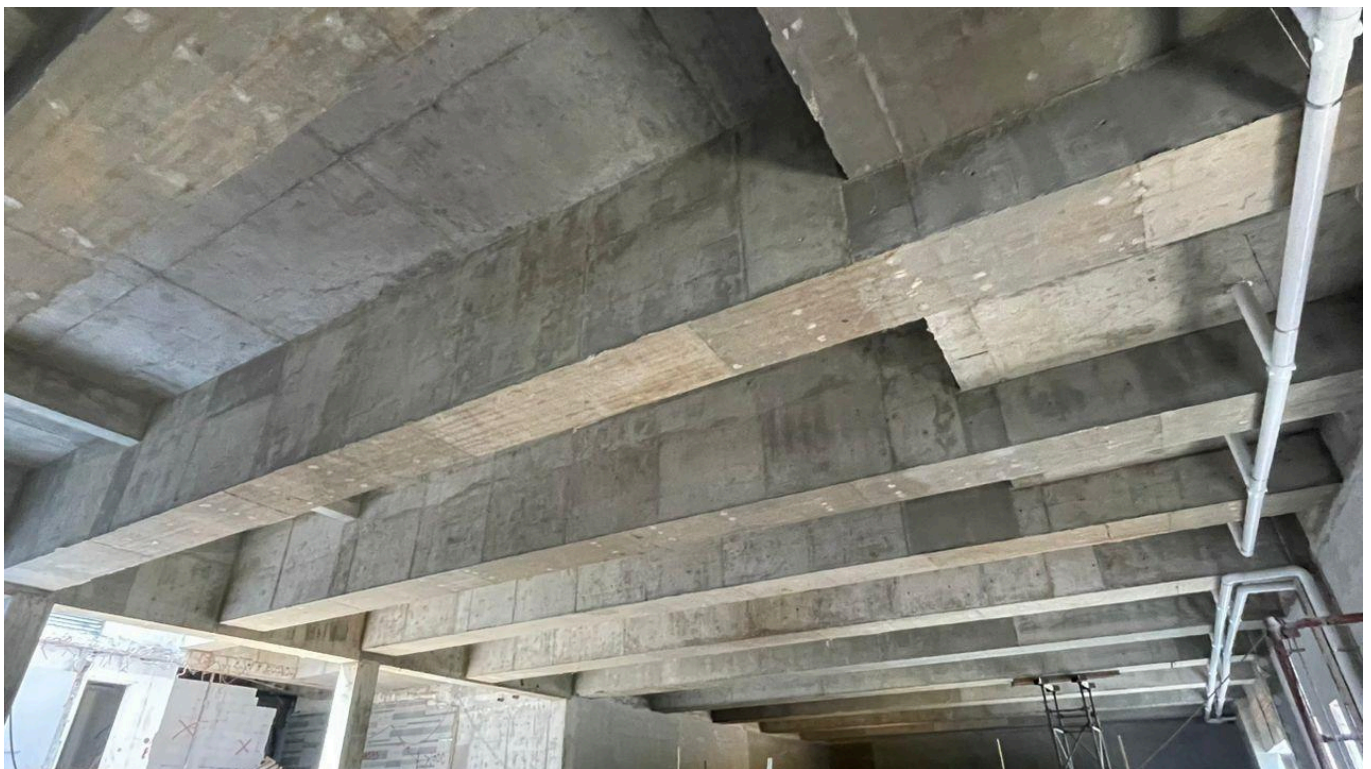


Minimum dimensions for fire resistance of private residences constructed in reinforced concrete

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Photograph: C2 Builder

In Malaysia, like most countries, it is a statutory requirement that in the event of a fire, a building has to be able to maintain its structural integrity for a given minimum period. This duration is termed the minimum period of fire resistance.

Note on the date of publication

The statutory provisions and design-standard references in this note reflect the February 2023 publication. Requirements and applicable standards may have changed. Confirm the current UBBL provisions, adopted design standards and project-specific fire-resistance requirements with the relevant authorities and qualified professionals before relying on the values below.

