

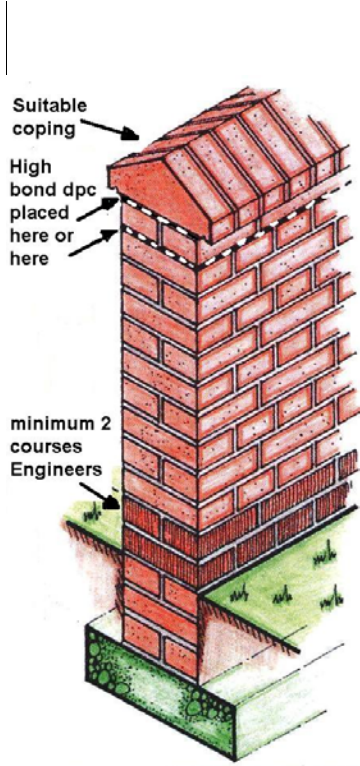
# GET IT RIGHT

## 9. CONSTRUCTION OF FREESTANDING & EARTH RETAINING WALLS IN LOCATIONS RATED AS 'SEVERE EXPOSURE'

Particularly Scotland, Northern England, Wales, South West England and Northern Ireland

To prolong the life of external boundary walling it is important to ensure that they are afforded the best protection from complete saturation and subsequent frost attack.

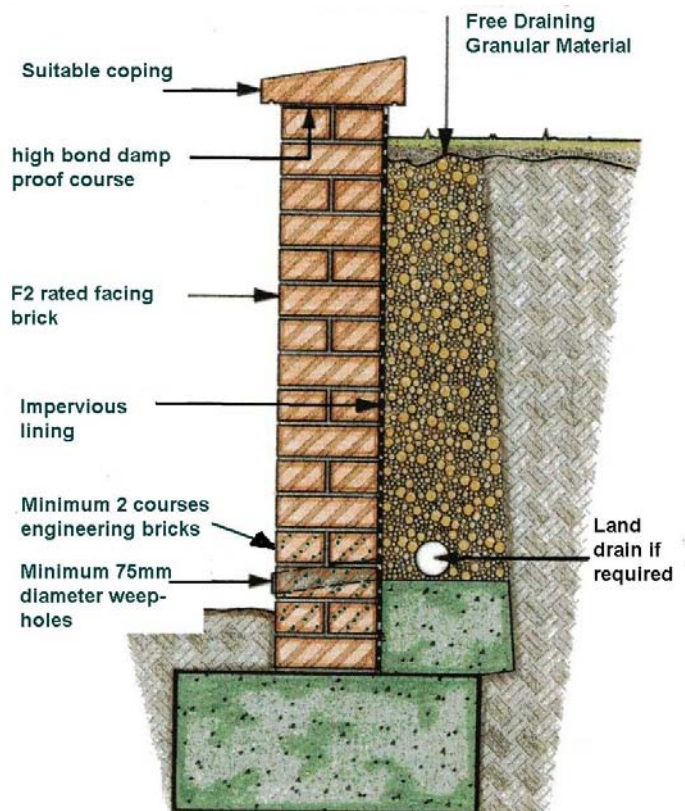
### FREE-STANDING WALLS



- For **Free-standing** walls bricks must be F2 durability.
- Copings with a drip throating will shed rainfall away from the wall.
- 2 courses of Engineering quality bricks must be used at the base.
- A high bond dpc must be sandwiched in the mortar under the coping or capping.
- A mortar mix of 1: ¼ : 3 (cement:lime:sand) should be used throughout\*. (\*refer to mortar section)
- Half brick (102mm) walls are not recommended.

### EARTH RETAINING WALLS

- For **Earth-retaining** walls bricks must be of F2 durability.
- A high bond dpc must be sandwiched in the mortar under the coping or capping.
- A 2 coat liquid water-proofer must be used to coat the retaining side of the wall.
- 2 courses of Engineering quality bricks must be used at lower ground level.
- A mortar mix of 1: ¼ : 3 (cement:lime:sand) should be used\*.(\*refer to mortar section).
- Drainage outlets should be spaced at maximum 1350mm centres.



## Mortar Specification

Mortar is just as exposed as the brick. Generally, and especially in Wales, the South West and North West of England, Scotland and Northern Ireland, we strongly recommend mortar mix 1 throughout. The exception to this recommendation would apply to 'Stock' bricks (generally containing an indentation or 'frog') for which mix 2 should be used.

Fully fill all bed and perpendicular joints and lay 'frogged' bricks with indentation uppermost.

Mix 1 (des (i) or M12 equivalent)	Mix 2 (des (ii) or M6 equivalent)
1 part Portland Cement	1 part Portland Cement
1/4 part Lime	1/2 part Lime
3 parts Sand	4 1/2 parts Sand

The mixes listed assume the use of Ordinary Portland Cement. Lime addition may be omitted however mortar will be less able to accommodate movement stresses.

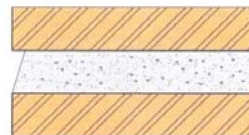
For CEMII cements contact the manufacturer for advice.

