

(I) BRICKWORK:

4.01.a Brick work using common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm^2 , in foundations and plinth, in any shape in CM 1:4 (1 cement : 4 fine sand), including curing, scaffolding, etc. complete, as directed.

1.0 **Materials :** Water shall conform to M-1. Cement to M-3. Sand to M-6. Brick to M-15. Cement mortar to M-11.

2.0 Workmanship :

2.1 **Proportion :** The proportion of the CM shall be 1:4 (1 cement : 4 fine sand), by volume.

2.2 **Soaking of bricks :** The bricks required for masonry shall be thoroughly wetted with clean water for about 4 hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water is an indication of thorough wetting of bricks.

2.3 Laying :

2.3.1 Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete the bond; closer and in such case it shall be cut to required size and used near the ends of walls.

2.3.2 A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with the handle of the trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of the course, the vertical joints shall be fully filled from the top, with mortar.

2.3.3 The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. Vertical joints in alternate courses shall generally be in one vertical plane. The thickness of brick course shall be kept uniform.

2.3.4 The bricks shall be laid with the frog facing upwards. A set of tools comprising of wooden straight edges, manson's spirit level, square half meter rub, pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

2.3.5 Both the faces of walls, having thickness greater than 23 cm. shall be kept in proper plumb. All the connected brick work shall be kept not more than 1 m. over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45° .

2.3.6 All the fixtures, pipe outlets of water, holdfasts of doors and windows, etc. which are required to be built in the wall shall be embedded in CM, as per the drawings or as directed.

2.4 Joints :

2.4.1 Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exceed 12 mm. The face joints shall be raked out as directed by taking tools daily, during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to be done, subsequently.

2.4.2 The face of bricks shall be cleaned everyday on which the brick work is laid and all mortar

dropping shall be removed.

2.4.3 At the end of day's work or on holidays the top of unfinished masonry shall be kept wet. If the mortar becomes dry, white or powdery, for want of curing, work shall be pulled down and re-built at Contractor's expense.

2.5 **Curing :** Fresh work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for minimum period of 7 days. The top of masonry work shall be kept well wetted at the end of the day's work.

2.6 **Preparation of foundation bed :** If the foundation is to be laid directly on the excavated bed, the bed shall be levelled, cleared off of all loose materials, cleaned and wetted before starting masonry work. If masonry is to be laid on concrete footing, the top of concrete shall be roughened, cleaned and moistened. The Contractor shall obtain approval of the Engineer-in-charge for the foundation bed, before foundation masonry is started. When pucca flooring is to be provided flush with the top of the plinth, the inside of the plinth wall shall be lowered down having an offset of the same thickness of the flooring with respect to the outside plinth wall top or as directed.

3.0 **Mode of Measurements and Payment :**

3.1 The measurement of this item shall taken for the brick masonry fully completed in foundation upto plinth. The limiting dimensions not exceeding those shown on the drawings or as directed shall be final. Battered, tapered and curved portions shall be measured net.

3.2 No deduction shall be made from the quantity of brick work, nor any extra payment shall be made for embedding in masonry or making holes in respect of following items :

- (1) End of joists beams, posts, girders, rafters, purlins, trusses, corbel, steps etc. where cross sectional area does not exceed 500 cm^2 .
- (2) Openings in walls, parapet and compound walls, not exceeding 1.0 m^2 area.
- (3) Wall plates and bed plates, bearing of slabs, chhajjas and the like whose thickness does not exceed 10 cm. and the bearing does not extend to the full thickness of wall.
- (4) Drainage holes, recesses for cement concrete blocks to embed hold fasts for doors, windows etc., forming toothings, grooves etc. and providing cramps for holding stone lining.
- (5) Iron fixtures, pipes upto 300 mm. dia.; holdfasts and doors and windows built into masonry and sanitary and water supply pipes, etc., for concealed electrical wiring and any other fixtures or inserts.
- (6) Forming chases of section not exceeding 350 cm^2 in masonry.

3.3 Apertures for fire places shall not be deducted nor shall extra labour required to make splaying of jambs, throating and making arches over the aperture be paid for separately. The rate shall include for work of any shape e.g. pillars of any size and shape, curved or tapered walls, drip courses, projections, parapets, load bearing walls, sills, ottas, steps, tank walls, platforms and counter walls, ducts, channels and mouldings like corbelling, pattas, etc.

3.4 The rate shall be for a unit of one m^3 .

4.01.b **Bricks works using common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm^2 , in foundation and plinth, in CM 1:5 (1 cement :5 find sand), including curing, scaffolding, etc. complete, as directed.**

1.0 **Materials :** Water shall conform to M-1. Cement mortar to M-11. Bricks to M-15.

2.0 Workmanship : The relevant specification of item no. 4.01.a shall be followed except that the bricks to be used shall be conventional bricks and proportion of CM shall be 1:5.

3.0 Mode of Measurements and Payment :

3.1 The relevant specification of item no. 4.01.a shall be followed.

3.2 The rate shall be for a unit of one m³.

F01 Providing and laying Brick Work in CM 1:5 (1 cement : 5 coarse sand) in foundation, plinth, superstructure and all works below & above plinth for all levels/ all heights/ all floors using common burnt clay conventional building bricks conforming to IS 1077-1992 having compressive strength not less than 50 Kg/ cm² in any width, any shape and all depth including curing, scaffolding, racking / flush jointing etc.all as per drawing, specifications.

1.0 Materials: Water shall conform to M-1. Cement mortar to M-11. Bricks to M-15.

2.0 Workmanship: The relevant specification of item no. 4.01.a shall be followed except that the bricks to be used shall be conventional bricks **confirming to IS 1077-1986** and proportion of CM shall be 1:5.

3.0 Mode of Measurements and Payment:

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3.1 The relevant specification of item no. 4.01.a shall be followed.

3.2 The rate shall be for a unit of one m³.

4.02.a Brick work using common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm² for super structure above plinth level upto floor two level, for height not exceeding 9 m., in CM 1:4 (1 cement : 4 fine sand), including curing, scaffolding, etc. complete, as directed.

1.0 Materials : Brick shall conform to M-15. Cement mortar to M-11.

2.0 Workmanship :

2.1 The relevant specifications of item no. 4.01.a shall be followed except that the masonry work shall be carried out above plinth level upto floor two level i.e. for height as specified in the special conditions.

2.2 The frames of doors, windows, cupboards, etc. shall be housed into the brick work at the correct location and level, as directed. The heavy steel doors, windows frames, etc. shall be built in with brick work, but for ordinary steel doors and windows, required opening for frames, hold-fasts, etc. shall be left in the wall and frames shall be embedded later on in order to avoid damage to the frames.

2.3 Necessary scaffolding shall be provided by the Contractor. The supports of the scaffolding shall be sound and strong, tied together with horizontal pieces over which the scaffolding planks shall be fixed. Normally simple scaffolding only shall be allowed. In this case horizontal pieces of the scaffolding shall rest in the holes, made in the header course only. Minimum number of holes

shall be left in brick work for supporting horizontal member of the scaffolding.

2.4 The Contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.

2.5 For the face of brick work, where plastering is to be done, joints shall be racked out to a depth not less than the thickness of the joints. The face of brick work shall be cleaned off of mortar dropping and other foreign matters at the end of day's work.

3.0 Mode of Measurements and Payment :

3.1 The masonry work above plinth level to floor two level shall be measured and paid under this item.

3.2 Brick work in parapet shall be measured in the corresponding masonry item of storey immediately below the floor above which the parapet is built.

3.3 No deduction shall be made from quantity of brick work, nor extra payment shall be made for embedding in masonry or making holes in respect of following items :

(1) Ends of joists, beams, posts, rafters, purlins trusses corbel, step etc. where cross sectional area does not exceed 500 cm^2 .

(2) Openings in walls, parapet and compound walls, not exceeding 1000 cm^2 area.

(3) Wall plate, sand bed plates, bearing of slab, chhajjas and like whose thickness does not exceed 10 cm. and the bearing does not extend the full thickness of wall.

(4) Drainage holes, recesses for cement concrete blocks to embed hold fasts for doors, windows, etc., forming toothings, grooves etc. and providing cramps for holding stone lining.

(5) Iron fixture, pipes upto 300 mm. dia hold fasts of doors, and windows built into masonry and sanitary and water supply pipes etc., for concealed electrical wiring and any other fixtures or inserts.

(6) Forming chases of section not exceeding 350 cm^2 in masonry.

(7) Apertures for fire places, shall not be deducted nor shall extra labour required to make spraying of Jambs, throating and making trenches over the aperture be paid for separately. The rate shall include for work of any shape e.g. pillars, curved or tapered walls, drip courses, projections, parapets, load walls, sills, ottas, steps, tank walls, platform and counter walls, ducts, channels and mouldings like corbelling, pattas, etc.

3.4 The rate shall be for an unit of one m^3 .

4.02.b Brick work using common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm^2 for super structure above plinth level upto floor two level, for height not exceeding 9 m., in CM 1:5 (1 cement : 5 fine sand), including curing, scaffolding, etc. complete, as directed.

1.0 Materials and Workmanship : The relevant specifications of item no. 4.02.a shall be followed except that the brick masonry work shall be carried out with conventional bricks using CM in proportion 1:5.

2.0 Mode of Measurements and Payment :

2.1 The relevant specifications of item no. 4.02.a shall be followed.

2.2 The rate shall be for an unit of one m^3 .

4.02.c **Brick work using common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm² for super structure above plinth level upto floor two level, for height not exceeding 9 m., in CM 1:6 (1 cement : 6 fine sand), including curing, scaffolding, etc. complete, as directed.**

1.0 **Materials and Workmanship :** The relevant specifications of item no. 4.02.a shall be followed except that brick masonry work shall be carried out with conventional bricks using CM in proportion 1:6.

2.0 **Mode of Measurements and Payment :**

2.1 The relevant specifications of item no. 4.02.a shall be followed.

2.2 The rate shall be for an unit of one m³.

4.03.a **Brick work using common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm² in superstructure above plinth upto first floor level, in CM 1:6, including curing, scaffolding, etc. complete, as directed.**

The relevant specifications of item no. 4.02.a shall be followed except that the proportion of CM shall be 1:6 and the masonry work shall be measured and paid for superstructure, above plinth level upto first floor level.

4.03.b - do - as per 4.03.a but over and above extra for brick work using common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm², in superstructure for each floor level above ground floor level, in CM 1:6, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.02.a shall be followed except the proportion of CM shall be 1:6 and the masonry work shall be measured and paid in superstructure, for each floor level above ground floor level. The rate shall be extra for each floor, (the rate of first floor will be the rate for ground floor plus the extra for each floor and so on).

A02 **Providing and laying Half brick masonry in common burnt clay building bricks conforming to IS 1077-1992 and having crushing strength not less than 50 kg/cm² in cement mortar 1:4 (1 cement : 4 coarse sand) in any width, any shape and all depth including curing, scaffolding, racking / flush jointing etc. as per drawing, & specifications. The soild Brick columns / RCC stiffners will be measured and paid under respective item of this tender.**

1.0 **Materials :** Bricks shall conform to M-15. Water to M-1. Cement to M-3. Sand to M-6. Cement mortar to M11.

