

**BRICKWORK****1 GENERAL****1.1 INSPECTION****Notice**

Give sufficient notice so that inspection may be made of the following:

- Set out of brickwork to lintels, arches and other architectural features.
- Damp-proof courses, in position.
- Lintels, in position.

**2 PRODUCTS****2.1 MATERIALS****First Class Bricks**

First Class Bricks shall be made from good brick earth free from saline deposits, and shall be sand molded. They shall be thoroughly burnt by coal without being vitrified, of uniform and good color, shall be regular and uniform in size, shape and texture with sharp square edges and parallel faces. They must emit a clear metallic ringing sound when struck one against another. They shall be free from flaws, cracks, chips, stones, and nodules of lime or canker. A First Class Brick shall not absorb more than 1/6th of its weight of water after being soaked for one hour.

**Second Class Bricks**

Second Class Bricks shall be as well burnt as First Class or may be slightly over burnt but not vitrified, and must give a clear ringing sound when struck one against another. Slight irregularities in size, shape or color are acceptable provided irregular or uneven courses do not result. Second Class Bricks may have slight chips or flaws but must be free from lime or canker nodules. They shall not absorb more than 1/4th of their weight of water after being soaked for one hour.

**General**

Machine made pressed bricks shall be standard commercial products. The Engineer prior to use in the Works shall approve the use of machine made pressed bricks.

Bricks not meeting the above requirements shall not be used in brickwork.

First and Second Class Bricks should have the following dimensions after burning: 250mm x 120mm x 70mm. The unit weight of First and Second Class Bricks shall not be less than 1100 kg/m<sup>3</sup>.

The crushing strength of bricks shall be tested in a laboratory. The average crushing strength of First and Second Class Bricks shall not be less than 17MPa (N/mm<sup>2</sup>).

At the start of the works samples of the bricks shall be tested for crushing strength and water absorption, and brickwork shall only commence when the Engineer has approved the bricks. The Contractor may then only change the source of supply of bricks after samples from the new supplier have similarly been tested and approved.

**Mortar materials**

Cement shall conform to the requirements of ASTM specification C-150 Type 1 or similar approved standard for normal Portland cement.

- White cement: Iron salts content  $\leq$  1%.
- Off-white cement: Iron salts content  $\leq$  2.5%.

Lime: Confirm source of Lime with Engineer to ensure highest quality Lime is used in the mortar. Protect from damage on site and store minimum 300mm above ground in waterproof storage facility.

Sand: Fine aggregate with a low clay content selected for grading, sharp and free from efflorescing salts. River or pit sand should be sharp, angular, hard, clean uncoated particles free from clay and organic impurities.

Water: Water to be used for the mixing of mortar should be clean and free from oil, acid, alkali, salts, organic materials or other substances that are harmful to the mortar mix.

Measurement of volume: Measure binders and sand by volume using buckets or boxes. Do not allow sand to bulk by absorption of water.

### Mortar

Proportioning: Standard and ratio of mix for all mortar shall be M-400 (1:3), M-300 (1:4), M-250 (1:5) and M-200 (1:6). Provide minimum water.

## 2.2 COMPONENTS

### Nailing blocks

Solid timber, or hollow timber box filled with earthen mortar. Timber unseasoned or thoroughly pre-wetted.

### Steel components, including reinforcement

All steel components to be galvanised for maximum durability after incorporation into the structure.

### Window and Door lintels

Lintels: Use steel, concrete or timber lintels in accordance with the manufacturers' technical literature or conform to the **Steel angle and T-lintels table**.

#### Steel angle and T-lintels table

Maximum span (mm)	Wall height above ≤ 600 mm			Wall height above > 600 mm, ≤ 1800 mm		
	Angle lintel size	T-Lintel dimensions: H x W x T (mm)	Bearing min. (mm)	Angle lintel size	T-Lintel dimensions: H x W x T (mm)	Bearing min. (mm)
1000	Two 75 x 50 x 5 Unequal angles	81 x 150 x 6	100	Two 125 x 75 x 8 Unequal angles	136 x 150 x 6	200
2000	Two 100 x 75 x 6 Unequal angles	136 x 150 x 6	150	Two 150 x 90 x 8 Unequal angles	156 x 150 x 6	200
2400	Two 125 x 75 x 8 Unequal angles	156 x 150 x 6	150	Two 150 x 90 x 10 Unequal angles	160 x 150 x 10	250
2800	Two 150 x 90 x 8 Unequal angles	158 x 150 x 8	200	Two 150 x 100 x 10 Unequal angles	210 x 200 x 10	300
3000	Two 150 x 90 x 10 Unequal angles	160 x 150 x 10	200	Two 150 x 100 x 12 Unequal angles	210 x 200 x 10	300

### Timber lintels

Size: Width of the wall and in conformance with the **Timber lintels height table**.

Grade: Best quality of imported Russian timber or suitable approved local timber.

Bearing: 300 mm (minimum).

#### Timber lintels height table

Maximum span (mm)	Lintel height (mm)
1200	150
1800	150
2400	200
3000	250

### Timber fixing plates

Size: 200 x 50 mm (minimum).

### Holding-down bolts

Type: 10 mm diameter threaded rod.

Termination: Horizontal 5 x 100 x 200 mm steel plate, weld-fixed, or with nuts.