Minimum period of fire resistance

This has to be determined in accordance with the Ninth Schedule of the Uniform Building By-Laws (UBBL) and is dependent on the type of use and height of the building structure.

For private residences: the above-ground structure needs to have a minimum resistance period of 30 minutes for three storeys and below, and 60 minutes for above. Basements require 60 minutes for four storeys and below, and 90 minutes for above.

Ninth Schedule / UBBL extract

Values reproduced from the February 2023 publication

Purpose group	Height (m)	Floor area (m ²)	Cubic capacity (m ³)	Above-ground (hours)	Basement (hours)
Small residential: not more than 3 storeys	NL	NL	NL	½	1(a) (x)
Small residential: 4 storeys	NL	250	NL	1(b)	1 (x)
Small residential: any number of storeys	NL	NL	NL	1	1½
Institutional	28	2,000	NL	1	1½
Institutional: over 28 m	over 28	2,000	NL	1½	2

NL = No limit, as denoted in the original extract. Lettered markers and (x) retain the original UBBL notation; refer to the full Schedule for its qualifications and exceptions.

Minimum dimensions

The minimum dimensions in the Ninth Schedule of the UBBL must be met. Where the adopted code of practice gives a larger value, it may be best practice to adopt that value; this is to be discussed and agreed with the client.

The governing dimension is the largest required for fire resistance or other design considerations, such as structural resistance under permanent loads and deflection.

Minimum dimensions / Slab

Fire resistance	UBBL	British Standard	Eurocode
30 minutes	Not defined ¹	75 mm	60 mm
60 minutes	Not defined ¹	95 mm	80 mm

¹ UBBL dimension not defined in the source table.

Beam / Minimum width

Fire resistance	UBBL	British Standard	Eurocode ²
30 minutes	Not defined ¹	200 mm	80–200 mm
60 minutes	Not defined ¹	200 mm	120–300 mm

¹ Not defined. ² The exact value has to be calculated based on several factors.

Column / Minimum width

The original publication differentiates UBBL, British Standard and Eurocode requirements according to the extent of fire exposure.

UBBL and British Standard

Resistance	UBBL fully exposed ¹	UBBL built into wall ²	BS fully exposed ³	BS 50% exposed ³	BS 1 face exposed ³
30 min	150 mm	75 mm	150 mm	125 mm	100 mm
60 min	200 mm	75 mm	200 mm	160 mm	120 mm

Eurocode

Resistance	Exposed more than 1 side ³	Exposed 1 side
30 min	200–300 mm	155 mm
60 min	200–350 mm	155 mm

¹ UBBL allows smaller dimensions with specified reinforced plaster, vermiculite or fire-rated plasterboard encasement; refer to the Ninth Schedule.

² Fully built into a full-height wall extending 600 mm either side, same fire rating, no projecting column face; 63 mm if 12.5 mm vermiculite gypsum plaster is used.

³ Exposure concerns a column face exposed to fire; exact values depend on several factors.

Minimum dimensions / Wall

Resistance	UBBL ¹	BS p < 0.4% ²	BS 0.4% < p < 1%	BS p > 1%	Eurocode ³
30 min	75 mm	150 mm	100 mm	75 mm	100–120 mm
60 min	75 mm	100 mm	120 mm	75 mm	110–140 mm

¹ 63 mm if 12.5 mm thick vermiculite gypsum plaster is used.

² p is the percentage of reinforcement provided.

³ The exact value has to be computed based on several factors.

References

1. Uniform Building By-Laws 1984, Amendment 2021.
2. Figure 3.2, BS 8110-1-1:1997.
3. BS EN 1992-1-2:2004.

Definitions and source notes

- (i) The UBBL defines the fire resistance period by reference to transmission of heat or resistance to collapse with passage of flame when tested in accordance with BS 476.
- (ii) Structural integrity, in the context of fire resistance, concerns resistance to flame penetration, heat transmission and collapse.
- (iii) The minimum dimensions detailed are from part one of the British Standard and Eurocode. Part two can be used for more detailed assessments that may yield more economical solutions.

Publication disclaimer

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