

<b>Name of work:</b>	<b>CONSTRUCTION OF HALL AT RAMDEVPIR TEKRI, HABAY VILLAGE TA.BHUJ(DMF/2024-25)</b>
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### **ITEM WISE SPECIFICATIONS FOR CIVIL WORK**

#### **Item No. 1**

**Excavation for foundation upto 1.50 m. depth including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 meter lead ( A ) Hard and dense soil..**

#### **1.0. General:**

**1.1.** Any soil which generally yields to the application of pickaxes and shovels, phawaras, rakes or any such ordinary excavating implement or organic soil, gravel, silt, sand turf loam, clay, peat etc., fall under this category.

#### **2.0 Clearing the site:**

**2.1** The site on which the structure is to be built shall be cleared and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and tree shall be removed as directed. The materials so obtained shall be property of the Government and be conveyed and stacked as directed within 50 M. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

**2.2** The rate of site clearance is deemed to be included in the rate of earth work for which no extra will be paid.

#### **3.0 Setting out:**

After clearing the site, the center lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the tractor shall assume full responsibility for alignment elevation and dimension of each and all parts of the work. Contractor shall supply laborers, materials, etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

#### **4.0 Excavation:**

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for such precautionary measures shall be paid separately if not specified. The bottom of the excavated area shall be leveled both longitudinally and transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made deeper or wider than shown on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation up-to 1.5 m. depth shall be measured under this item.

#### **5.0. Disposal of the excavated stuff:**

**5.1.** The excavated stuff of the selected type shall be used in filling the trenches and plinth or leveling the ground in layers including ramming and watering etc.

**5.2.** The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead up-to 50 M. and all lift.

#### **6.0. Mode of measurement and payment:**

**6.1.** The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge. No payment shall be made for surplus excavation made in excess of above requirements or due to slopping and sloping back as found necessary on account of conditions of soil and requirements of safety.

**6.2.** The rate shall be for a unit of one cubic meter.

#### **Item No. 2**

**Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth  
AND**

**1.0. Materials :** Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm. nominal size shall conform to M-12.

#### **2.0. General:**

**2.1.** The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1 : 2 :

4 (1 cement: 2 coarse sand ; 4 graded stone aggregate 10 mm. nominal size) by volume. Concrete work shall have exposed

concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-200, M-250 specified as per. I.S. Corresponding approximately to 1 : 3 : 6,

1 : 2 : 4, 1 : 1 1/2 : 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. by weight (0.0342 Cu. M.) for different proportions of mix shall be as under:

Grade of concrete	Total quantity of dry aggregate by volume per 50 Kgs. of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kgs. of cement maximum.
1	2	3	4
M-100 (1 : 3 : 6)	300 Liters	Generally 1 : 2 for fine aggregate	34 Liters
M-150 (1 : 2 : 4)	2.20 “	to coarse aggregate by volume	32 “
M-200 (1 : 1 1/2 : 3)	160 “	but subject to and upper limit	30 “
M-250 (1 : 1 : 2)	100 “	of 1 : 1 1/2 and lower limit 1 : 3	27 “

2.4. The water cement ratios shall not more than those specified in the above table. The cement content of the mix specified in the Table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction so that the water-cement-ratio specified in the Table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than

one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the comers of the form.

2.7. For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum, clear distance between the main bars, or 5 mm. less

than the minimum cover to the reinforcement whichever is smaller.

2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as OF greater than the minimum cover.

2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

### 3.0. Workmanship:

3.1. Proportioning : Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50

Kg. weight. The volume of one such bag being taken as 0.0342 Cu. metre. Boxes of suitable sizes shall be used for measuring sand aggregate. The size of the boxes (internal) shall be 35 cms. x 25 cms. and 40 Cms. deep. While measuring the aggregate and sand, the box shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.