Depth of embedment:

- Length (minimum): 450 mm.

### 3 EXECUTION

#### 3.1 GENERAL

##### General

Construction of masonry brickwork shall not commence until the Engineer has accepted the footings on which it is to be placed.

Brickwork shall be built plumb, curved or battered as shown on the Drawings or as may be required, by skilled masons and properly supervised workmen. Bricks shall be clean and if necessary, they shall be scrubbed. Bricks shall be soaked in water for at least one hour before use.

Unless otherwise specified bricks shall be laid in English Bond, with frogs downward. All horizontal joints shall be parallel and level. Vertical joints in alternate courses shall come directly over one another. Joint thickness shall be 6mm and shall in no case exceed 8mm. The height of four courses including 4 bed joints shall rise 300mm. Set out brickwork with joints of uniform width and minimise cutting of masonry units.

Walls shall always be carried up regularly along their entire length unless otherwise directed by the Engineer.

##### Mortar mix

Mortar mixing shall be done in a mechanical mixer unless the Engineer specifically permits hand mixing. If hand-mixing is done, the operation shall be carried out on a clean watertight platform and cement & sand shall be first mixed dry in the required proportion to obtain a uniform color and then the mortar shall be mixed for at least two minutes after addition of water.

Cement Mortar shall be mixed in such quantities as can be used in the work within 30 minutes. Mortar, which has taken initial set, shall not be used, nor shall it be re-mixed with fresh mortar.

Preparing lime putty:

- Using hydrated lime: Add lime to water in a clean container and stir to a thick creamy consistency. Leave undisturbed for at least 16 hours. Remove excess water and protect from drying out.
- Using quicklime: Run to putty as soon as possible after receipt of quicklime. Partly fill clean container with water, add lime to half the height of the water, then stir and hoe ensuring that no lime remains exposed above the water. Continue stirring and hoeing for at least 5 minutes after all reaction has ceased, then sieve into a maturing bin. Leave undisturbed for at least 14 days. Protect from drying out.

Mortar proportions (cement:lime:sand):As defined on the drawings.

Sand stockpile: Ensure sand is dry and stored undercover to avoid errors in volume batching during the mixing process.

##### Protection from contamination

Protect masonry materials and components from ground moisture and contamination.

##### Building in

Embedded items: Build in fixing blocks, brackets, lintels and accessories as the construction proceeds.

Steel door frames: Fill the backs of jambs and heads solid with mortar as the work proceeds.

##### Joining to existing

If jointing to existing work is required, provide a straight joint. Do not tooth new masonry into existing work.

##### Chasing

Chasing of brickwork shall be to the **Brickwork chasing table** and subject to the following limitations:

- Parallel chases on opposite faces of a wall shall not be closer than 600 mm to each other.

##### Brickwork chasing table

Brick thickness (mm)	Depth of chase (maximum mm)
More than 250 thick	35
250 thick	25

Brick thickness (mm)	Depth of chase (maximum mm)
100 thick non load bearing walls only	20

**Joint finish**

Lay brickwork on a full bed of mortar. Fill perpends solid.

Finish:

- Externally: Tool to give a dense water-shedding finish for face brickwork or rake not more than 10mm to give a key for render finish.
- Internally: If wall is to be plastered, rake not more than 10 mm to give a key.

**Temporary support**

If the final stability of the brickwork or blockwork is dependent on structural elements to be constructed after the brickwork, provide proposals for temporary support or bracing for the approval of the Engineer.

**3.2 FACEWORK****Cleaning**

General: Clean progressively as the work proceeds to remove mortar smears, stains and discolouration.

**Colour mixing**

Evenly distribute the colour range of units and prevent colour concentrations and "banding" unless specifically identified as a feature of the brickwork.

**3.3 DAMP-PROOF COURSES****Damp-proof courses**

Material: Embossed Polythene sheeting. Install sheeting at base of all walls to stop moisture rising up wall structures.

**Location**

Provide damp-proof courses as follows:

- Walls built off slabs on ground: In the bottom course of the wall on top of the slab.
- Walls adjoining infill floor slabs: In the course above the slab. Project 40 mm and dress down over the membrane turned up against the wall.

**Installation**

Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding 2 courses per step. Sandwich damp-proof courses between mortar.

**3.4 CONTROL OF MOVEMENT****Joints**

Provide joints as follows:

- Expansion joints for brickwork:
  - . Maximum length of continuous wall face: 8 m.
  - . Closest joint location to external corner: 2.5m
  - . Maximum vertical spacing: 8 m.
  - . Width of control joint:  $\geq 10 \text{ mm} \leq 20 \text{ mm}$ .
  - . Width of horizontal joint:  $\geq 15 \text{ mm} \leq 20 \text{ mm}$ .

Filler material: Provide compatible sealant and bond breaking backing materials which are non-staining to masonry.

- Bond breaking materials: To be non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: To be closed-cell or impregnated, not water-absorbing.

Joint filling:

- Installation: Clean the joints thoroughly and insert an easily compressible backing material before sealing.

- Sealant depth: Fill the joints with a gun-applied flexible sealant for a depth of at least two-thirds the joint width.

Refer to the **Brickwork Construction Schedule**, BOQ and drawings for details of locations, types and extent of built in components.

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