For more information on prescribed and designed mortars refer to Ibstocks 'Technical Information Sheet 23 - Brickwork Mortars'.

Joint profile must be bucket handle or weather-struck – both well compressed and smoothed. Recessed joints are not recommended in any application subjected to severe weather exposure. Water must not be allowed to pool in brick-on-edge applications.



bucket handle



weather-struck (for vertical applications)

Water will migrate through jointed material such as brick on edge, concrete copings and creasing tiles, its passage must be halted by the incorporation of damp proof material.

## Damp Proofing

Damp proofing is the barrier to the passage of water and moisture.

At Low Level, for stability use a minimum of 2 courses (150mm) of Ibstock Engineering Bricks of F2 durability in mortar mix 1.

At High Level, always use a flexible damp proof course beneath coping and capping courses, which must be at least the width of the wall, be sandwiched within the mortar and have the ability to adhere to the mortar (**use a high-bond bitumen polymer type DPC**). Polyethylene DPC's should be avoided as they do not bond with the mortar leaving the coping or capping susceptible to being displaced.

For earth retaining walls a minimum 2 coats of liquid water-proofer must be used to coat the retaining side. Adhesive tanking materials are also available but need extra care with application.

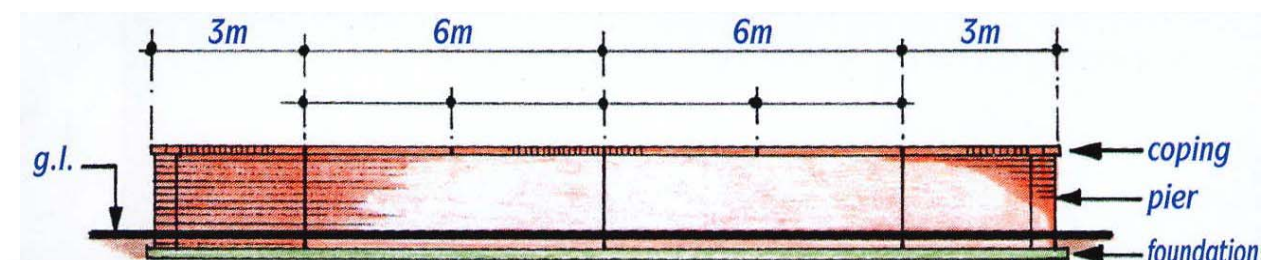
## Movement Joints.

All building materials move when subjected to temperature and moisture changes. Brickwork is no exception. In freestanding walls, movement joints (often referred to as expansion joints) must be provided at a maximum of 6m spacing with a maximum 3m from a corner or change of direction.

They must commence at concrete foundation level and continue through the coping/capping courses. A 10mm joint width will normally be sufficient for this spacing.

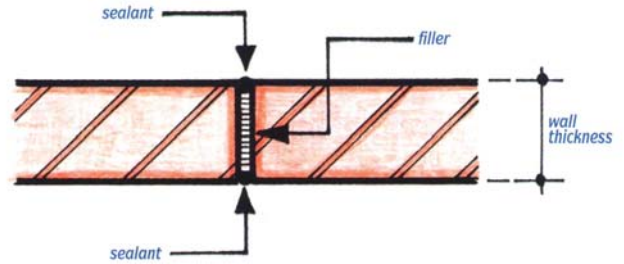
**Additional movement joints will be required at minimum 3m centres through the copings/ cappings.**

Use ties fitted with de-bonding sleeves to span the joint to maintain stability.



## Fillers and Sealants.

Filler materials should be compressible by easy pressure between finger and thumb and should recoil back to its original thickness when released. Cellular polyethylene and cellular polyurethane are ideal. Impregnated **fibre boards should not be used** as they do not compress easily and will restrict expansion. The filler material should be installed as the brickwork is built, keeping it back from the face of brickwork by 10mm to allow for a 10 x 10mm recess for the sealant.

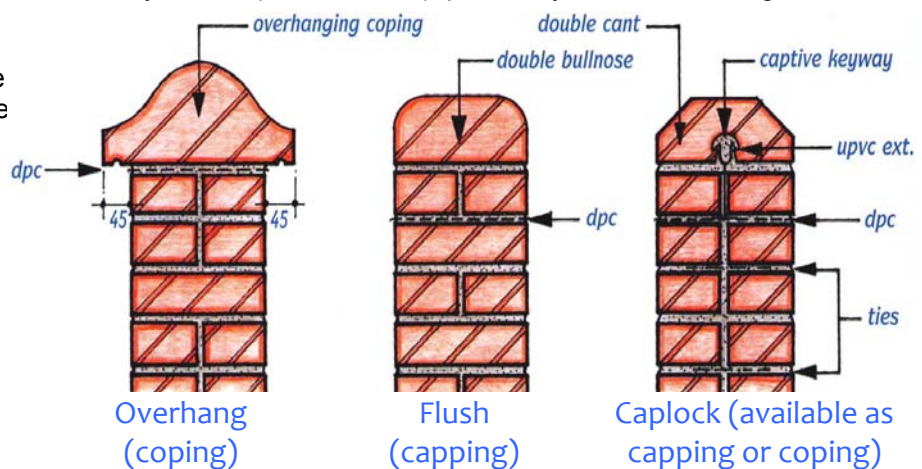


The sealant should be a polysulfide or low modulus silicone.