### 3.2 Mixing:

3.2.1. For all work, concrete shall “be mixed in a mechanical mixer which alongwith other accessories shall be kept in first

class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand, cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about

half a minute of dry mixing, measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be. continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less

than 2 minutes after all ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done

on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture to uniform colour. Specified quantity of water shall then be added gradually through a rose-can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

3.2.3. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another.

3.3. Consistency: 3.3.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration

of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm. to 25 mm.

shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

#### **1.4. Inspection:**

3.4.1. Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not

relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately

before concreting, all forms shall be thoroughly cleaned.

3.4.2. Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall

invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts, suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

#### **3.5. Transporting and laying:**

3.5.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place.

All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

3.5.2. Concreting shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre when internal vibrators are used and not exceeding 0.30 metre in all other cases.

3.5.3. Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding 2 metres. When trucks or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

3.5.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators unless,

otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

**3.6. Curing:** Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hessian or other similar absorbent material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

### 3.7. Sampling and Testing of concrete :

3.7.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure

that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period

of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work	No. of samples	Quantity of concrete in the works	No. of samples
1-5Cmt.	1	16-30Cmt.	3
6-15Cmt.	2	31-50	4

51 and above 4 + one additional for each additional 50 M. or part thereof.

NOTE : At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. Tire average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 Kg/Cm at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower, grade concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

### 3.8. Stripping:

3.9. The Engineer-in charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other condition that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20 ° C) and where ordinary concrete is used, forms may be struck after expiry of periods specified in item No. 9.1 (A) for respective item of form work.

3.8.1. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit and struts are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centring shall be gradually and uniformly lowered in such manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the, concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in- charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of

good quality.

- 3.8.2. Immediately after the removal of forms, all exposed bolts etc., passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fine caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions honeycomb spots, broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is-being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough Riling in all voids. Surfaces which are pointed shall be kept moist for a period of 24 hours.

If rock pockets/honeycombs in the opinion of the Engineer in- charge are of such an extent or character to effect the strength of the structure materially or to endanger the, life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

#### **4.0. Mode of measurement and payment:**

4.1. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deduction shall be made for

(a) Ends of dis-similar materials such as joits, beams, posts, girders, rafters, purline trusses, corbels and steps etc upt 500Sq.Cm. in section.

(b) Opening upto 0.1 Sq. M.

4. 2. The rate includes cost of all materials, labour, tools and plant required for mixing, placing, position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete lied strength The rate excludes the cost of form work.

The rate shall be for a unit of one cubic metre

#### **Item No. 3**

**Providing and laying ordinary cement concrete M20 (1cement :1.5coarse sand:3 stone agg.20mm nominal size) and curing comp.incl.cost of form work but excl.the cost of reinforcement for reinforced concrete work in foundation, footing base of columns and mas**

#### **Item No. – 5**

**Providing and laying ordinary cement conctere M20 ( 1 cement: 1.5 coarse sand :3 graded stone agg. 20mm nominal size )and finishing smooth with curing comp.incl.cost of form work but excl.the cost of reinforcement.for R.C.C.work in Column having cross sectoinal area 0.12 to 0.18 Sq.M.G.F.**

#### **Item No. 6**

**Providing and Laying ordinary cement concrete M-20 1:1.5:3 (1-Cement 1.5-Coarse sand 3-Graded stone agg. 20mm nominal size) and finishing but excl. the cost of reinfor RCC work in Beam having C/S area 0.12 to 0.18 sq. mt. G.F.**

#### **Item No. – 9**

**Providing and laying ordinary cement conctere M20 (1 cement :1.5 coarse sand:3 stone agg.20mm nominal size) and curing comp.incl.cost of form work in sill and sides (R.C.C.Band) but.excl.the cost of reinforcement. (R.C.C.Band)**

#### **Item No. – 10**

**Providing and laying ordinary cement conctere M20 (1 cement :1.5 coarse sand:3 stone agg.20mm nominal size) and curing comp.incl.cost of form work in sill and sides for R.C.C Lintel incl. Finishing smooth with curing comp.incl.cost of form work but.excl.the cost of reinforcement. (R.C.C.Band)**

