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MOVEMENT JOINTS

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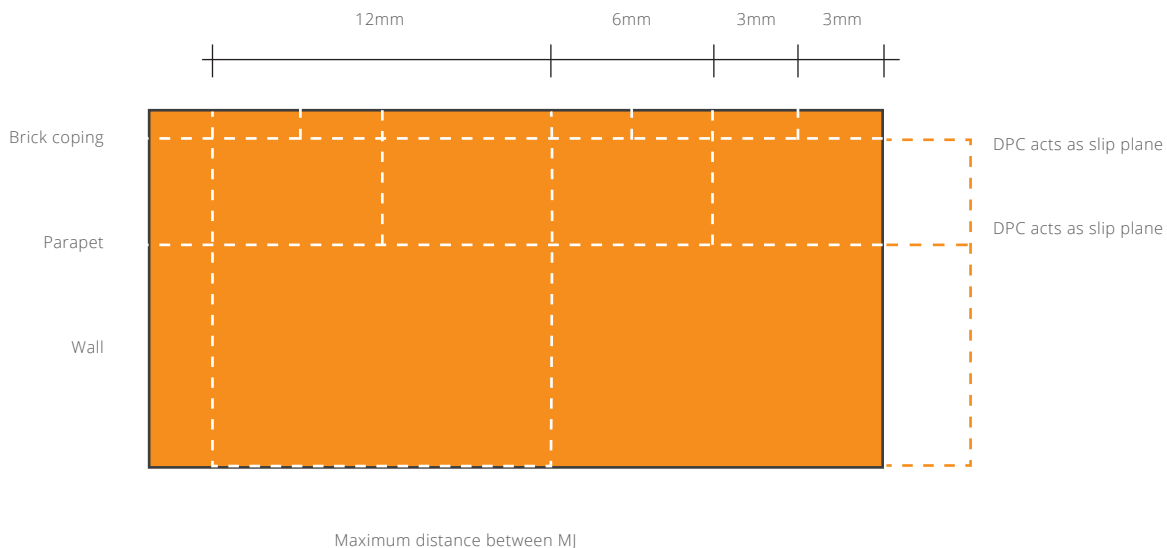
Bricks are unusual in that while most building materials contract in use bricks conforming to EN BS 771-1 the European Standard, expand after firing significantly for a number of years. Many other materials shrink over the same period. Timber cladding and timber structures shrink significantly. Reinforced concrete frames creep and contract. Concrete blocks contract throughout their initial life as do concrete bricks which are excluded from the advice contained within this note.

Vertical and horizontal provision for Movement Joints (MJ) are required. They are designed as compressible gaps which will close up as the brickwork expands. Other movement joint provision which works in a satisfactory way may be junctions with other materials. Movement joints are generally viewed as scars on the face of the building, and placing of MJ's can damage the façade unless worked out as part of the building

Clay bricks require movement joints to allow for irreversible expansion during the first few years of installation. After 5 years the most of the irreversible movement has occurred and stability has been achieved. Although expansion may continue for up to 20 years this is generally minor, and unimportant. Other structural movements are part of the buildings design including deflections are in addition to MJ provision for expansion. The following illustration summarises the information for vertical movement joint provision.

- *MJs required at maximum 12M centres*
- *Above the Parapet MJs required at 6M centres*
- *Clay Cappings require MJs at 3M centres*
- *MJs maximum distance to corner normally 6M*
- *MJs with Bed Joint Reinforcement every 3rd course (225mm) can be 17M between MJs*

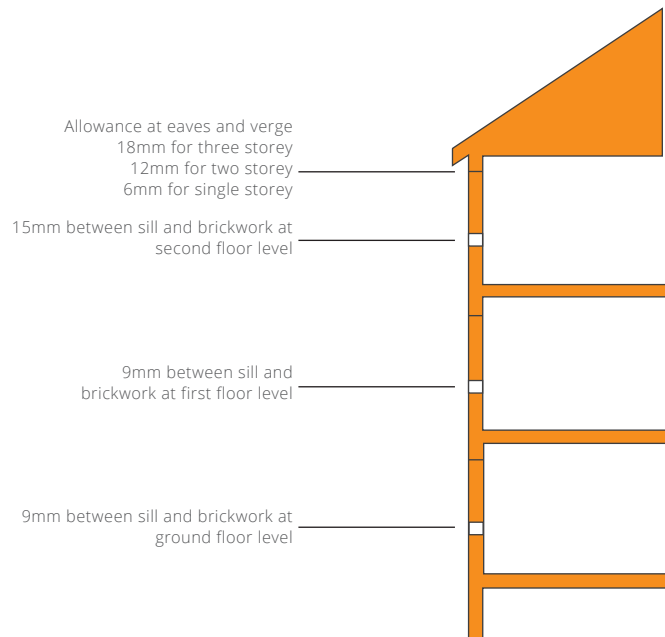
Vertical Movement Joints for horizontal expansion:



HORIZONTAL MJS FOR VERTICAL EXPANSION

Generally vertical expansion should be restricted to 9M with horizontal MJs. While facades can be built higher than this depending on structural performance ties need to be sliding above 9M, normally by sliding ties in channels. If an RC frame creeps or compresses or Steel beams deflect MJs may need to be at single storey level. Any structural movement will be in addition to brickwork expansion.