2.0 **Workmanship :**

2.1 Relevant specifications of bricks, wetting and laying of brick, joints, curing, etc. shall conform to item no. 4.01.a except that the brick work of half bricks, 90 mm. thick shall be carried out, in foundation and plinth.

2.2 Cement mortar used in masonry work shall be in proportion of 1 part of cement and 4 parts of sand, by volume.

2.3 All bricks shall be laid stretcher wise, breaking joints with those in the upper and lower courses. The wall shall be taken truly plumb. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. The bricks shall be laid with frogs upwards. A set of mason's tools shall be maintained on work site as required for frequent checking.

3.0 Mode of Measurements and Payment :

3.1 The half brick masonry work shall be measured under this item, the limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over the specified dimensions shall not be measured and paid for.

3.2 The relevant specifications of item no. 4.01.a shall be followed. The length shall be measured nearest to one cm.

3.3 The rate shall be for an unit of m².

4.04.a.2 Half brick, 3" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm², in CM 1:3 (1 cement : 3 coarse sand), in foundation and plinth, including providing 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in the mortar, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.04.a.1 shall be followed except that conventional brick masonry of half brick (3") thickness shall be done, measured and paid for.

4.04.b.1 Half brick, 4¹/₂" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm², for super structure above plinth upto floor two level, for height not exceeding 9 m., in CM 1:3 (1 cement : 3 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.04.a.1 shall be followed but the work shall be for super structure above plinth upto floor two level for height not exceeding 9 m.

4.04.b.2 Half brick, 3" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm², for super structure above plinth upto floor two level, in CM 1:3 (1 cement : 3 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.04.a.2 shall be followed but the work shall be for super structure above plinth upto floor two level.

4.04.c.1 Half brick, 4¹/₂" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm², for super structure above plinth upto first floor level, in CM 1:3 (1 cement : 3 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.04.a.1 shall be followed but the work shall be for super structure above plinth upto first floor level.

4.04.c.2 Half brick, 3" thick masonry in common burnt clay conventional building bricks, having

crushing strength not less than 50 Kg/cm²., for super structure above plinth upto first floor level, in CM 1:3 (1 cement : 3 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.04.a.2 shall be followed but the work shall be for super structure above plinth upto first floor level.

4.04.d.1 Extra for Half brick masonry, 4-1/2" thick, in CM 1:3, in super structure for each floor level above ground floor level, using conventional bricks.

1.0 Materials and Workmanship : The relevant specifications of item no. 4.04.a.1 shall be followed except that this work is for additional lift for each floor level above ground floor level. Brick masonry work shall be carried out with conventional bricks, 4-1/2" thick.

2.0 Mode of Measurements and Payment :

2.1 The relevant specifications of item no. 4.01.a shall be followed.

2.2 The extra payment shall be made for additional lift above ground floor level to each additional floor over and above the rate of masonry work. The rate of first floor will be the rate for ground floor plus the extra for each floor and so on.

2.3 The rate shall be for an unit of one m².

4.04.d.2 Extra for Half brick masonry, 3" thick, in CM 1:3, in super structure for each floor level above ground floor level, using conventional bricks.

1.0 Materials and Workmanship : The relevant specifications of item no. 4.04.a.2 shall be followed except that this work is for additional lift above ground floor level for each floor level. Brick masonry work shall be carried out with conventional bricks, 3" thick.

2.0 Mode of Measurements and Payment :

2.1 The relevant specifications of item no. 4.01.a shall be followed.

2.2 The extra payment shall be made for additional lift above ground floor level to each additional floor over and above the rate of masonry work. The rate of first floor will be the rate for ground floor plus the extra for each floor and so on.

2.3 The rate shall be for an unit of one m².

4.04.e.1 Half brick, 4-1/2" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., for all floors, at any height and level, in any position, in CM 1:3 (1 cement : 3 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.04.a.1 shall be followed but the work shall be for all floors, at any height and level, in any position.

4.04.e.2 Half brick, 3" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., for all floors, at any height and level, in any

position, in CM 1:3 (1 cement : 3 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 course embedded in CM including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.04.a.2 shall be followed but the work shall be for all floors, at any height and level, in any position.

- 4.05.a.1** Half brick, 4¹/₂" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., in CM 1:4 (1 cement : 4 coarse sand), in foundation and plinth, including providing 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in the mortar, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.04.a.1 shall be followed except that the work shall be done in CM 1:4 in foundations and plinth.

- 4.05.a.2** Half brick, 3" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., in CM 1:4 (1 cement : 4 coarse sand), in foundation and plinth, including providing 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in the mortar, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.05.a.1 shall be followed except that conventional brick masonry of half brick (3") thickness shall be done, measured and paid for.

- 4.05.b.1** Half brick, 4¹/₂" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., for super structure above plinth upto floor two level, for height not exceeding 9 m., in CM 1:4 (1 cement : 4 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.05.a.1 shall be followed but the work shall be for super structure above plinth upto floor two levels for height not exceeding 9 m.

- 4.05.b.2** Half brick, 3" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., for super structure above plinth upto floor two level, in CM 1:4 (1 cement : 4 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.05.a.2 shall be followed but the work shall be for super structure above plinth upto floor two level.

- 4.05.c.1** Half brick, 4¹/₂" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., for super structure above plinth upto first floor level, in CM 1:4 (1 cement : 4 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.05.a.1 shall be followed but the work shall be for super structure above plinth upto first floor level.

- 4.05.c.2** Half brick, 3" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., for super structure above plinth upto first floor level, in CM 1:4 (1 cement : 4 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after

every 3 course embedded in CM including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.05.a.2 shall be followed but the work shall be for super structure above plinth upto first floor level.

4.05.d.1 Extra for Half brick masonry, 4-1/2" thick, in CM 1:4, in super structure for each floor level above ground floor level, using conventional bricks.

1.0 Materials and Workmanship : The relevant specifications of item no. 4.05.a.1 shall be followed except that this work is for additional lift for each floor level above ground floor level. Brick masonry work shall be carried out with conventional bricks, 4-1/2" thick.

2.0 Mode of Measurements and Payment :

2.1 The relevant specifications of item no. 4.01.a shall be followed.

2.2 The extra payment shall be made for additional lift above ground floor level to each additional floor over and above the rate of masonry work. The rate of first floor will be the rate for ground floor plus the extra for each floor and so on.

2.3 The rate shall be for an unit of one m².

4.05.d.2 Extra for Half brick masonry, 3" thick, in CM 1:4, in super structure for each floor level above ground floor level, using conventional bricks.

1.0 Materials and Workmanship : The relevant specifications of item no. 4.05.a.2 shall be followed except that this work is for additional lift above ground floor level for each floor level. Brick masonry work shall be carried out with conventional bricks, 3" thick.

2.0 Mode of Measurements and Payment :

2.1 The relevant specifications of item no. 4.01.a shall be followed.

2.2 The extra payment shall be made for additional lift above ground floor level to each additional floor over and above the rate of masonry work. The rate of first floor will be the rate for ground floor plus the extra for each floor and so on.

2.3 The rate shall be for an unit of one m².

4.05.e.1 Providing and laying Half brick, 4-1/2" thick masonry using common burnt clay conventional building bricks confirming to IS 1077-1986, having crushing strength not less than 50 Kg/cm², for all floors / all heights / all levels, in any shape, in any position, in CM 1:4 (1 cement : 4 coarse sand) including curing, scaffolding, etc. complete, as directed including racking out the joints etc. (without reinforcement). RCC M20 grade vertical mullions at 4.5 mt. distance & horizontal stiffeners at every approximately 900 mm with shuttering & reinforcement shall be provided as per drawing at or direction of engineer in charge . The stiffeners shall be measured & paid in relevant tender item .

The relevant specifications of item no. 4.05.a.1 shall be followed but the work shall be for all floors, at any height and level, in any position.

4.05.e.2 Half brick, 3" thick masonry in common burnt clay conventional building bricks, having

crushing strength not less than 50 Kg/cm²., for all floors, at any height and level, in any position, in CM 1:4 (1 cement : 4 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.05.a.2 shall be followed but the work shall be for all floors, at any height and level, in any position.

- 4.06.a.1 Half brick, 4½" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., in CM 1:5 (1 cement : 5 coarse sand), in foundation and plinth, including providing 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in the mortar, including curing, scaffolding, etc. complete, as directed.**

The relevant specifications of item no. 4.04.a.1 shall be followed except that the work shall be done in CM 1:5 in foundations and plinth.

- 4.06.a.2 Half brick, 3" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., in CM 1:5 (1 cement : 5 coarse sand), in foundation and plinth, including providing 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in the mortar, including curing, scaffolding, etc. complete, as directed.**

The relevant specifications of item no. 4.06.a.1 shall be followed except that conventional brick masonry of half brick (3") thickness shall be done, measured and paid for.

- 4.06.b.1 Half brick, 4½" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., for super structure above plinth upto floor two level, for height not exceeding 9 m., in CM 1:5 (1 cement : 5 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.**

The relevant specifications of item no. 4.06.a.1 shall be followed but the work shall be for super structure above plinth upto floor two level for height not exceeding 9 m.

- 4.06.b.2 Half brick, 3" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., for super structure above plinth upto floor two level, in CM 1:5 (1 cement : 5 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.**

The relevant specifications of item no. 4.06.a.2 shall be followed but the work shall be for super structure above plinth upto floor two level.

- 4.06.c.1 Half brick, 4½" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., for super structure above plinth upto first floor level, in CM 1:5 (1 cement : 5 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.**

The relevant specifications of item no. 4.06.a.1 shall be followed but the work shall be for super structure above plinth upto first floor level.

- 4.06.c.2 Half brick, 3" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm²., for super structure above plinth upto first floor**

level, in CM 1:5 (1 cement : 5 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.06.a.2 shall be followed but the work shall be for super structure above plinth upto first floor level.

4.06.d.1 Extra for Half brick masonry, 4½" thick, in CM 1:5, in super structure for each floor level above ground floor level, using conventional bricks.

1.0 Materials and Workmanship : The relevant specifications of item no. 4.06.a.1 shall be followed except that this work is for additional lift for each floor level above ground floor level. Brick masonry work shall be carried out with conventional bricks, 4½" thick.

2.0 Mode of Measurements and Payment :

2.1 The relevant specifications of item no. 4.01.a shall be followed.

2.2 The extra payment shall be made for additional lift above ground floor level to each additional floor over and above the rate of masonry work. The rate of first floor will be the rate for ground floor plus the extra for each floor and so on.

2.3 The rate shall be for an unit of one m².

4.06.d.2 Extra for Half brick masonry, 3" thick, in CM 1:5, in super structure for each floor level above ground floor level, using conventional bricks.

1.0 Materials and Workmanship : The relevant specifications of item no. 4.06.a.2 shall be followed except that this work is for additional lift above ground floor level for each floor level. Brick masonry work shall be carried out with conventional bricks, 3" thick.

2.0 Mode of Measurements and Payment :

2.1 The relevant specifications of item no. 4.01.a shall be followed.

2.2 The extra payment shall be made for additional lift above ground floor level to each additional floor over and above the rate of masonry work. The rate of first floor will be the rate for ground floor plus the extra for each floor and so on.