#### **Item No. – 11**

**Providing and laying ordinary cement conctere M20 (1 cement :1.5 coarse sand:3 stone agg.20mm nominal size) for reinforced concrete chajjas not excedding 10cm. thickness upto floor two level including finishing the exposed surfaces with cement mortar 1:3 (1Cement : 3 fine sand) to gove a smooth surface centering and form work and curing complete excluding cost of reinforcement.**

**Item No. – 12**

**Providing and laying ordinary cement concrete M20 (1 cement :1.5 coarse sand:3 stone agg.20mm nominal size) and finishing smooth with curing etc. complete including the cost of form work but excluding the cost of reinforcement for R.C.C. work in Slabs having more than 10 cm & upto 12 cm thickness.**

1. In case of ordinary concrete mix is not required to be designed by preliminary tests and proportions of cement, fine aggregates and coarse aggregates are specified by volume as given in tables below for different grades of concrete designated as ordinary M100, M150, M200 and M250.
2. IN the designation of a concrete mix, letter "M" refers to the mix and the number the specified 28 days works cube compressive strength of that mix on 150mm cubes expressed in Kg/Cm<sup>2</sup>.
3. The ordinary concrete mix shall generally be specified by volume. For cement which normally comes in bags and issued by weight, volume shall be worked out taking 50 Kg. of cement as 0.035 Cu.M. in volume. While measuring aggregates by volume, shaking, ramming or hammering shall not be done. Proportioning of sand shall be as per its dry volume. In case it is dump, allowance for bulking shall be made as per IS : 2386 {Part : III}
3. Ingredient required for ordinary cement concrete containing one 5 Kg. bag of cement for different proportions of mix shall be as given the table below.

Grade of Concrete	Mix by Volume	Total Quantity of dry aggregates by volume per 50 Kg. of cement to be taken as sum of the individual volumes of fine and coarse aggregates mix	Proportion of fine aggregates to coarse aggregates	Quantity of water per 5 Kg. of cement max.
Ordinary	Liter	One Cubic meter = 1000 liters		Liter
M100	1:3:6	300	General 1:2 for fine agg. To coarse agg. By volumes but subject to a upper limit of 1 : 1 ½ & a lower limit of 1:3	34
M150	1:2:4	220		32
M200	1:1 ½ : 3	160		30
M250	1:1:2	100		27

Note :- The proportion of the aggregates shall be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates becomes finer & the maximum size of coarse aggregates becomes larger.

Example : For an average grading of fine aggregates (that is zone II or IS 383-1963) the proportions shall be 1 : 1 ½ 1:2 and 1:3 for maximum size of aggregates 10mm, 20mm and 40mm respectively (after carrying out sieve analysis).

Note : 2 A mix leaner than M100 (1:3:6)m may be used for non structural parts, if provided in the contract, in such case grading of aggregates shall be by volume. Other requirement for mixing and placing & curing shall be the same.

5. Following shall be the maximum nominal size of coarse aggregates for the different items of work

Sr. No.	Item of Construction	Maximum nominal size of coarse aggregates
1.	R.C.C. Well curbs, R.C.C. well staining and R.C.C. piles	40mm
2.	R.C.C. well staining	63mm
3.	Well cap or pile cap, solid type piers, abutment and wing walls and other pier caps	40mm
4.	R.C.C. work in cross girders, deck slab, wearing course, kerb, light post, blast walls, approach slab, etc. and hollow type piers, abutments, wing walls, and their pier cap	20mm
5.	R.C.C. bearings	20mm
6.	For any other items of construction not covered by Item 1 to 4.	As specified on the drawing or as desired by the Engineer in charge in case it is not specified on drawing.

For heavily reinforced concrete members as in the case of ribs of main beams nominal maximum size of aggregate shall be usually be restricted to 5mm less than the minimum cover to the reinforcement which is the smaller.

6. Fine aggregates shall be clean hard, coarse sand. It shall be free from dust and such other substance. The sand be got approved by the Engineer in charge.

