

Brick Walls - Expansion and Expansion Gaps

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Brick growth, as it is often called, is a property of fired clay materials which begins from the time the product comes out of the kiln and continues, at a reducing rate, for the life of the brick.

The 'e' value, as it is commonly known, is an estimate of the amount of growth expected in the first fifteen years after the brick leaves the kiln. This figure is used by designers to size and space control joints.

The coefficient of expansion or 'e' value of clay bricks when tested in accordance with AS/NZS 4456.11 can vary from a very low 0.3mm/m (millimetres per metre) to over 1.6mm/m.

Most general purpose bricks have a coefficient of expansion in the range 0.5 to 1.0mm/m over 15 years.

For design purposes, the 'e' value of the brick lot to be used in a construction must be determined by test. Typical values such as those given in table 1 are given only as a guide and should never be used in the design of control joint spacing.

Table 1. Average expansion (e) figures for bricks manufactured in New South Wales, Australia.

Production Method	Expansion
Extruded	1.1 mm/m
Pressed	0.6 mm/m
Wet Pressed	1.0 mm/m

It is important to note that there is no pattern in coefficient of expansion based on brick colour or manufacturing methods, and due to variations in the manufacturing process, the coefficient of expansion can vary considerably between batches even within a single brick type.

Expansion Gaps

What is The Purpose of Expansion Gaps?

Because all building materials change size as their temperature varies, or as they are loaded or unloaded, there becomes a need to introduce movement gaps between parts of the structures.

Materials such as concrete, and cement products shrink over time after being placed in a building, whereas clay bricks expand slowly over a long period of time.

The use of different materials and their different responses to changing loads, temperatures and moisture contents will lead to size differences between them. These differential movements must be taken into account if damage to the structure is to be avoided. This is done by the provision of control gaps or articulation joints between parts of the structure.

Typical control gaps should initially be about 20mm wide, clear of mortar dabs or bridges, tied at the appropriate intervals and sealed with a polyethylene tube or suitable compressible filler.

Sources of Movement

External

- Brick expansion due to temperature or growth
- Foundation and footings movement
- Frame movement
- Temperature Movement
- Frame Shortening

Internal

- Horizontal movement
- Vertical movement

Other Sources

Most common problems with expansion gaps are due to:

- Inadequate sealing.
- Failure to ensure that gaps were clean and that no hard materials such as mortar droppings are left before sealing.
- The use of joint fillers that are too rigid which have compressive strengths high enough to transfer forces across the joint.