2.3 The rate shall be for an unit of one m².

4.06.e.1 Half brick, 4½" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm², for all floors, at any height and level, in any position, in CM 1:5 (1 cement : 5 coarse sand), with 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.06.a.1 shall be followed but the work shall be for all floors, at any height and level, in any position.

4.06.e.2 Half brick, 3" thick masonry in common burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm², for all floors, at any height and level, in any position, in CM 1:5 (1 cement : 5 coarse sand), with 2 nos. of 6 mm. dia. MS round bars

after every 3 courses, embedded in CM, including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.06.a.2 shall be followed but the work shall be for all floors, at any height and level, in any position.

4.07 Half bricks thick Honey comb brick work with burnt clay conventional building bricks, having crushing strength not less than 50 Kg/cm², in CM 1:4 (1 cement : 4 coarse sand), including curing, scaffolding, etc. complete, as directed, at all floors.

1.0 Materials : Bricks shall conform to M-15. Cement mortar to M-11.

2.0 Workmanship : The relevant specifications of item no. 4.04.a.1 shall be followed except that the honey comb masonry work shall be carried out in thickness of half bricks in CM 1:4 (1 cement : 4 coarse sand) as and where directed, with all lifts, in any position.

3.0 Mode of Measurements and Payment :

3.1 The honey-comb masonry work shall be measured in m². The full area of honey-comb work shall be measured without deduction for openings.

3.2 The rate shall be for all floors, at any height and level.

3.3 The rate shall be for an unit of one m² of wall surface.

4.08.a Providing brickwork for cavity walls, in CM 1:3 (1 part cement : 3 part sand), including providing galvanized iron, mild steel or wrought iron wall ties, scaffolding, curing, etc. complete, as directed, for all floors.

1.0 Materials : Bricks shall conform to M-15. Water to M-1. Cement to M-3. Sand to M-6. Cement mortar to M-11.

2.0 Workmanship :

2.1 Relevant specifications of bricks, wetting and laying of bricks, joints, curing, etc. shall conform to item no. 4.01.a except that the brick work shall be carried out for cavity walls constructed using bricks or blocks so arranged to provide an air space within the wall.

2.2 Usually, cavity wall is constructed of 2 leaves, 4 1/2" thick, with a cavity in between. The bricks are laid on edge as stretchers and headers in each course, breaking joints. Each leaf of the cavity wall shall not be less than 75 mm. thick. If the 2 leaves are of different thickness, the thicker leaf shall be made on the inside. These walls shall not be built more than 7.5 m high and 9 m long. Where longer lengths and heights are desired, the walls are divided into panels.

2.3 The 2 leaves of the cavity wall are tied together at specified intervals, by galvanised iron, mild steel or wrought iron wall ties made of flats of 10 mm. x 5 mm., cranked or twisted at their mid-point with the ends split or fish tailed. 5 mm. dia. wires spaced not more than 4 brick lengths apart horizontally and 5 brick heights vertically and staggered may also be used as wall ties. There shall be atleast 5 ties per m². Additional ties shall be used near openings. The ties are sloped towards the exterior side so that water does not flow along the tie from the outer leaf to the inner leaf. The ties shall be given a coating of Bitumen before insertion to protect it against corrosion. The ties are built into the horizontal bed joints during erection.

2.4 The cavities are not kept continuous. The width of the cavity shall not be less than 50 mm. and not more than 80 mm. with a maximum of 150 mm.

2.5 Cement mortar used in masonry work shall be in proportion of 1 part of cement and 3 parts of sand, by volume.

3.0 Mode of Measurements and Payment :

3.1 The relevant specifications of item no. 4.01.a shall be followed.

3.2 The work of cavity brick wall shall be measured under this item. Measurements shall be taken separately for 2 walls under the relevant items of work depending on the thickness. Cavity shall not be measured. Binders or ties shall be measured per number and included in the rate unless specified otherwise.

3.3 The rate shall be for an unit of one m³, only extra for laying cavity walls with ties.

4.08.b Providing brickwork for cavity walls, using half brick thickness, in CM 1:3 (1 part cement : 3 part sand), including providing galvanised iron, mild steel or wrought iron wall ties, scaffolding, curing, etc. complete, as directed, for all floors.

The relevant specification of item no. 4.08.a shall be followed except that the leaf thickness of the cavity walls shall be 3" or 4 1/2".

4.09.a Brick work using common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², in foundations and plinth, in CM 1:4 (1 cement : 4 fine sand) including curing, scaffolding, etc. complete, as directed.

1.0 Materials : Cement mortar of proportion 1:4 shall conform to M-11. Modular bricks to M-15.

2.0 Workmanship : The relevant specification of item no.4.01.a shall be followed except that the masonry work shall be carried out by using modular bricks instead of conventional bricks.

3.0 Mode of Measurements and Payment :

3.1 The relevant specification of item no. 4.01.a shall be followed.

3.2 The rate shall be for an unit of a one m³.

4.09.b Brick works using common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², in foundation and plinth, in CM 1:5 (1 cement : 5 fine sand), including curing, scaffolding, etc. complete, as directed.

1.0 Materials : Water shall conform to M-1. Cement mortar to M-11. Bricks to M-15.

2.0 Workmanship : The relevant specification of item no. 4.09.a shall be followed except that the proportion of CM shall be 1:5.

3.0 Mode of Measurements and Payment :

3.1 The relevant specification of item no. 4.01.a shall be followed.

- 3.2 The rate shall be for an unit of one m³.
- 4.09.c Bricks works using common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², in foundation and plinth, in CM 1:6 (1 cement :6 fine sand), including curing, scaffolding, etc. complete, as directed.**
- 1.0 Materials :** Water shall conform to M-1. Cement mortar to M-11. Bricks to M-15.
- 2.0 Workmanship :** The relevant specification of item no. 4.09.a shall be followed except that the proportion of CM shall be 1:6.
- 3.0 Mode of Measurements and Payment :**
- 3.1 The relevant specification of item no. 4.01.a shall be followed.
- 3.2 The rate shall be for an unit of one m³.
- 4.10.a Brick work using common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², for super structure above plinth level upto floor two level, for height not exceeding 9 m., in CM 1:4 (1 cement : 4 fine sand), including curing, scaffolding, etc. complete, as directed.**
- 1.0 Materials and Workmanship :** The relevant specifications of item no. 4.02.a shall be followed except that brick masonry work shall be carried out with modular bricks.
- 2.0 Mode of Measurements and Payment :**
- 2.1 The relevant specifications of item no. 4.02.a shall be followed.
- 2.2 The rate shall be for an unit of one m³.
- 4.10.b Brick work using common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², for super structure above plinth level upto floor two level, for height not exceeding 9 m., in CM 1:5 (1 cement : 5 fine sand) including curing, scaffolding, etc. complete, as directed.**
- 1.0 Materials and Workmanship :** The relevant specifications of item no. 4.10.a shall be followed except that brick masonry work shall be carried out using CM in proportion 1:5.
- 2.0 Mode of Measurements and Payment :**
- 2.1 The relevant specifications of item no. 4.10.a shall be followed.
- 2.2 The rate shall be for an unit of one m³.
- 4.10.c Brick work using common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², for super structure above plinth level upto floor two level, for height not exceeding 9 m., in CM 1:6 (1 cement : 6 fine sand), including curing, scaffolding, etc. complete, as directed.**

- 1.0 Materials and Workmanship :** The relevant specifications of item no. 4.10.a shall be followed except that brick masonry work shall be carried out using CM in proportion 1:6.
- 2.0 Mode of Measurements and Payment :**
- 2.1 The relevant specifications of item no. 4.10.a shall be followed.
- 2.2 The rate shall be for an unit of one m³.
- 4.11.a Half brick, 90 mm. thick, masonry in common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², in CM 1:3 (1 cement : 3 coarse sand), in foundation and plinth, including providing 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in the mortar, including curing, scaffolding, etc. complete, as directed.**
- The relevant specifications of item no. 4.04.a.1 shall be followed except that modular brick masonry of half brick 90 mm. thickness shall be done, measured and paid for.
- 4.11.b Half brick, 90 mm. thick, masonry in common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², in CM 1:3 (1 cement : 3 coarse sand) for super structure above plinth upto floor two level, for height not exceeding 9 m., including providing 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in the mortar, including curing, scaffolding, etc. complete, as directed.**
- The relevant specifications of item no. 4.11.a shall be followed but the work shall be for super structure above plinth upto floor two level for height not exceeding 9 m.
- 4.11.c Half brick, 90 mm. thick, masonry in common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², in CM 1:3 (1 cement : 3 coarse sand), for all floors, at any height and level, in any position, including providing 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in the mortar, including curing, scaffolding, etc. complete, as directed.**
- The relevant specifications of item no. 4.11.a shall be followed but the work shall be for all floors, at any height and level, in any position.
- 4.12.a Half brick, 90 mm. thick, masonry in common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², in CM 1:4 (1 cement : 4 coarse sand), in foundation and plinth, including providing 2 nos. of 6 mm. dia. MS round bars after every 3 courses, embedded in the mortar, including curing, scaffolding, etc. complete, as directed.**
- The relevant specifications of item no. 4.11.a shall be followed except that the proportion of CM shall be 1:4.
- 4.12.b Half brick masonry in common burnt clay modular building bricks, having crushing strength not less than 50 Kg/cm², in CM 1:4 (1 cement : 4 coarse sand), for superstructure above plinth level upto floor two level, for height not exceeding 9 m., including curing, scaffolding, etc. complete, as directed.**
- The relevant specifications of item no. 4.12.a shall be followed for brickwork in CM 1:4 and the work shall be for super structure above plinth upto floor two level for height not exceeding 9 m.
- 4.12.c Half brick masonry in common burnt clay modular building bricks, having crushing**

strength not less than 50 Kg/cm², in CM 1:5 (1 cement : 5 coarse sand), for all floors at any height including curing, scaffolding, etc. complete, as directed.

The relevant specifications of item no. 4.11.c shall be followed except that the proportion of CM shall be 1:5.

4.13.a Precast concrete block masonry (including quoin block, jamb block, closer etc.) with solid concrete blocks of approved size, made of C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm. and down gauge), in CM 1:6, for all floors, etc. complete, as directed.

1.0 Materials :

1.1 Aggregate shall conform to M-12. Sand to M-6. Cement to M-3.

1.2 The solid cement concrete block shall be precast with concrete of 1:2:4 mix (1 cement : 2 graded sand : 4 graded stone aggregate).

1.3 A block shall be deemed to be solid if the solid material is not less than 75% of the total volume of the block calculated from over all dimensions.

1.4 The actual size of the blocks shall be one of the following.

1.4.1 Size-A : 39 x 30 x 19 cm., Size-B : 39 x 20 x 19 cm., Size-C : 39 x 10 x 19 cm.

1.4.2 The size other than those specified above may be used with the approval of the Engineer-in-charge.

1.5 The blocks may be either machine made or hand made. The concrete mix, the mixing of concrete, the manufacturing of blocks, curing and drying shall be accordance with para-6 to 10 of IS : 2185-1967.