7. All materials shall be stored as to prevent their deterioration or destruction of their quality and fitness for the work. Any material which has deteriorated or has been damaged or is otherwise considered defective by the Engineer in charge shall not be used in the works.
8. Cement shall be stored above the ground level in perfectly dry and watertight sheds. Wherever bulk storage containers are used, their capacity should be sufficient to cater to the requirements at site and should be cleaned at least one every 3 to 4 months. The aggregates shall be stored in such a way as to prevent admixture of foreign materials. Different sizes of the fine or coarse aggregates shall be stored in separate stock piles sufficiently removed from each other to prevent inner mixing of the materials.
9. The water for mixing shall be potable water to satisfaction of the Engineer in charge. The quality of water shall be just sufficient to produce a dense concrete of required workability for the job.
10. For all work concrete shall be mixed in a mechanical mixer which along with other accessories shall be kept in first class working condition and so maintained throughout the construction. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregates show complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.
11. When hand mixing is permitted by the Engineer in charge for small jobs or for certain other reasons. It shall be done on a smooth watertight platform large enough to allow efficient turning over of the ingredient of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material shall be mixed with concrete nor does the mixing water flow out. Cement in required numbers of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregates, which shall also be spread in layers of uniform thickness on the mixing platform. Dry coarse and fine aggregates and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour, enough water shall then be gradually added thoroughly by and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified.
12. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in new batch. Unless otherwise agreed to by the Engineer in charge, the first batch of concrete from the mixer shall contain only two thirds of normal quantity of coarse aggregates. Mixing plant shall be thoroughly cleaned before changing from one type cement to another.
13. The method of transporting and placing concrete shall be approved by the Engineer in charge. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All formwork and reinforcement contained in it shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer in charge has been obtained.
14. If concreting is not started within 24 hours of the approval being given, it shall have to be obtained again from the Engineer in charge. Concreting being given it shall proceed continuously over the area between construction joints. Fresh concrete shall not be laid against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer unless carried in properly design agitators, operating continuously. When this time shall be within 2 hours of the addition of cement to the mix and within 30 minutes of its discharge from the agitator. Except where otherwise depth of not more than 45 minutes when internal vibrators are used and not exceeding 0.30 meter in all other cases.
15. Unless otherwise agreed to by the Engineer in charge concrete shall not be dropped into place from a height exceeding 2 meters. When trunking or chutes are used they shall be kept clean and used in such a way as to avoid segregation. When concreting has to resume on surface which has hardened it shall be roughened, swept, clean thoroughly wetted and covered with a 13mm thick layer of mortar composed of cement and sand in the same ratios as in the concrete mix itself. This 13mm layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened all laitance shall be removed by scrubbing the wall surface with wire or bristly brushed, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150mm in thickness and shall be well rammed against old work particular attention being given to corner and close spots.
16. All concrete shall be compacted to produce a dense homogenous mass with the assistance of vibrators unless otherwise permitted by the Engineer in charge for exceptional cases such as concrete under water, where vibrators can not be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.
17. Immediately after compaction, concrete shall be protected against harmful effect of weather including rains, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hessian or other similar absorbent material approved by the Engineer in charge soon after the initial set and shall be kept continuously wet for a period not less than 14 days from the date of placement. Masonry work over the foundation concrete may be started after 48 hours of its laying but the curing of concrete shall be continued for a minimum period of 14 days.
18. Formwork shall include all temporary or permanent forms required for forming the concrete together with all temporary construction required for their support. Formwork shall however be divided into following two distinct categories.
  1. Shuttering i.e. formwork required for forming the concrete
  2. Scaffolding i.e. formwork required for supporting shuttering.

Forms for shuttering shall be constructed only in metal suitably line. Forms for scaffolding shall be constructed of metal or timber. Both shuttering and scaffolding shall be of substantial rigid construction and shuttering shall be true to shape and dimension shown on the drawings. All bolts and rivets shall be counter sunk and well ground to provide a smooth plane surface.