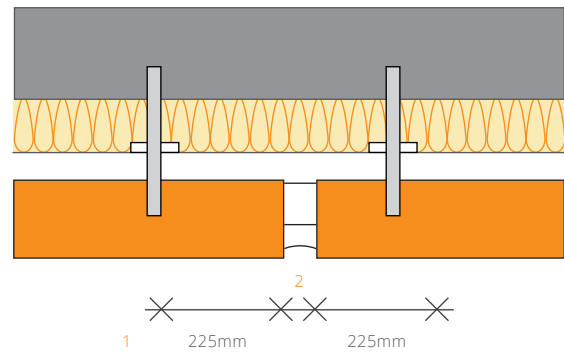
Timber frames compress more than other frames guidance from PD 6697 is shown below.



TIES AT MJS

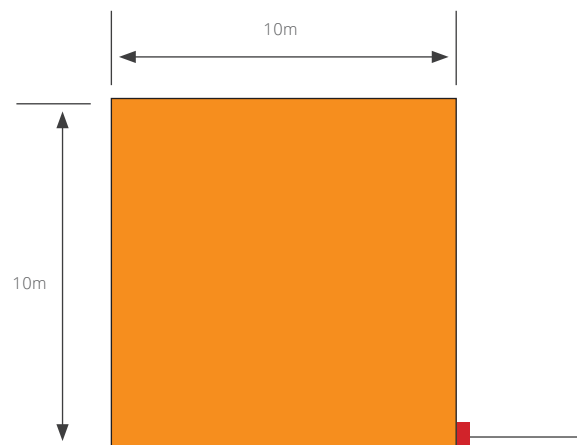
Ties are required either side of MJs within 225mm of the opening at a Max of 300mm vertically to maintain stability.

- 1 Ties to within 225 of MJ and at 300mm min. vertically
- 2 Movement joint



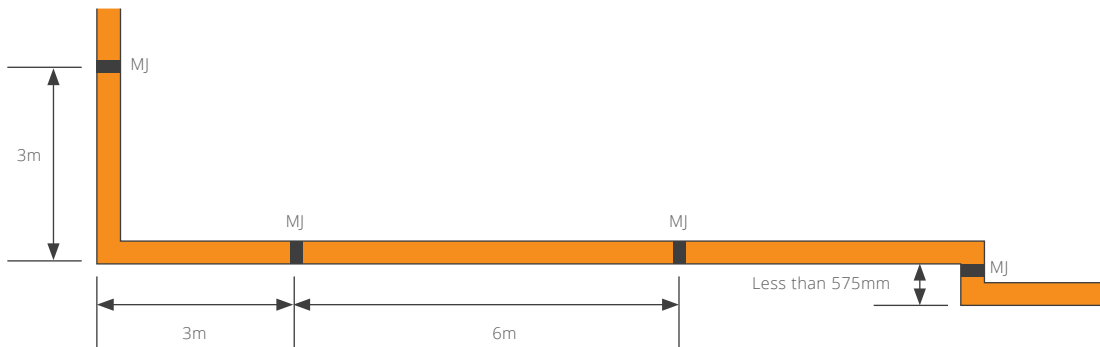
SMALL BUILDINGS

Small buildings with sides up to 10M and broadly square do not require MJs as the forces are opposite and equal.



MJS IN FREESTANDING WALLS

Freestanding walls require particular requirements the diagram below indicates advice.



Bed Joint Reinforcement (BJR) is a panacea for many areas of brickwork. This includes Movement Joints which can be extended to up to 17M with BJR in every 3rd bed joint of a standard brick or 225mm. BJR imparts tensile characteristics to a masonry wall which otherwise would be a largely compressive structure.

Lime Mortar manufacturers have claimed on occasion that the use of lime mortar means that the façade can move and brickwork expand without the use of MJ's. We suggest that if this is considered the design is underwritten by the lime mortar manufacturer. There is no authoritative independent evidence of the need for MJ's not being required. Examples of projects constructed with Lime Mortar with no MJ's such as Glyndebourne Opera House by Hopkins Architects required very sophisticated structural advice. This is beyond the scope of general advice.

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