1.6 Faces of blocks shall be flat and rectangular. Surface finish shall be rendered smooth or plastered with CM 1:3 (1 cement : 3 coarse sand), as directed.

1.7 The average compressive strength of 8 blocks, when determined in the manner described in IS : 2185-1967, shall not be less than 50 Kg/cm². of gross area. The lowest strength of an individual block shall not be less than 75% of average compressive strength of the 8 blocks.

1.8 Concrete blocks shall be stored and stacked properly in such a way to avoid any contact with moisture at site. They shall be stock plied on planks or other supports free from contact with ground and covered to protect against wetting.

1.9 Cement mortar of proportion 1:6 shall conform to M-11.

2.0 Workmanship :

2.1 The blocks need not be wetted before or during laying in the walls. In case climatic conditions so required, the top and the sides of block may only be slightly moistened so as to prevent absorption of water from the mortar and ensure the development of required bond with mortar.

2.2 Joints :

- 2.2.1 Operations of laying precast cement concrete block masonry shall be carried out in accordance with instructions detailed in IS : 6042-1962. The mortar shall not be spread so much ahead of the actual laying of the units that it tends to stiffen and lose its plasticity; thereby resulting in poor bond. For most of the work; mortar shall be spread over the entire top surface of the block so that the horizontal joint shall be 10 mm. thick except in the case of extended joint construction. The mortar joints shall be struck off flush with wall surface and when the mortar has started stiffening, it shall be compressed with rounded or U-shaped tool. The mortar shall be pressed against the units with a jointing tool after the mortar has stiffened in effect intimate contact between the mortar and the masonry unit and obtained a weather tight joint. Normally full mortar bedding shall be adopted as it shall enable full utilisation of the load carrying capacity, however, where walls shall carry lighter loads, the mortar shall be spread only over the front and rear shells and not on the webs. This shall arrest the seepage of water through the joints.
- 2.2.2 For vertical joints, the mortar shall be applied on the vertical edges of the front and rear shells of the blocks. It shall be more convenient to apply mortar on the edges of the succeeding units and then placing it horizontally well-pressed against the previously laid unit. It may be necessary to add mortar, particularly to the vertical joints, to ensure that they are well-filled.
- 2.3 **Laying :**
- 2.3.1 The first course shall be laid with great care, making sure that it is properly aligned, levelled and plumbed. The blocks for this course shall be first laid without mortar, over the footing, along the string lightly stretched, to determine the correct position and also adjust their spacing. When the blocks are set in proper position, the 2 corner blocks are removed, a full mortar bed is spread for them on the footing and are then laid back again in place, truly level and plumb. The string is then stretched tightly along the faces of the two corner blocks. Thereafter, each block shall be removed and re-laid over a bed of mortar, with their faces to coincide with the string line. After every 3 or 4 blocks have been laid, their correct alignment, level and verticality shall be checked.
- 2.3.2 **Quoins and Closer :** Special quoins blocks (with a return face equal to half the length of normal face) shall be cast for all building blocks and slabs and for external work. Proper half length closer shall be cast and not cut from full size blocks. The returned ends of blocks for door and windows reveals and quoins shall be finished with a fair face in the mould.
- 2.3.3 Construction of the wall may be started either at the corners first or from one end proceeding on the other direction. If the corners shall be built first, they shall be built four or five courses higher than the center of the wall. Each block shall be checked with a level or straight edge to ascertain that the blocks are in one plane. Each course, shall be stepped back by half-block and the horizontal spacing of the block shall be checked by placing a mason's level diagonally across the corners of the block.
- 2.4 Only double scaffolding shall be used. The scaffolding shall be strong and sound. No holes in the masonry for supporting shall be allowed.
- 2.5 **Curing :** The curing of concrete block masonry shall be carried out atleast for 7 days.
- 3.0 **Mode of Measurements and Payment :**
- 3.1 The relevant specifications of item no. 4.01.a shall be followed.
- 3.2 The work of concrete block masonry for all floors, at any height and level shall be measured under this item.

- 3.3 The rate shall be for an unit of one m³.
- 4.13.b Precast concrete block masonry in partition walls, 10 cm. thick, with solid block of approved size (including quoins, blocks, jamb blocks, closer etc.), made of C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. and down gauge), in CM 1:4, for all floors, etc. complete, as directed.**
- 1.0 Materials :** The relevant specifications of item no. 4.13.a shall be followed except that the precast concrete blocks shall be of suitable size for 10 cm. thick partition wall, i.e. size 'C' and the proportions of CM shall be 1:4 (1 cement : 4 coarse sand).
- 2.0 Workmanship :** The relevant specifications of item no.4.13.a shall be followed except that the precast concrete blocks shall be of suitable size for 10 cm. thick partition wall, i.e. size 'C' and the proportions of CM shall be 1:4 (1 Cement coarse sand).
- 3.0 Mode of Measurements and Payment :**
- 3.1 The relevant specifications of item no. 4.04.a.1 shall be followed.
- 3.2 The rate shall be for an unit of one m².
- 4.14.a Precast concrete block masonry (including quoin block, jamb block, closer etc.) with hollow concrete blocks of approved size, made of C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm. and down gauge), in CM 1:6, for all floors, etc. complete, as directed.**
- 1.0 Materials :**
- 1.1 Aggregate shall conform to M-12. Sand to M-6. Cement to M-3. Precast hollow concrete block to M-73.
- 1.2 The actual size of the blocks shall be one of the following.
- 1.2.1 Size-A : 39 x 30 x 19 cm., Size-B : 39 x 20 x 19 cm., Size-C : 39 x 10 x 19 cm.
- 1.2.2 The size other than those specified above may be used with the approval of Engineer-in-charge.
- 1.3 The blocks may be either machine made or hand made. The concrete mix, the mixing of concrete, the manufacture of blocks, curing and drying shall be accordance with para-6 to 10 of IS : 2185-1967.
- 1.4 Faces of blocks shall be flat and rectangular. Surface finish shall be rendered smooth or plastered with CM 1:3 (1 cement : 3 coarse sand) as directed.
- 1.5 The average compressive strength of eight blocks when determined in the manner described in IS : 2185-1967 shall not be less than 50 Kg/cm². of gross area. The lowest strength of an individual block shall not be less than 75% of average compressive strength of eight blocks.
- 1.6 Cement mortar of proportion 1:6 shall conform to M-11.
- 2.0 Workmanship :** The relevant specifications of item no. 4.13.a shall be followed and in addition to that the following shall be followed :

For provision of Door and window frames :

- a) A course of solid block masonry shall be provided under the door and window openings or a 10 cm. thick precast concrete sill-block under the windows. This solid course shall extend for at least 20 cm. beyond the opening, on either side.
- b) For jambs of very large doors and windows, either solid block shall be provided or the hollow blocks used shall be filled with concrete mix of 1:3:6.
- c) Mild steel holdfasts shall be so fixed that they coincide with the block course level. Their ends shall be embedded in the hollow, which has to be filled with concrete mix 1:3:6.

3.0 Mode of Measurements and Payment :

- 3.1 The relevant specifications of item no. 4.01.a shall be followed.
- 3.2 The work of hollow concrete block masonry shall be measured under this item.
- 3.3 The rate shall be for an unit of one m³.

4.14.b Precast concrete block masonry in partition walls, 10 cm. thick, with hollow block of approved size (including quoins, blocks, jamb blocks, closer etc.), made of C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. and down gauge), in CM 1:4, for all floors.

1.0 Materials : The relevant specifications of item no. 4.14.a shall be followed except that the precast concrete blocks shall be of suitable size for 10 cm. thick partition wall, i.e. size 'C' and the proportions of CM shall be 1:4 (1 cement : 4 coarse sand).

2.0 Workmanship : The relevant specifications of item no.4.14.a shall be followed except that the precast concrete blocks shall be of suitable size for 10 cm. thick partition wall, i.e. size 'C' and the proportions of CM shall be 1:4 (1 Cement coarse sand).

3.0 Mode of Measurements and Payment :

- 3.1 The relevant specifications of item no. 4.04.a.1 shall be followed.
- 3.2 The rate shall be for an unit of one m².

4.15 Providing Cavity wall using hollow blocks, in CM 1:3 (1 part cement : 3 part sand), including providing galvanised iron, mild steel or wrought iron wall ties, scaffolding, curing, etc. complete, as directed, for all floors.

The relevant specification of item no. 4.08.a shall be followed except that hollow concrete blocks laid as ordinary brickwork shall be used. The proportion of CM shall be 1:3. The relevant specifications of item no. 4.13.a shall be followed for block masonry construction.

4.16 Providing and fixing 190mm x 190 mm glass bricks (Chinese / Sri-lankan with white CM 1:2 over the markings @ 20 cm C/C. Two numbers of 5 mm thick GI wires dowels to be anchors in each joint horizontal as well as vertical by drilling holes and filling the same with Hilti or equivalent chemical. The PVC concealed spacer (with provision for passing the 2 no. GI wires in horizontal and vertical direction) shall be provided to maintain grooves/spaces for GI wire and cement mortar at the junction of two glass bricks. The sample of the glass brick shall be got approved by Engineer-in-charge. The glass bricks shall be fixed with placing GI wires vertically as well as horizontally after passing through

the spacer and having minimum lap length of + 200 mm in staggered pattern as per the site conditions at all the places, heights and shapes, etc. complete, as per the details and drawing to the satisfaction of Engineer-in-charge. Joints along the periphery of glass bricks to be filled with white weather sealant.

1.0 Materials : Glass brick shall be of good quality, manufactured by "KIG brand – Chinese / Srilankan" or equivalent as approved and specified in the item. The size of the block shall be 190x190x80mm or otherwise specified in the drawing. Concealed PVC spacer and 5mm GI wire shall be provided. **Sample shall be approved by the Architect or Engineer-incharge.**

2.0 Workmanship :

2.1 The glass brick shall be fixed with best workmanship as and where directed, at all heights with necessary scaffolding. The glass brick shall be fixed with white CM 1:2, as directed. Relevant specification of item no.4.01.a shall be followed.

2.2 Additionally, as the glass bricks cannot be broken, the opening etc. shall be so designed that full size bricks can be used at all places.

2.3 The vertical joints in this type of work shall be truly vertical and the horizontal shall be truly horizontal, so that the pattern within the brick also gives a true to line and level appearance.

3.0 Mode of Measurements and Payment :

3.1 The relevant specification of item no. 4.01.a shall be followed.

3.2 The rate shall be for an unit of one m² for a visible area of work done. No wastage shall be permitted and measured.

4.17.a Providing and fixing in expansion joints, (Sil flex) Capcell HD 100 Supreme or equivalent (Polyethylene foam filler) of the best quality, including cutting to required size and shape, at all levels, etc. complete, as directed.