## Copings and Cappings

This is where water will ingress the brickwork if not properly constructed. Clay brick copings and cappings must always be F2 (frost resistant), preferably with an overhang and the ability to shed water. A flexible (roll type) high bond bitumen polymer DPC should always be provided and sandwiched in the mortar. The Istock patent 'Caplock' system will provide additional security, particularly in areas where vandalism is prevalent.

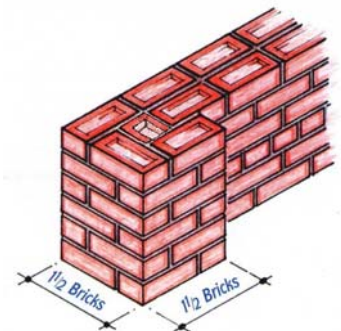
In general and especially in areas rated as Severe Exposure, copings should always be used in preference to cappings where possible.



## Piers.

Maintaining stability is essential for long term safety in use. It is advisable to incorporate the pier shown at the ends of most walls. This pier will be adequate for hanging a 1.2m x 800mm wide gate. It is likely that walls over 1.5m high will require intermediate stiffening piers along its length.

In Scotland, a free standing wall over 1200mm above ground level may require Building Control approval. Please check with your local Building Control office before commencing any building operations.



### Do;

- Use a DPC below the capping/coping and Sandwich the DPC in mortar
- Use the correct mortar mix
- Build in the movement joints
- Coat the back of retaining walls with 2 coats of bituminous paint
- Use bucket handle mortar jointing

### Do not;

- Use bricks for treads or risers in step construction, pavers or path edging.
- Use recessed mortar jointing
- Use coatings or waterproofing agents other than where indicated.
- Clean brickwork with high pressure water washers.

## Associated materials suggestions;

(other manufacturers may offer similar products)

### Under copings/cappings-

#### Ruberoid- Hyload Permabit DPC

Permabit offers excellent performance in terms of tensile, elongation and tear strength. It provides horizontal, vertical or stepped DPCs including cavity trays in solid/cavity walls of brick, block, stone or concrete. A mixture of bitumen, synthetic polymers, synthetic fibres and other additives, **Permabit excels where mortar adhesion is particularly important, for example in lightly loaded areas.**



### Retaining walls –

#### Wrimco Waterproofing

**Durabit Reo** - is a latex based, water-based waterproofing membrane internally reinforced with micro-fibres, making it a tough, high tensile strength, flexible waterproofing membrane. Typical applications include wet areas, retaining walls, decks, plant rooms and upturns where a polyurethane mastic has been first applied (corners fillets).

#### RIW Flexiseal

RIW Flexiseal is a two coat, seamless and fully bonded liquid applied waterproof coating based on polyurethane technology. RIW Flexiseal cures by drawing moisture from the air to form a highly flexible but durable barrier to water and water vapour and is typically used where a high performance tanking system is required.

**RIW Sheetseal 226** is a traditional self-adhesive preformed bitumen sheet membrane and although not the simplest of membranes to use vertically, it can with a little care provide a cost effective solution to larger areas, provided it is adequately protected against backfilling operations, and continuous below ground level.

### Movement Joints –



**Fillcrete** – closed cell polyethylene foam.

**Fosroc - Expandafom** is a closed-cell polyethylene joint filler for use as an expansion joint filler in brick and blockwork, isolation joints and hinge joints where a readily compressible low load transfer joint filler is required.

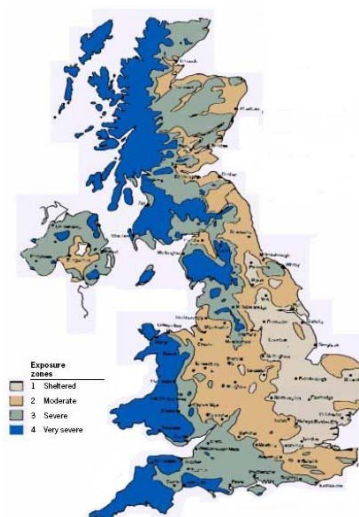
#### Geocel 201 One Part Polysulphide Sealant

Geocel 201 is a one part, ready to use, flexible polysulphide sealant for expansion joints in building and construction.

#### Adshead Ratcliffe- ARBO. Arbomeric MP10

A One Part Low Modulus Modified Polymer Sealant for Structural Joints in Brickwork & Blockwork, Joints in Lightweight Cladding.

UK Exposure zones- 'severe' & 'very severe' span the left hand side of the UK.



For further help and advice contact Ibstocks  
Design & Technical Helpline on 0844 800 4576

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