Marshalls
Bricks & Masonry

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Brick Technical Bulletin - Good Site Practice Guide

BTB 1

INTRO

The following notes are a précis of more comprehensive details available from our other Brick Technical Bulletins which are available on our website – www.marshalls.co.uk/commercial

DELIVERY

Marshalls Sales Offices can advise on load and pack sizes, weights and delivery methods. Please advise the Offices of any special delivery requirements, site restrictions or time windows which are applicable at the time of ordering and before deliveries commence.

STORAGE AND HANDLING

Bricks should be stored on sound, level ground and raised clear of wet and muddy areas to prevent contamination and staining. Storage areas should be sited close to the points of work to reduce unnecessary handling and minimise damage and waste. Bricks should be protected from the weather on site and during construction, including the covering of completed but uncapped brickwork. Waterproof coverings should allow circulation of air. These precautions will reduce the likelihood of subsequent lime bloom, shrinkage and movement. Materials used in conjunction with concrete facing bricks should also be stored under protection. Damage and wastage will be minimised by mechanical methods of distribution to the points of work. Facing bricks should be lifted and placed – not thrown and tipped. Selection of bricks should be made by combining from 3 packs if possible and mixing loads where practical. Bricks should be kept as dry as possible with opened packs and bricks that are stacked out on site protected from the weather.

LAYING, BEDDING AND JOINTING

Building with Marshalls bricks should pose no more problem than using any other masonry material. The accurate dimensions and regularity of size will help with the laying out and maintenance of brick courses. Bricks should be dealt with in the same way as dense concrete blocks, reconstructed or natural stone. Solid bricks in particular can offer mortar savings of up to 15% when compared with deep frogged or perforated bricks. The number of courses achievable per day should be between 15 and 20, provided dry bricks are used and mortar consistency is adjusted to suit brick suction. In accordance with BS 8000-3 the height of lifts should not exceed 1.5 metres or 20 courses per day.

Frogged bricks should be laid frog up. Marshalls bricks should NOT be wetted before laying. The workability of the mortar should be adjusted to take into account the weight and suction of the bricks. Marshalls bricks have a low to medium absorption and tend to shed water towards the mortar joints. Failure to fill the perpend joints in particular can lead to excessive water ingress into the cavity.

The specified joint profile should be formed after leaving the mortar to harden slightly. Tooling is recommended to compact the joints, improve weather resistance and reduce shrinkage in the mortar. Recessed or flush pointing is not recommended in areas of high exposure.

Do not lay bricks when the temperature is at or below 3°C or when freezing may occur after the mortar has hardened. Wall ties should be placed at normal locations, except around movement joints where additional ties may be necessary. Ties should be positioned within 225mm either side of the opening or joint and at vertical centres not exceeding 300mm. Alternatively flat ties may be inserted across the joint provided one end of the tie is unbonded.

BED JOINT REINFORCEMENT

Bed joint reinforcement (BJR) may be used to control stresses within the brickwork and in certain instances can be used to extend the distances between movement joints.

We would suggest a ladder type reinforcement however consultation with an approved engineer is recommended.

BONDING

Bonding patterns should be maintained at openings. Broken bonds increase the risk of cracking. Where special details are required at openings Marshalls can supply a full range of standard or bespoke special bricks to suit each design.

CAVITIES

Both leaves of a cavity wall construction should rise simultaneously. Cavities must be kept clean to reduce the risk of cold bridging or water reaching the inner leaf. Cavity trays over openings should incorporate stop ends to prevent water over-run during severe weather.

WEEP HOLES

Weep holes should be provided wherever there is extensive bridging of the cavity, eg. at lintels and floor slabs. Weep holes are recommended at the rate of every third perpend.

WALL TIES

The selection of wall ties should be made in accordance with PD 6697: 2010, Section 6.2. Tables 9 to 12 give guidance on the selection of ties for normal use and refer to exposure zone, cavity width and type of structure. Wall ties should be simultaneously incorporated into both leaves as the work progresses and be embedded at least 50mm into each leaf. The ties should have the drip located centrally within the cavity and facing downwards. Ties should fall towards the outer leaf to prevent any tracking of moisture towards any partial cavity insulation or the inner leaf.

The density of ties (number of ties per square metre) should be in accordance with BS EN 1996-1-1: 2005 and they should be evenly distributed except around openings where, at vertical edges (for example movement joints), additional ties should be used at a rate of one tie per 300mm height. These should be placed not greater than 225mm from the edge.