1.0 Materials : Capcell HD 100 board shall be of approved manufacturer.

2.0 Workmanship : The board shall be cut neatly with all edges even and to the size required, i.e to the size of the structure at the expansion joint. It shall be placed resting on the existing structure, at the joint, before the structure adjoining to the joint is constructed. The board shall snugly fill the gap in between the expansion joint. **Board shall be kept recessed by putting wooden/aluminum section for filling sealant and back up materials or the capcell board shall be cut & the cut portion of the board shall be joined with both side adhesive tape at the place where it is cut .At the time of filling the sealant ,the jointed portion of the board from both edges is removed & backup rod & sealant work can be completed**

3.0 Mode of Measurements and Payment : The item will be measured and paid in m² as per actual work done. Wastage shall not be measured and paid for.

4.17.b Providing and fixing in expansion joint, 20 mm. thick shalitex board of the best quality and approved make, including cutting to required size and shape, at all levels, etc. complete, as directed.

The relevant specification of item no.4.17.a shall be followed except that the required thickness of 20 mm. shall be achieved either using one 8 mm. board and one 12 mm. board or one 20 mm. thick board.

- 4.17.c Providing and fixing in expansion joint, 25 mm. thick shalitek board of the best quality and approved make, including cutting to required size and shape, at all levels, etc. complete, as directed.**

The relevant specification of item no. 4.17.a shall be followed except that the required thickness of 25 mm. is achieved either using two 12 mm. boards or one 25 mm. thick board.

- 4.18.a Providing and filling the expansion joints, with polysulphide sealant, including cleaning, scraping the expansion filler materials from joints, repairing of the edges with polymer mortar for plaster & micro concrete or epoxy mortar for concrete with necessary polyurethane backup rod of 30 to 35 mm dia and abro / teflon tapes on the sides to a line, etc. complete as per sample approved & as directed. Expansion joint shall be tested for watertightness all as per specifications by manufacturer, for all heights / levels including the cost of scaffolding. The contractor should furnish guarantee bond for a period of 10 years .**

- 1.0 Materials :** Polysulphide shall conform to BS : 4254-1983 and shall be of the best quality like Pidiseal, manufactured by Pidilite Industries.

2.0 Workmanship :

- 2.1 Polysulphide shall be filled as and where directed as per detail drawing and design. Before applying the sealant, the edges shall be perfectly cleaned, dried and free from any loose materials. Broken edges to be repaired by epoxy mortar. It shall be applied with cartridge.

- 2.2 The expansion joint shall be cleaned and made dry completely. All loose material such as sand, concrete, dust, etc. shall be removed. The joint gap shall be in uniform width and depth after cleaning. Best quality backup material shall be used to bring the width and depth of the joint to the required dimensions.

- 2.3 PU rod to be applied on sides of gaps as per supplier's instructions and top of edge to be covered with Abro Tape.

- 2.4 Polysulphide sealant of approved quality as mentioned in the material specification shall be used. The base and hardner shall be thoroughly mixed to make a uniform mixture of grey colour, in which no white or black colour streaks shall be visible. Mixed Polysulphide base sealant shall be filled in the joints to the required depth. The filled sealant shall be pressed and fixed by required instruments till air trapped is removed. The top surface shall be smooth and levelled. Required depth as per specification shall be maintained.

- 2.5 The work shall be carried out in the best workmanship as directed by the Engineer-in-charge in true line and level, for all heights, in any position.

- 3.0 Mode of Measurements and Payment :** The item will be measured and paid in rmt. as per actual work done. Wastage shall not be measured and paid for.

- 4.18.b Filling the expansion joints of size 25 x 20 mm., with Polysulphide sealant, including cleaning, scraping the expansion filler materials from joints with necessary backup**

material, like PU rod of required size and abro tapes to a line, etc. complete, as directed. Broken edges to be repaired with epoxy mortar.

The relevant specification of item no. 4.18.a shall be followed except that the width of expansion joint shall be 20 mm. instead of 12 mm.

4.18.c Filling the expansion joints of size 25 x 25 mm., with Polysulphide sealant, including cleaning, scraping the expansion filler materials from joints with necessary backup material, like PU rod of required size and abro tapes to a line, etc. complete, as directed. Broken edges to be repaired with epoxy mortar.

The relevant specification of item no. 4.18.a shall be followed except that the width of expansion joint shall be 25 mm. instead of 12 mm.

4.19 Extra for providing exposed finish to brickwork of all thickness, at all heights, in any position.

1.0 Materials : First class bricks for exposed brick work shall conform to M-15A.

2.0 Workmanship : The relevant specification of normal brick masonry shall be followed and additional care should be taken in the following scope of works :

- a) The bricks used shall be laid true in line, level and plumb.
- b) No bricks which are broken, chipped, wrinkled or which have irregular edges or corners, shall be used.
- c) The thickness of joints shall not exceed 12 mm. and shall be even in thickness. For the same, wooden fillets 10 mm. thick and 12 mm. wide shall be placed at the edge of the joints so that no mortar comes onto the surface of the bricks and a regular thickness of the joint is maintained. The face joints shall be raked out as directed by taking tools daily, during the progress of work, when the mortar is still green so as to provide key for pointing to done, subsequently.
- d) The surface shall be cleaned thoroughly of all mortar dropping.
- e) Double scaffolding to be used either of steel or bamboo during execution of this work.

3.0 Mode of Measurements and Payment :

3.1 The relevant specifications of item no. 4.01.a shall be followed.

3.2 The rate shall be over and above the rate for normal masonry work. The rate shall be for an unit of one m².

(II) RUBBLE MASONRY WORK :

A01 Providing and constructing RANDOM RUBBLE MASONRY in cement: mortar 1:6 using hard granite/ Black trap stones obtained from approved quarry with RCC bond stones at every 0.50 sqm of wall surface in cement mortar in mixes stipulated below without pinning on face, but including raking out joints and pointing flush in same mortar including curing, etc; complete as per specifications in FOUNDATION AND PLINTH for all depths. Note: RCC Bond stones (Concrete, steel & formwork) will be measured and paid separately in the respective items of this tender.

1.0 Materials : The cement mortar shall conform to M-11. Stones to M-16.

2.0 Workmanship :

2.1 **Dressing of Stones :** Stone used for uncoursed rubble masonry work shall be hammer dressed on the sides, and beds in such a way as to close up with the adjacent stone in the masonry work as strongly as possible. The face stone shall be dressed in such a manner as to give a specified pattern such as diagonal touching etc. The face of the stone shall be so dressed that brushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on the face to be plastered, it shall not project by more than 19 mm. nor shall have depressions more than 10 mm. from the average wall surface.

2.2 Laying :

2.2.1 All the stone shall be sufficiently wetted before laying to prevent absorption of water from mortar. The wall shall be built truly in plumb (or true to required batter when so specified). All connected walls in a structure shall normally be raised up uniformly and regularly. However, if for any specific reason, one part of masonry is required to be left behind, the wall shall be racked back at an angle not steeper than 45° , vertical toothed joints in masonry shall not be allowed. The work shall be carried out regularly and masonry of any day will not be raised by more than 1 m. in height, at a time.

2.2.2 The stone shall be laid in an uncoursed fashion or random facing etc. However, the masonry is required to be brought to level at various stages viz. plinth level, window sill level, roof level and any other level specifically shown in the drawings. This may be done by adjusting the laying of stones upto the level specified or the nearest to that level and then by providing levelling coarse of cement concrete 1:6:12 (1 cement : 6 sand : 12 graded stone aggregate 20 mm. nominal size) to bring the masonry work upto the desired level or as otherwise specified.

2.2.3 Proper bonding shall be achieved by closely filling in adjacent stones as well as by using bond stones or through stones as described herein below. Face stones shall extend back sufficiently and bond well with the masonry. The stone shall be carefully set so as to break joints and avoid formation of vertical joints. The depth of stone from the face of wall inward shall not be less than height or breadth at the face. The hearting or interior filling of the wall shall consist of rubble stones which may be of any shape. Neither the face stone nor the hearting stone shall be so small to pass through circular ring of 150 mm. internal diameter in any direction nor shall any of them shall have minimum thickness 100 mm.

2.2.4 All stone shall be carefully laid, hammered down by a wooden mallet into position and solidly embedded in mortar. Chips and spawls of stone may be used wherever necessary to avoid thick mortar beds or joints. At the same time no hollow space shall be left anywhere in the masonry. The chips used shall not be more than 20% by volume of masonry. The hearting stone shall be laid nearly in level with face stones except at vertical bond stone laid at 1 m. intervals or plumbs projecting about 150 to 200 mm. shall be firmly embedded to form vertical bonding in masonry.

2.3 **Bond Stones :** Bond stones or through stones running right across the thickness of the wall shall be provided in walls upto 600 mm. thick. In thicker walls two stones overlapping each other by at least 150 mm. shall be provided across the thickness of the wall to form bond stones. There shall be atleast one bond stone for every 0.5 m^2 of walls surface. The bond stone shall be marked by a distinguishing letter during construction for subsequent verification and shall be laid staggered in subsequent layers.

2.4 **Quoins :** The quoins or corner stone shall be selected stone neatly dressed with hammer and/or chisel to form the required corner angle and laid header and stretcher alternatively. The bed and top surface of quoins shall be chiselled, dressed to give horizontal joints. The quoins shall have a

uniform chisel draft of at least 25 mm. width at four edges of each exposed face, all the edges of the same face being in one plane. No quoin stones shall be smaller than 0.025 m^3 in volume.

2.5 **Jamb Stones :** The jamb stone shall be made with stone specified for quoins, except that the stone provided on the jambs shall have their length equal to thickness of wall upto 600 mm. and a line of headers shall be provided for walls thicker than 600 mm. as specified for bond.

2.6 **Joints :** All the joints shall be completely filled with mortar and their width shall not exceed 25 mm. When plastering or pointing is not required to be done, the joints shall be struck and finished simultaneously while laying the stone. Otherwise the joints shall be raked to a minimum depth of 20 mm. by a racking tools, during progress of laying while the mortar is still green.

2.7 **Scaffolding :** Single or double scaffolding shall be used. The scaffolding shall be strong and sound. The holes left in masonry for supporting scaffolding shall be filled and made good before plastering or pointing.

2.8 **Curing :** Green work shall be protected from rains by suitably covering the same. Masonry shall be kept constantly moist on all the faces atleast for a period of 7 days. The top of masonry shall be flooded at the close of the day.

3.0 **Mode of Measurements and Payment :**

3.1 All work shall be measured on the basis of finished dimensions and measured net except where otherwise specified. Only specified dimensions shall be allowed. Anything extra shall not be measured and paid for. The masonry work in foundation and plinth shall be measured under this item. No deduction shall be made nor extra payment shall be made for the following :

- (a) Ends of joints, beams, posts, girders, rafters, purlins, trusses, corbels, etc. each upto 500 cm^2 in section.
- (b) Opening each upto 0.1 m^2 .
- (c) Wall plates and bed plates bearings of chhajja and like upto 10 cm. depth (hearing of floor and roof slabs shall be deducted from masonry).
- (d) Drain holes and recesses for cement concrete block to embed holdfasts for doors and windows.
- (e) Building in the masonry iron fixtures pipes upto 300 mm. dia holdfasts of doors and windows.
- (f) Forming cheeses in masonry upto section of 350 cm^2 .

