2400 (Lignacrete and Facing Masonry ranges)	50	70	90	90	100	100
	(50)	(50)	(70)	(75)	(90)	(100)
Group 2 units						
Mortar: general purpose						
Lightweight aggregate: 240 ≤ p ≤ 1300 (Lignacite)	50	70	75	100	115	125
	(50)	(50)	(70)	(75)	(90)	(100)
Dense aggregate: 720 ≤ p ≤ 1800 (Lignacrete and Facing Masonry ranges)	90	100	125	140	140	140
	(70)	(80)	(90)	(100)	(125)	(125)

Note: This Table is based on data from the National Annex to EC6 Part 1-2

*Table 3.2 - Dense and lightweight aggregate concrete masonry: minimum thickness of **separating loadbearing single-leaf walls** (criteria RE1) for fire resistance classifications.*

Material properties: gross density p (kg/m³)		Minimum wall thickness t_F (mm) for fire resistance classification RE1 for time $t_{fi,d}$ (mins) of					
		30	60	90	120	180	240
Group 1 units							
Mortar: general purpose							
Lightweight aggregate: 400 ≤ p ≤ 1700 (Ashlite, Fibo 800, Lignacite)	a ≤ 1.0	90	90	100	100	140	150
		(90)	(90)	(90)	(90)	(100)	(100)
	a ≤ 0.6	70	75	90	90	100	100
		(60)	(60)	(75)	(75)	(90)	(90)
Dense aggregate: 1200 ≤ p ≤ 2400 (Lignacrete and Facing Masonry ranges)	a ≤ 1.0	90	90	90	100	140	150
		(90)	(90)	(90)	(90)	(100)	(100)
	a ≤ 0.6	75	75	90	90	100	140
		(60)	(75)	(75)	(75)	(90)	(100)
Group 2 units							
Mortar: general purpose							
Lightweight aggregate: 240 ≤ p ≤ 1300 (Lignacite)	a ≤ 1.0	90	100	100	100	140	150
		(90)	(90)	(90)	(100)	(140)	(140)
	a ≤ 0.6	75	90	90	100	125	140
		(75)	(75)	(75)	(90)	(100)	(125)
Dense aggregate: 720 ≤ p ≤ 1800 (Lignacrete and Facing Masonry ranges)	a ≤ 1.0	100	100	140	140	140	190
		(90)	(100)	(100)	(140)	(140)	(150)
	a ≤ 0.6	90	100	100	140	140	150
		(75)	(90)	(90)	(125)	(125)	(140)

Note:

(i) This Table is based on data from the National Annex to EC6 Part 1-2.
(ii) a ≤ 0.6 applies when the vertical load capacity is only 0.6 of the permitted design vertical resistance being used.
(iii) a ≤ 1.0 applies when more than 0.6 of the permitted capacity is being used.

*Table 3.3 - Dense and lightweight aggregate concrete masonry: minimum thickness of each leaf of **separating loadbearing cavity walls** with one leaf loaded (criteria RE1) for fire resistance classifications.*

Material properties: gross density p (kg/m³)		Minimum wall thickness t_F (mm) for fire resistance classification RE1 for time $t_{fi,d}$ (mins) of					
		30	60	90	120	180	240
Group 1 units							
Mortar: general purpose							
Lightweight aggregate: 400 ≤ p ≤ 1700 (Ashlite, Fibo 800, Lignacite)	a ≤ 1.0	90	90	100	100	140	150
		(90)	(90)	(90)	(100)	(100)	(100)
	a ≤ 0.6	70	75	90	90	100	100
		(60)	(60)	(75)	(75)	(90)	(90)
Dense aggregate: 1200 ≤ p ≤ 2400 (Lignacrete and Facing Masonry ranges)	a ≤ 1.0	90	90	100	100	140	150
		(90)	(90)	(90)	(90)	(100)	(100)
	a ≤ 0.6	75	75	90	90	100	140
		(60)	(75)	(75)	(75)	(90)	(125)
Group 2 units							
Mortar: general purpose							
Lightweight aggregate: 240 ≤ p ≤ 1300 (Lignacite)	a ≤ 1.0	90	100	100	100	140	150
		(90)	(90)	(90)	(100)	(140)	(140)
	a ≤ 0.6	70	90	90	100	125	140
		(70)	(70)	(70)	(90)	(100)	(125)
Dense aggregate: 720 ≤ p ≤ 1800 (Lignacrete and Facing Masonry ranges)	a ≤ 1.0	90	100	100	100	140	190
		(90)	(90)	(100)	(100)	(140)	(150)
	a ≤ 0.6	90	100	100	100	140	150
		(70)	(90)	(90)	(100)	(125)	(140)

Note:

(i) This Table is based on data from the National Annex to EC6 Part 1-2.

(ii) a ≤ 0.6 applies when the vertical load capacity is only 0.6 of the permitted design vertical resistance being used.

(iii) a ≤ 1.0 applies when more than 0.6 of the permitted capacity is being used.

(iv) The tabulated thicknesses are for the loaded leaves of cavity walls where the loaded leaf is subjected to fire.

(v) The non-loaded leaf may be of a dissimilar material to the loaded leaf, but should otherwise confirm to the relevant material specifications. In such cases the respective thickness of each leaf should conform to that specified in the appropriate material table.