DAMP PROOF COURSES

Damp proof course materials should conform to the relevant British Standard referenced in Table 1 of PD 6697: 2010. Damp proof material must be of the correct width so that it fully covers the leaf thickness. Damp courses should be fully bedded in mortar and have an overlap of at least 150mm.

In certain instances where a slip plane is required, two layers of joint material may be laid on top of each other, but the effectiveness of this depends on the type of material used and the loads imposed upon it. Reputable manufacturers can give further advice. If a slip plane is to be provided, then other means of maintaining structural stability, such as extra wall ties, should be installed.

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MORTAR

A 1:1:6 or equivalent mortar is adequate for most locations. Further details for specific locations are given in Table 15 of PD 6697: 2010 or by reference to Marshalls.

Lime enhanced mortars have more capacity to absorb small degrees of movement and are recommended. This mortar category allows the location of movement joints to be at 7.5-9 metre centres depending on window openings and other factors. Workability should be adjusted to suit the density and absorption of the brick. Approved admixtures may be used to improve the workability. Retarded or silo based mortars should be used in accordance with the suppliers' recommendations. *(Full information regarding Mortar is detailed in Technical Bulletin BTB 4).*

CUTTING AND CHASING

Cutting can be done by bolster, mechanical saw or hydraulic guillotine. On facing work mechanical means should be adopted to preserve a true arris. Wet cutting will help to maintain the appearance of the bricks, but if this method is used the bricks should be hosed down immediately after cutting and dried prior to laying. Chases generally should not exceed one-third of the thickness of the wall in vertical chasing and not be deeper than one-sixth of the wall in horizontal chasing. Timber laths should be used as guides when using mechanical means. Goggles and dust masks should always be used when chasing concrete bricks.

BRICK FINISHES

The choice of brick, with their different finishes, can have an effect on the final brickwork appearance and the following comments should be considered. Textured and Sandfaced bricks have one finished stretcher and approximately 25% of each pack has a finished header end. Additional finished headers are available if required, and these should be specified at the order stage. Smooth faced bricks have one finished stretcher and are presented face side up in the pack. The non-faced stretcher is marked and care should be taken to lay smooth faced bricks the correct way around. Sandstock bricks, which are frogged, have finished faces on four sides.

Final brickwork appearance is a matter of agreement between the specifier or user and the supplier and may vary depending on the use to which the bricks are to be put. Sample panels are recommended to be built between 1 to 1.5 square metres in size. Viewing of these panels should be made from a distance of at least 3 metres. The brickwork should be examined as a whole rather than just viewing individual bricks. Some degree of damage may be inevitable on an individual brick, depending on the brick type and subsequent site handling, but generally speaking bricks are required to be reasonably free from deep or extensive cracks and damage to edges and corners. However, it is generally accepted that all facing bricks may have some form of chipping and the industry accepted standard is that no individual chip should be greater than 15mm. An added benefit of Marshalls bricks is that they are through coloured and hence any chips may be less apparent than an applied face brick.

MOVEMENT CONTROL

For general movement control measures should have been catered for by the designer and if not indicated on drawings it is advisable to raise it with the designers prior to work commencing. Marshalls' recommendations, derived from those given in BS5628-3 and PD 6697, together with the experience of the technical and performance characteristics of the product, are detailed as follows. This guidance is endorsed for Marshalls bricks by warranty schemes including NHBC, Local Authority Building Control (LABC) and Checkmate.

- Ensure that bricks are kept as dry as possible whilst storing and stacking out. Bricks should not be wetted before laying and incomplete brickwork should be protected from rain and snow.
- Ensure the correct grade of mortar is specified and used. An M4 Class mortar is generally most appropriate but be aware that stronger mixes which utilise a CEM I rather than a CEM II cement may not accommodate movement as well.
- In most cases movement joint centres of between 7.5 to 9 metres in two storey and above type dwellings should be adequate, but shorter distances may be needed for single storey buildings. The length/height ratios of brickwork panels should not exceed 3:1.
- Particular care should be taken with openings greater than 1.5 metres, especially if they are placed directly above each other, eg. the panel profile between a ground floor opening and a first floor window may be less than 3:1 but they are relatively slender and can be subject to stresses from larger areas of brickwork adjacent to the openings. In these cases lattice type bed joint reinforcement should be introduced above the ground floor opening and below the first floor window. Note, whilst bed joint reinforcement will assist in the prevention of potential cracking, it is not a complete alternative to the provision of movement joints which should be installed in the appropriate locations.
- For openings where there are only a few courses of bricks above or below the openings then crack inducers, in the form of raked joints which have been filled with mastic, should be considered at the ends of the openings.
- A large proportion of movement joints when using concrete bricks can be simple contraction joints, but south facing elevations, particularly those built with dark coloured bricks, may require full compressible joints to accommodate thermal movement.
- In elevations which consist of block and render and concrete bricks then any movement joints should follow through both materials.
- Movement joints at short returns can frequently be installed as butt joints incorporated into the corner, with the longer leg abutting the shorter return.
- Placing vertical movement joints in locations where lateral support from party walls or internal load bearing partitions exist will assist in the stability and resistance to wind loading.
- Avoid mixing dissimilar materials that have different levels and types of movement characteristics, eg. concrete (shrinkage) v. clay (expansion). Bricks made using limestone aggregates, such as those produced by Marshalls, will generally have lower moisture movement values than bricks made with gravel/ sand type aggregates.
- Shrinkage cracks tend to be mainly cosmetic and do not normally affect the integrity of a structure.
- *More detailed information regarding Movement can be found in Technical Bulletin BTB 5.*