3.2 The rate shall be for a unit of one m^3 .

4.20.b **Uncoursed rubble masonry, with hard stone of approved quality, in foundations and plinth, in CM 1:5 (1 cement : 5 coarse sand), including levelling up, etc. complete, as directed. The minimum crushing strength of the stone shall be -a) 200 Kg/cm^2 .b) 100 Kg/cm^2 .**

1.0 **Materials and Workmanship :** The relevant specifications of item no. 4.20.a shall be followed except that the proportion of cement mortar shall be 1:5 (1 cement : 5 coarse sand).

2.0 **Mode of Measurements and Payment :**

2.1 The relevant specifications of item no. 4.20.a shall be followed.

- 2.2 The rate shall be for an unit of one m³.
- 4.20.c Uncoursed rubble masonry, with hard stone of approved quality, in foundation and plinth, in lime mortar 1:5 (1 lime putty : 5 coarse sand), including levelling, etc. complete, as directed. The minimum crushing strength of the stone shall be -a) 200 Kg/cm².b) 100 Kg/cm².**
- 1.0 Materials :** Lime mortar shall conform to M-10. The rubble to M-16.
- 2.0 Workmanship :** The relevant specifications of item no. 4.20.a. shall be followed, except that the work shall be done in Lime mortar 1:5.
- 3.0 Mode of Measurements and Payment :**
- 3.1 The relevant specifications of item no. 4.20.a shall be followed.
- 3.2 The rate shall be for an unit of one m³.
- 4.21.a Coursed rubble masonry, with hard stone of approved quality, in foundation and plinth, in CM 1:6 (1 cement : 6 coarse sand), etc. complete, as directed. The minimum crushing strength of stones shall be**
a) 200 Kg/cm². b) 100 Kg/cm².
- 1.0 Materials :** Cement mortar shall conform to M-11. The stone to M-16.
- 2.0 Workmanship :**
- 2.1 Dressing of Stone :** The face stone shall be hammer dressed so as to give approximately rectangular block shape. They shall be squared on bed and side joints. The bed joints shall be rough chisel dressed for a depth of atleast 50 mm. back from the faces and the side joints shall be dressed to a depth of atleast 40 mm. back from the face, such that no portion of the dressed surface shall be projected more than 10 mm. from a straight edge held against the surface. The remaining portions of surface shall not project above the chisel dressed bed and side joints. The bushing of the face shall not project by more than 40 mm. on an exposed face and 10 mm. on a face to be plastered. The hammer dressed stone shall also have a rough tooling for a minimum width of 25 mm. along the four edges of the face of the stone.
- 2.2 Laying :**
- 2.2.1 All stones shall be wetted before laying. The wall shall be built-up truly plumb (or to required better where so specified).
- 2.2.2 All connected masonry in a structure shall normally be raised up uniformly and regularly. However, if for nay specific reasons, one part of wall is required to be left behind, such wall shall be raked back at an angle not steeper than 45°. Vertical toothed joints in masonry shall not be allowed. The work shall be carried out regularly and masonry of any day shall not be raised by more than 1 m. in height at a time.
- 2.2.3 All the courses, shall be laid truly horizontal. The height of course shall not be less than 150 mm. nor more than 300 mm. Face stone shall be laid in alternate header and stretcher fashion.
- 2.2.4 They shall be so arranged as to break joints by atleast 75 mm. Stones shall be laid with grains

2.2.5 The hearting or the interior filling of the wall shall consist of flat bedded stone carefully laid on their proper beds in mortar. Chips and spawls of stone shall be used where necessary to avoid excessive use of mortar. Care being taken to see that no hollow space shall be left any where in the masonry. Chips shall not be used below the hearting stone to bring these upto the level of stones. The use of chips shall be restricted upto the filling of interstices between the hearting stone but the volume of chips shall be limited to 15% of the total volume of the masonry work for that.

2.4 **Quoins :** The quoins, which shall be of the same height as the course to which it belongs shall be formed from selected stone of atleast 400 mm. length. They shall be laid square or beds as stretcher and headers alternatively. The beds shall be rough, chisel dressed to a depth of atleast 100 mm. These stones shall have a minimum uniform chisel draft of 25 mm. width at four edges. All the edges being in the same plane. Quoin stones shall not be smaller than 0.025 m³. in volume and it shall not be less than 300 mm. in length, 25% of them being not less than 500 mm. in length.

2.5 **Joints :** All the bed joints shall be horizontal and all side joints shall be vertical. Face joints shall not be more than 10 mm. thick. All joints shall be properly and completely filled up with mortar. On cases where no plastering or pointing is required to be done the joint shall be struck flush and finished simultaneously while laying stones. In other cases, the joint shall be raked to a minimum depth of 20 mm. by raking tools during the progress of work while the mortar is still green.

2.6 **Curing :** The relevant specifications of item no. 4.20.a para 2.8 shall be followed.

3.0 Mode of Measurements and Payment :

3.1 The relevant specifications of item no. 4.20.a shall be followed.

3.2 The rate shall be for an unit of one m³.

4.21.b **Coursed rubble masonry, with stone of approved quality, in foundations and plinth, in CM 1:5 (1 cement : 5 coarse sand) etc. complete, as directed. The minimum crushing strength of the stone shall be -**

a) 200 Kg/cm². b) 100 Kg/cm².

1.0 Materials and Workmanship : The relevant specifications of item no. 4.21.a shall be followed except that the proportion of CM shall be 1:5 (1 cement : 5 coarse sand).

2.0 Mode of Measurements and Payment :

2.1 The relevant specifications of item no. 4.21.a shall be followed.

- 2.2 The rate shall be for an unit of one m³.
- 4.21.c Coursed rubble masonry, with stone of approved quality in foundation and plinth, in CM 1:4 (1 cement : 4 coarse sand), etc. complete, as directed. The minimum crushing strength of the stone shall be -**
a) 200 Kg/cm². b) 100 Kg/cm².
- 1.0 Materials and Workmanship :** The relevant specifications of item no. 4.21.a shall be followed except that proportion of CM shall be 1:4 (1 cement : 4 coarse sand) etc. complete.
- 2.0 Mode of Measurements and Payment :**
- 2.1 The relevant specifications of item no. 4.21.a shall be followed.
- 2.2 The rate shall be for an unit of one m³.
- 4.21.d Coarse rubble masonry, with stone of approved quality, in foundations and plinth, in CM 1:3 (1 cement : 3 coarse sand), etc. complete, as directed. The minimum crushing strength of the stone shall be -**
a) 200 Kg/cm². b) 100 Kg/cm².
- 1.0 Materials and Workmanship :** The relevant specifications of item no. 4.21.a shall be followed except that the proportion of CM shall be 1:3 (1 cement : 3 coarse sand).
- 2.0 Mode of Measurements and Payment :**
- 2.1 The relevant specifications of item no. 4.21.a shall be followed.
- 2.2 The rate shall be for an unit of one m³.
- F04 Providing and constructing RANDOM RUBBLE MASONRY in cement : mortar 1:6 using hard granite stones/Black trap stone obtained from approved quarry with RCC bond stones at every 0.5 Sqm of wall surface in cement mortar in mixes stipulated below without pinning on face, but including raking out joints including curing, scaffolding, etc; complete as per specifications in SUPER STRUCTURE for all heights / all levels / all floors Note : RCC Bond stones (Concrete , steel & formwork) will be measured and paid seperatly in the respective items of this tender**
- 1.0 Materials :** Cement mortar shall conform to M-11. The rubble to M-16.
- 2.0 Workmanship :**
- 2.1 The relevant specifications of item no. 4.21.a. shall be followed, except that the work shall be done in CM 1:6 for superstructure, for all floor levels.
- 2.2 Single or double scaffolding may be used. The scaffolding shall be strong and sound. In case single scaffolding is used, the holes shall be carefully made good as directed.
- 3.0 Mode of Measurements and Payment :**
- 3.1 The relevant specifications of item no. 4.21.a shall be followed.
- 3.2 The rate shall be for an unit of one m³.

- 1.2.2.1 The maximum variation in the length of the unit shall not be more than ± 5 mm. and maximum variation in width and height of the unit, not more than ± 3 mm.
- 1.2.2.2 Face shells and webs shall increase in thickness from the bottom to the top of the unit (flared web and face shells).
- 1.2.3 **Ingredients :**
- 1.2.3.1 **Fly Ash :** Fly Ash should be confirming to IS 3812 (Part III) 1966 (upto a maximum of 20% of fine aggregates).
- 1.2.4 **Additives and Admixtures :** Additives used may be as below :
 a) Plasticizer and air entraining admixtures confirming to IS 9103 - 1979.
 b) Fly Ash confirming to IS 3812 (Part III).
- 1.2.5 **Manufacturing Process :**
- 1.2.5.1 The concrete mixed used for blocks shall not be richer than one part by volume of cement & 6 parts by volume of combined aggregates.
- 1.2.5.2 The concrete to be machine pressed at a pressure of @ 15000 psi with a w/c ratio of @ 0.35 with hydro-pneumatic vibrations and pressing.
- 1.2.6 **Curing :** The blocks to be steam cured after they are sufficiently hardened to enable handling for one day duration and then to be cured by water spray for seven before they are ready for despatch.
- 1.2.7 **Surface Texture and Finish :** In case of building not required plaster the surface texture of the unit shall be fine-close texture which shall be painted by 2-3 coats of cement paint to render it resistant to rain water. If it is intended to plaster concrete masonry, the block shall have sufficiently rough texture to afford a good key to the plaster.
- 1.2.8 **Physical Requirements :**
- 1.2.8.1 **General :** All units shall be sound & free of crack and other defects which interfere with the proper placing of the unit, or impair the strength or performance of the construction. Minor chipping resulting from the customary methods of handling during delivery, shall not be deemed grounds for rejection.
- 1.2.8.2 **Dimensions :** The over all dimensions of the units when measured as per appendix A of IS 2185 Part I shall be in accordance with 1.1.1 subject to the tolerance mentioned in 1.1.2.
- 1.2.8.3 **Block Density :** The net density of the concrete used shall be 2000 Kg/m^3 .
- 1.2.8.4 **Compressive Strength :** The minimum compressive strength at the time of despatch, being the average of eight units shall not be less than 70 kg/cm^2 on gross area.
- 1.2.8.5 **Water absorption :** The water absorption, being an average of three units determined in the manner prescribed in appendix 'D' of IS 2185 part I shall not be more than 8% by mass.

