BRICKWORK MOVEMENT GUIDANCE

Clay Facing Bricks - Guidance for brickwork movement calculations

MICHELMERSH
Britain's Brick Specialists

Technical Information Sheet

INTRODUCTION

This document is intended as a general guide to calculations of movement joint sizes in brickwork and should be read in conjunction with the relevant sections of BSI published document PD 6697 "Recommendations for the design of masonry structures to BS EN 1996-1 and BS EN 1996-2".

GENERAL

Most construction materials when subjected to changes of temperature, moisture or other variables will undergo expansion and/or contraction depending upon their specific characteristics.

Clay materials also undergo a long-term irreversible expansion as they absorb moisture from the atmosphere. This starts immediately after manufacture and continues, albeit at an exponentially decreasing rate, for many years. Other non-clay materials may irreversibly shrink over time.

At individual brick level these movements are very small, however when longer runs of brickwork are considered the combined movement can significantly impact on the brickwork causing cracking or displacement if not properly allowed for at the design stage.

Clay masonry is a natural product and will absorb water when wet and, over longer term, from atmospheric moisture. It will also expand and contract with temperature variations.

The following guidance applies to most normal situations.

MOISTURE MOVEMENT

Wetting Movement – Reversible

Typical movement can be considered to be no more than: 0.20 mm/m

Long Term Expansion – Irreversible

This is caused by the absorption of atmospheric moisture over a very long period of time (50 years).

The values for our brick products in normal brickwork have been derived, using a method developed by British Ceramic Research Ltd as being in the order of:

Blockleys	0.58 mm/m
Carlton	0.60 mm/m
Charnwood	0.66 mm/m
Freshfield Lane	0.50 mm/m
Michelmersh	0.53 mm/m

THERMAL MOVEMENT

Reversible

It is generally sufficient to assume a coefficient of linear thermal movement in the order of 6 x 10^{-6} m/ºC

A temperature change of 45ºC gives around: 0.30 mm/m

SUMMARY

Plant	Reversible Moisture Movement	Long Term Moisture Expansion	Total Moisture Movement (a)	Thermal Movement (b)	Theoretical Maximum (a+b)*
BLOCKLEYS	0.20 mm/m	0.58 mm/m	0.78 mm/m	0.30 mm/m	1.08 mm/m*
CARLTON	0.20 mm/m	0.60 mm/m	0.80 mm/m	0.30 mm/m	1.1 mm/m*
CHARNWOOD	0.20 mm/m	0.66 mm/m	0.86 mm/m	0.30 mm/m	1.16 mm/m*
FRESHFIELD LANE	0.20 mm/m	0.50 mm/m	0.70 mm/m	0.30 mm/m	1.00 mm/m*
MICHELMERSH	0.20 mm/m	0.53 mm/m	0.73 mm/m	0.30 mm/m	1.03 mm/m*

*In the UK climate maximum Thermal and Moisture movements are unlikely to occur simultaneously so, depending on specific application, their whole maximum values need not necessarily be added together.

In practice this leads to an overall figure no greater than **1 mm/m** which is the recommended standard value given in PD 6697 (Section 6.2.6.3).

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NOTES

When using our bricks, it is recommended in general, that distance between movement joints should not exceed the below. Shorter distances should be considered in unrestrained brickwork and spacing should not exceed 6 m from a corner or return.

Plant	Maximum Distance between movement joints (m)
BLOCKLEYS	12
CARLTON	12
CHARNWOOD	12
FRESHFIELD LANE	12
MICHELMERSH	10

Final design and location of movement joints will ultimately rely on engineering judgement based on a detailed understanding of the individual construction.

In addition to PD 6697 we recommend reading the Brick Development Association technical guide 'Designing for Movement in Brickwork'. www.brick.org.uk