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PREVENTION OF EFFLORESCENCE

The phenomenon of efflorescence or lime bloom in all concrete products is derived from the leaching of free calcium ions which are present in solution during the hydration of the cement matrix within the bricks. As the calcium ions migrate to the surface of the brick they crystallise on the surface and are exhibited as a milky white deposit. However, due to the above potential problems, Marshalls has developed systems which involve the incorporation of advanced additives both within and on the surface of the brick. The amount of efflorescence emanating from Marshalls bricks can thus be classed as minimal.

Although the bricks can be classed as having minimal efflorescence this can still occur if good site practice and laying procedures are not followed.

The most common causes are:

- Poor building practice, such as partially built walls being left exposed to rain.
- Poor storage of bricks on site, both once packs have been delivered and also once packs have been broken down and bricks have been stacked out ready for building. Marshalls bricks need to be kept dry.
- Poorly designed or missing copings and flashings.
- Failure to protect incomplete brickwork at the end of the working day. It must be remembered that mortar is rich in cement and whilst in its uncured state it is extremely susceptible to water leaching out the lime within it. (Further information is detailed in Technical Bulletin BTB 7 – Efflorescence and Colour Integrity).

PLASTERING AND RENDERING

Any areas of concrete common brickwork that are to be rendered or plastered should have raked joints to form a key for the specified finish. For optimum adhesion a plaster bonding coat or similar should be applied. A spatterdash coat may be necessary for good adhesion and if so this should be 1:2-3 parts cement:sand, applied before the undercoat. On concrete masonry the render coat should be 1:1:6 (this is referring to 3 elements not 2 as above) or equivalent, using clean sand. In all cases of two or three coat rendering the final coat should be a weaker mix than the undercoat or the same mix but thinner.

PAINTING

Smooth faced bricks are suitable for painting with emulsion or alkali resisting paint, especially plastic emulsions. Brickwork should be dry and free from dust, lime bloom, grease and other detritus. Oil based paints should be avoided.

CLEANING DOWN

Concrete masonry in the form of bricks, split walling and cast stone can be described as a "low maintenance" building material. However there are simple precautions that should be taken to ensure its long term attractiveness and ability to perform its required function. These involve:

- Ensuring the masonry remains weatherproof.
- Ensuring adequate design and detailing of protruding elements.
- Prevention of the possibility of mortar smears and efflorescence by good site practice.

Given the above is carried out, then the amount of cleaning down should be minimal. (Further information is detailed in Technical Bulletin BTB 8 – Cleaning, Maintenance and Repairs).

REPAIRS

One of the many advantages of Marshalls bricks is their through colour which enables any repairs on chips or damage to be carried out in a reasonably discrete manner.

WINTER WORKING

Marshalls bricks are supplied in shrink wrapped packs which should remain sealed until such time as they are required. Once opened packs should be kept protected, as should incomplete or fresh brickwork. Stacked out bricks on scaffolding should also be fully protected. Overnight, or whenever rain interrupts bricklaying, the top of newly laid walls should be protected. Bricklaying should cease when the temperature is below 3oC and falling or when frost is imminent. Brickwork and mortar dry out more slowly when cold and mortar takes more time to cure, hence it is important that adequate protection is given to the wall until the mortar has developed enough strength to resist frost attack.

WASTE DISPOSAL

Marshalls bricks are completely inert and may be crushed and recycled as aggregate or inert fill. All packaging, which may consist of polythene covers, plastic strapping and wooden pallets or skids, is recyclable. If burnt, however, they may release smoke and fumes, which if inhaled in sufficient quantities can be injurious to health.