- 1.2.8.6 **Drying Shrinkage :** The drying shrinkage of the units when unrestrained being the average of three units, determined in the manner prescribed in appendix 'E' of IS 2185 part I, shall not exceed 0.1%.
- 1.2.8.7 **Moisture movement :** The moisture movement of dry blocks on immersion in water, being an average of three units, when determined in the manner prescribed in appendix 'F' of IS 2185 part I shall not exceed 0.09%.
- 1.2.9 **Tests :** As described in appendices A to F of IS 2185 part I on sample of units selected.
- 1.3 **Masonry Mortar :**
- 1.3.1 **Grade of Mortar :** Masonry mortar used shall be of proportion 1:1:6 (1 part cement, 1 part lime and 6 parts sand) Minimum grade as per IS 2250 - 1981 to be MM 3.
- 1.3.2 **Preparation of Masonry Mortar :**
- 1.3.2.1 **Proportioning :** It shall be proportioned only by full bags Hydrated lime and aggregates shall be measured by volume using gauge boxes of suitable capacity.
- 1.3.2.2 **Preparation :** When coarse sand is used the lime putting and sand in the required proportions shall after preliminary mixing on a water-tight platform, with necessary addition of water, be ground in a mortar shall taking care to rake up continuously the mortar particularly at the corners, and also adding water as and when required during grinding.
- 1.3.2.3 The mix shall then be transferred to a mechanical mixer to which the required quantity of cement is added and the content mixed for at least three minutes.
- 1.3.2.4 When fine sand is used the mixing operations shall be as above except that grinding may be omitted for the preliminary mixing of lime putty and sand. (P.S. : when factory made hydrated lime conforming to IS: 712-1973 is used, grinding of lime and sand is not necessary).
- 1.3.2.5 If the mixture of lime putty and sand is not used immediately for mixing with cement, it shall be kept protected from drying out till the time of use.
- 1.3.2.6 When adding water in the mortar during mixing operations, it shall be ensured that it is added only to the extent necessary for obtaining working consistency for the mortar and not more.
- 2.0 **Workmanship and Construction Methods:**
- 2.1 **Modular Co-ordination:**
- 2.1.1 Hollow concrete block walls shall preferably be planned on the basis of modular co-ordination with a view to making the maximum use of full and half length units.
- 2.1.2 The cutting of units at the site shall be restricted to the minimum. Attention shall be paid to modular co-ordination while fixing the overall length and height of the wall; width and height of door, window and other openings; and wall dimensions between doors, windows and corners. All horizontal dimensions shall be in multiples of nominal half-length of the units and all vertical dimensions shall be multiples of full-height units.

- 2.2 **Avoidance of Crack Formation:** The major causes of cracks in the structure of hollow concrete block wall or partition and measures for their prevention are as below :
- 2.2.1 **Structural Movements:** Cracks may arise from alterations in length, curvature or orientation of the structural members enclosing a wall or partition due to load settlement, thermal expansion or changes in moisture content.
- 2.2.2 In the case of framed structures, erection partitions and panel walls shall be delayed wherever possible until the frame has taken up much as possible any deformation occurring due to structural loads.
- 2.2.3 **For floor deformation and movement:** The floor upon which a partition is built may deflect under load brought upon it after the partition is built. Where such deflections tend to create non-continuous bearing, the partition shall be strong enough to span between the points of least floor deflection or shall be capable of adapting itself to the altered conditions of support without cracking. This may be achieved by embedding horizontal reinforcement such as 6 mm. diameter bars or any other suitable reinforcement, or, if possible, by providing a reinforcement concrete band at every 40 cm height.
- 2.2.4 **Ceiling deflection or movement:** A ceiling above a wall or partition may deflect under loads applied after its erection, or through thermal or other movements. The wall or partition shall be separated from the ceiling by a gap, or by a layer of resilient material, to avoid cracking as a result of such deflection. Where this cannot be done, the risk of cracking, in the case of plastered finishes, may be diminished to some extent by reinforcement of the joint between the ceiling and the wall or partition, or by forming a cut between the ceiling plaster and the wall plaster.
- 2.3 **Storage and handling of materials:** The blocks shall be stored in such a way as to avoid any contact with moisture on the site. They shall be stock-piled on planks or other supports free from contact with the ground and covered to protect against wetting. The blocks shall be handled with care and damaged units shall be rejected.
- 2.4 **Wetting of Blocks :** The blocks need not be wetted before or during laying in the walls. In case the climatic conditions so require, the top and the sides of the blocks may only be slightly moistened so as to prevent absorption of water from the mortar and ensure the development of the required bond with the mortar.
- 2.5 **Laying Concrete Block Masonry:**
- 2.5.1 **Use of Mortar in Masonry :** Hollow concrete block masonry in superstructure shall be laid in composite mortar comprising one part of cement, one part of lime and six parts of sand depending upon the grading of sand.
- 2.5.2 **Horizontal (Bedding) Joints :** Mortar shall be spread over the entire top surface of the block including front and rear shells as well as the webs to a uniform layer of one centimeter thickness. Normally full mortar bedding shall be adopted as it enables fuller utilization of the load-carrying capacity of the blocks. But where the walls carry light loads, such as panel walls, in a framed structure 'face shell' bedding may be used. In this type of bedding, the mortar is spread only over the front and rear shells and not on hit webs, which help to arrest the seepage of water through the joints penetrating to the interior surface of the walls.
- 2.5.3 **Vertical (Cross) Joints:** For vertical joints, the mortar shall be applied on the vertical edges of

the front and rear shells of the blocks. The mortar may be applied either to the unit already placed on the wall or to the next unit to be laid alongside of it. But it will be more convenient to apply mortar on the edges of the succeeding unit when it is standing vertically and then placing it horizontally well-pressed against the previously laid unit. However, whatever the method used for applying mortar, care must be taken to produce well-compacted vertical joints.

2.5.4 In the case of two cell blocks, there is a slight depression on their vertical sides, which may also be filled up with mortar where is considered necessary to secure greater lateral rigidity.

2.5.5 Mortar shall not be spread so much ahead of the actual laying of the units that it tends to stiffen and lose its plasticity, thereby resulting in poor bond. For most of the work, the joints, both horizontal and vertical, shall be one centimeter thick. Except in the case of extruded-joint construction described later, the mortar shall be raked out from the joint with a trowel to a depth of about one centimeter as each course is laid to so as to ensure good bond of the plaster.

2.5.6 When the mortar has stiffened somewhat, it shall be firmly compacted with a jointing tool. This compaction is important, since mortar, while hardening, has a tendency to shrink slightly and thus pull away from the edges of the block. The mortar shall be pressed against the units with a jointing tool after the mortar has stiffened to effect intimate contact between the mortar and the masonry unit and obtain a weather-tight joint.

2.5.7 All the joints shall be now pointed with 1:2 cement mortar to ensure they are weather proof.

2.6 Operations for laying Block Masonry :

2.6.1 **First Course :** The first course of concrete masonry shall be laid with great care, making sure that it is properly aligned, levelled and plumbed, as this shall assist the mason in laying succeeding courses to obtain a straight and truly vertical wall.

2.6.2 Before laying the first course, the alignment of the wall shall be marked on the foundation footings, rafts, plinth beams or on sub base. The blocks for this course shall first be laid dry, that is without mortar over the sub base along a string lightly stretched between properly located corners of the wall in order to determine the correct position of the blocks including those of the cross-walls jointing it and also adjust their spacing. When the blocks are set in proper position, the two corner blocks shall be removed, a full mortar bed spread shall be spread on the sub base and these blocks laid back in place truly level and plumb. The string shall then be stretched tightly along the faces of the two corner blocks and the faces of the intermediate ones adjusted to coincide with the line. Thereafter each block shall be removed and re-laid over a bed of mortar. After every three or four blocks have been laid, their correct alignment, level and verticality shall be carefully checked.

2.6.3 The construction of walls may be started either at the corners first or started from one end proceeding in the other direction. If the corners of the wall are built first, they shall be built four or five courses higher than the centre of the wall. As each course is laid at the corner, it shall be checked for alignment and level and for being plumb. Each block shall be carefully checked with a level or straight-edge to make certain that the faces of the block are all in the same plane. This precaution is necessary to ensure truly straight and vertical walls.

2.6.4 The use of a storey-rod or course-pole, which is simply a board with markings 20 cm apart, provides an accurate method of finding the top of the masonry for each course. All mortar joints shall be one centimeter thick. Each course, in building the corners, shall be stepped back by a half-block and the horizontal spacing of the block shall be checked by placing a mason's level

diagonally across the corners of the block.

2.6.5 When blocks are laid between the corner blocks, a mason's line shall be stretched from corner to corner for each course and the top outside edge of each block shall be laid to this line. The manner of handling or gripping the block shall be such as to position the block properly with minimum adjustment.

2.6.6 To assure satisfactory bond, mortar shall not be spread too far ahead of actual laying of the block or it will stiffen and lose its plasticity.

2.6.7 As each block is laid, excess mortar extruding from the joints shall be cut off with the trowel and thrown back on the mortar board to be reworked into the fresh mortar. If the work is progressing rapidly, the extruded mortar cut from the joints may be applied to the vertical face-shells of the block just laid. Should there be any delay long enough for the mortar to stiffen on the block, the mortar shall be removed from the mortar board and fresh mortar shall be prepared and used. Dead mortar that has been picked up from the scaffold or from the floor shall not be used.

2.7 **Provision for Door & Window Frames (SOLID BLOCK) :**

2.7.1 A course of "C" channel block shall be provided under the doors and windows opening.

2.7.2 The jambs of doors and windows shall be grouted in the hollows of the 'c' channel blocks with concrete of mix 1:3:6.

2.7.3 Mild steel bar holdfasts should be so fastened to the door or window frames that these occur at 'c' block course level and their ends are embedded in the 'C' block hollow and grouted in 1:3:6 cement concrete

2.7.4 **The hollow blocks shall be used as solid blocks after grouting the individual block with 1:3:6 CC mix for using it below ground level & above plinth level**

2.8 **Provision for Roof and Services :**

2.8.1 The course immediately below the roof slab shall be built with 'c' shaped blocks with hollows facing upwards and shall be filled with 1:3:6 concrete later on, or else grouted along with the concreting of the roof slab with connecting steel carried on inside the roof slab. (in case of load bearing construction).

2.8.2 Alternatively (in RCC framed structure) course of solid blocks may be used as the top course.

2.8.3 'C' type blocks shall be used, vertically as well as horizontally, on each face, to cater the need of holdfasts of doors and windows, concealed piping (electrical and plumbing) wherever specified as per drawing and design.

2.9 **Rendering and Other Finishes :**

2.9.1 The plaster furnishes shall be applied in accordance with IS : 2402 - 1963 code of practice for external rendered finishes.

2.9.2 The concrete block masonry shall be rendered with at least one coat of 6 to 12 mm. thickness of 1:4 cement mortar. The sand to be used for the plaster shall be graded from 3 mm. downwards.

2.9.3 Where it is necessary to have the concrete block surface exposed, the wall shall be treated with two coats of approved quality of cement based paint.

3.0 Mode of Measurements and Payment :

3.1 The measurement of this item shall taken for the hollow concrete block masonry fully completed. The limiting dimensions not exceeding those shown on the drawings or as directed shall be final. Battered, tapered and curved portions shall be measured net.

3.2 No deduction shall be made from the quantity of block work, nor any extra payment shall be made for embedding in masonry or making holes in respect of following items :

- (1) End of joists beams, posts, girders, rafters, purlins, trusses, corbel, steps etc. where cross sectional area does not exceed 500 cm².
- (2) Openings in walls, parapet and compound walls, not exceeding 1.0 m² area.
- (3) Wall plates and bed plates, bearing of slabs, chhajjas and the like whose thickness does not exceed 10 cm. and the bearing does not extend to the full thickness of wall.
- (4) Drainage holes, recesses for cement concrete blocks to embed hold fasts for doors, windows etc., forming toothings, grooves etc. and providing cramps for holding stone lining.
- (5) Iron fixtures, pipes upto 300 mm. dia.; holdfasts and doors and windows built into masonry and sanitary and water supply pipes, etc., for concealed electrical wiring and any other fixtures or inserts.
- (6) Forming chases of section not exceeding 350 cm² in masonry.

3.3 Apertures for fire places shall not be deducted nor shall extra labour required to make splaying of jambs, throating and making arches over the aperture be paid for separately. The rate shall include for work of any shape e.g. pillars of any size and shape, curved or tapered walls, drip courses, projections, parapets, load bearing walls, sills, ottas, steps, tank walls, platforms and counter walls, ducts, channels and moldings like corbelling, pattas, etc.

3.4 The concrete block masonry shall be measured in sq.mts. The finished work shall be inspected for faults/cracks, line level etc. and the length and height of the masonry wall shall be measured in meters. The sq.mt. of work executed shall so be arrived at (for both reinforced and non-reinforced block masonry).

4.23.b Providing and laying of hollow concrete block masonry 140 mm. thick blocks confirming to IS 2185 Part I grade A (7.0) in composite mortar 1:4 (1 part cement and 4 part of sand) in the line and level and in pattern as directed from time to time including raking out of joints on both the sides and pointing in 1:2 cm (1 part cement, 2 part sand) with finishing, curing at all heights with necessary scaffolding etc complete as per the drawing and direction of Engineer in charge. The rate shall also include for use of 'C' type (Biaxial) blocks to make provision for service pipe lines, holdfasts, structural requirements (refer cl. 2.8.1) etc. as per the drawing and design.

The relevant specification of item no. 4.23.a shall be followed except that the thickness of hollow concrete block masonry shall be 140 mm. instead of 190 mm.

4.23.c Providing and laying of hollow concrete block masonry in 90 mm. thick blocks confirming to IS 2185 Part I grade A (7.0) in composite mortar 1:4 (1 part cement and 4 part of sand) in the line and level and in patterns as directed from time to time including raking out of joints on both the sides and pointing in 1:2 cm (1 part cement, 2 part sand) with finishing, curing at all heights with necessary scaffolding etc complete as per the drawing and direction of Engineer in charge. The rate shall also include for use of 'C' type (Biaxial)

blocks to make provision for services pipe lines, holdfasts, structural requirements (refer cl. 2.8.1) etc. as per the drawing and design.

The relevant specification of item no. 4.23.a shall be followed except that the thickness of hollow concrete block masonry shall be 90 mm. instead of 190 mm.

- 4.24.a Providing and laying of 190 mm. thick, in concrete blocks confirming to IS 2185 Part I grade A (7.0) in composite mortar 1:4 (1 part cement and 4 part of sand) in line and level including providing and fixing of vertical and horizontal steel in hollows of the masonry as per design and grouting these reinforced hollows in cement concrete of the grade specified from time to time) including raking out of joints on both sides and pointing them with 1:2 cm (1 part cement, 2 part sand) with finishing curing at all heights with necessary scaffolding etc complete as per the drawing and direction of Engineer in charge. The cost of reinforcement and concrete should be excluded from total rate. The same shall be paid separately. The rate shall also include for use of 'C' type (Biaxial) blocks to make provision for service pipe lines, holdfasts, structural requirements (refer cl. 2.8.1) etc. as per the drawing and design.**

The relevant specification of item no. 4.23.a shall be followed except that the hollow concrete block masonry shall be reinforced vertically as well as horizontally.

The concrete and reinforcement shall be paid under the relevant item as per the specifications.

- 4.24.b Providing and laying of 140 mm. thick in concrete blocks confirming to IS 2185 Part I grade A (7.0) in composite mortar 1:4 (1 part cement and 4 part of sand) in line and level including providing and fixing of vertical and horizontal steel in hollows of the masonry as per design and grouting these reinforced hollows in cement concrete of the grade specified from time to time) including raking out of joints on both sides and pointing them with 1:2 cm (1 part cement, 2 part sand) with finishing, curing at all heights with necessary scaffolding etc complete as per the drawing and direction of Engineer in charge. The rate shall also include for use of 'C' type (Bi-axial) blocks to make provision for service pipe lines, holdfasts, structural requirements (refer cl. 2.8.1) etc. as per the drawing and design.**

The relevant specification of item no. 4.24.a shall be followed except that the thickness of hollow concrete block masonry shall be 140 mm. instead of 190 mm.

The concrete and reinforcement shall be paid under the relevant item as per the specifications.

- 4.25.a Providing, laying and filling the expansion joints, grooves, cracks or gaps with silicone sealant of acetic grade, including cleaning, scraping the joints with necessary backup material and teflon tapes to a line, etc. complete, as directed.**

- 1.0 Materials :** Silicone sealant shall be of GE or WECKER brands and shall be used of 300 ml packing cartridge directly available from company.

- 2.0 Workmanship :**

- 2.1** Silicone sealant shall be provided as and where directed as per detail drawing and design. Before applying the sealant, the surface shall be properly cleaned, dried and free from any loose materials. It shall be applied with cartridge.

- 2.2 The joint shall be cleaned and made dry completely. All loose material such as sand, concrete, dust, etc. shall be removed. Best quality back up material shall be used to bring the width and depth of the joint to the required dimensions.
- 2.3 Silicone sealant of required quality shall be used. The colour of the sealant shall be grey, white, black or transparent Silicone sealant shall be filled in the joints to the required depth. The filled sealant shall be pressed and fixed by required instruments till air trapped is removed. The top surface shall be smooth and levelled. Required depth as per specification shall be maintained.
- 2.5 The work shall be carried out in the best workmanship as directed by the Engineer-in-charge in true line and level, for all heights, in any position.

3.0 Mode of Measurements and Payment :

- 3.1 The item will be measured and paid in terms of no. of cartridges consumed as per actual work done. Wastage shall not be measured and paid for.
- 3.2 Contractor has to maintain the day to day register of filled cartridges supplied, consumed and empty cartridges at site. The procedure of the records shall be as established by the client and Engineer-in-charge.

4.25.b Providing, laying and filling the expansion joints, grooves, cracks or gaps with silicone sealant of neutral grade, including cleaning, scraping the joints with necessary backup material and teflon tapes to a line, etc. complete, as directed.

The relevant specification of item no. 4.25.a shall be followed. The item shall be paid in terms of no. of cartridges consumed as per actual work done. Contractor has to maintain the day to day register of filled cartridges supplied, consumed and empty cartridges at site. The procedure of the records shall be as established by the client and Engineer-in-charge.

4.26 Providing and fixing in expansion joints, copper strip water stop of 1.25 mm thick & 125 mm wide with 'U' of 25 mm depth in middle with 3 mm dia copper hold fast soldered on strip at an interval of 30 cm as specified in drawing or as per sample approved & as directed by Engineer-In-Charge etc. complete.

1.0 General:

- 1.1 Copper shall confirm to M-28 and shall be of approved make.

2.0 Workmanship:

- 2.1 Copper strips are to be provided for expansion joints in RCC frame structure for internal as well as exposed joints.
- 2.2 Copper strip shall be 1.25mm thick and of 125 mm width with U shape in the middle.
- 2.3 Copper strip shall have holdfast of 3 mm dia copper rod, fixed to the plate soldered on strip at interval of about 30 cm, or as shown in the drawing or as directed.
- 2.4 The width of each flange of the copper plate to be embedded in the concrete work shall be 25 mm.
- 2.5 The depth of U provided shall be of 25 mm.

3.0 Mode of Measurement and Payment:

- 3.1 Measurement shall be taken for actual length of copper strip fixed.
- 3.2 Rate shall be for per Rmt.

F02 Providing and laying Autoclave Aerated Concrete Blocks (AAC) / bats as per drawing

(Thickness 150 to 350 mm) in single or multiple layers with Fixo bond mortar of ultratech make. Crushing strength of aerated concrete block/ bats shall not be less than 40-50 KG/sqcm, minimum dry density of 550-650 KG/CUM, thermal conductivity 0.16 w/mk, fire resistant 4 hours, in true line level and plumb and cleaning the surface with necessary tool tackles etc. at all floors, all heights, all depths, all levels (in foundation and superstructure) and at all places including curing, scaffolding, racking / flush jointing etc complete, as per drawing / specification and as directed by Engineer Incharge.

The rate should be inclusive of providing runner bands at every 1.2m. Runner bands will be measured and paid separately in relevant tender item.

Relevant specification of item no. 4.01a to be followed except that the masonry to be constructed with AAC blocks and at all floor / all heights / all levels.

F03 Providing and fixing 150 mm expansion joint system of make '3R' MSDSZJ (Floor Joints - Horizontal Surface) for all floors / all levels / all heights complete as per drawings, specifications and direction of Engineer-In-Charge. The joints system will be of extruded aluminum base members, self aligning / self centering arrangement and support plates etc. as per ASTM B221-02. The system shall be such that it provides floor to floor /floor to wall expansion control system for various vertical location in load application areas that accommodates multi directional seismic movement without stress to it's components. System shall consist of metal profiles with a universal aluminum base member designed to accommodate various project conditions and finish floor treatments. The cover plate shall be designed of width and thickness required to satisfy projects movement and loading requirements and secured to base members by utilizing manufacturer's pre-engineered self-centering arrangement that freely rotates / moves in all directions. The Self – centering arrangement shall exhibit circular sphere ends that lock and slide inside the corresponding aluminum extrusion cavity to allow freedom of movement and flexure in all directions including vertical displacement. Provision of Moisture Barrier Membrane in the Joint System to have watertight joint is mandatory requirement all as per the manufactures design and as approved by Engineer -in- Charge . (Material shall confirm to ASTM 6063.)

Rates shall also be inclusive of anodizing / powder coating of all exposed aluminium work, all as per manufacturers specifications and approval of EIC. If required, grouting should also be inclusive in the quoted rate. Rates shall also be inclusive of covering seismic joint from bottom for upper floors.

Material and Installation should comply strictly to manufacturers specifications and instructions. The item will be measured and paid in unit of RMT of installed length.

F04 Providing and fixing 150 mm expansion joint system of make '3R' MSNSK (Wall Joints - Vertical Surface) related with wall joint (internal/ external) location as per drawings and direction of Engineer-In- Charge. The joints shall be of extruded aluminum base members, self aligning / centering arrangement and support plates as per ASTM B221- 02. The material shall be such that it provides an Expansion Joints System suitable for vertical wall to wall/ wall to corner application, both new and existing construction in office Buildings & complexes with no slipping down tendency amongst the components of the Joint System. The Joint System shall utilize light weight aluminum profiles exhibiting minimal exposed aluminum surfaces mechanically snap locking the multicellular to facilitate movement. (Material shall confirm to ASTM 6063.) Rates shall also be inclusive of anodizing / powder coating of all exposed aluminium work, all as per manufacturers specifications and approval of Architect / EIC for all levels / at all heights for , all shapes with necessary scaffolding, . If required, grouting should also be inclusive in the quoted rate

Material and Installation should comply strictly to manufacturers specifications and instructions. The item will be measured and paid in unit of RMT of installed length.