19. Forms shall be mortar tight and shall be made sufficiently rigid by the use of ties and bracings to prevent any displacement or sagging between supports. They shall be strong enough to withstand all pressure, ramming and vibration, without deflection from the prescribed line occurring during and after the placing of the concrete. Screw jack or hard wood wedges where required shall be provided to make up any settlement in the formwork either before or during the placing of concrete. Suitable camber shall be provided in horizontal member of structure, specially in long spans so counteract the effect of any fixed as to provide for such camber. Forms shall be so constructed as to be removable in sections in the desired sequence, without damaging the surface of concrete or disturbing other section. Unless otherwise specified or directed, chambers or fillets of size 25mm x 25mm shall be provided at all angles of formwork to avoid sharp corners.

20. The inside surfaces of shuttering shall except in the case of permanent formwork or where otherwise agreed to by the Engineer in charge be coated with an approved material to prevent adhesion of concrete to the formwork. Release agents shall be applied strictly in accordance with the manufacturer's instructions and shall not be allowed to come into contact with any reinforcement or prestressing tendons and anchorages. Different release agents shall not be used in formwork for concrete which will be visible in the finished work.

21. Special measures shall be taken to ensure that the formwork does not hinder or shrinkage or concrete because without these cracking could occur before the formwork is removed. Where ever applicable arrangements must be made to ensure that the formwork does not restrain the shortening and hogging of the beams or slabs during tensioning of the tendons. The formwork should take due account of the calculated amount of positive or negative camber so as to ensure the correct final shape for the structure having regard to the deformation of a false work, scaffolding or propping and the instantaneous or deferred deformation due to various causes affecting prestressed structures. Where there are re-entrant angles in the concrete sections the formwork should be removed at those sections as soon as possible after the concrete has set in order to avoid cracking due to shrinkage of concrete. Formwork shall be tight enough to prevent any appreciable loss of cement during vibrations, suitable tolerance cleaned. Contractor shall give the Engineer in charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for safety of men, machinery, material and results obtained.

22. The Engineer in charge shall be informed in advance by the contractor of his intentions to strike any formwork. While fixing the time for removal of formwork due consideration shall be given to local condition, character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix. Where field operations are controlled by the strength tests of concrete the removal of the load supporting or soffit forms any commence when concrete has attained strength equal to at least twice the stress to which the concrete will be subjected at the time of striking props including the effect of any further addition of loads. When field operations are not controlled by strength tests of concrete the vertical forms of beams, columns and wall may be removed after 2 days. The props of slabs and beams may be removed after 14 and 21 day respectively. All formwork shall be removed without causing any damage to the concrete. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stress due to its own weight uniformly and gradually. Where internal metal ties are permitted they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanent embedded metal part shall have less than 25mm cover to the finished concrete surface. Where it is intended to reuse the formwork, it shall be cleaned and made good to the satisfaction of the Engineer in charge.

23. Immediately after the removal of forms all exposed bars or bolts passing through the cement concrete members and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25mm below the surface of the concrete and the resulting holes be filled by cement mortar. All fins caused by form joints all cavities produced by the removal of the form ties and all other holes and depressions, honeycomb spots, broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is being finished and as dry as consistency as is possible to sue. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surface which have been pointed shall be kept moist for a period of twenty four hours. If rock pockets / honeycombs in the opinion of the Engineer in charge are of such an extent or character as to affect the strength of the structure materially or to endanger the life of the steel reinforcement he may declare the concrete defective and require the removal and replacement of the portion of the structure affected.

24. In the case of reinforcement work workability shall be such that the concrete surrounds and properly grips all reinforcement. The degree of consistency which shall depend upon the nature of work and methods of vibration of concrete shall be determined by regular slump tests. Following slump shall be adopted for different type of works.

	Type of work	Slumps	
		Where vibrator are used	Where vibrator are not used
(i)	Mass concrete in RCC foundations, footing and retaining walls.	10mm to 25mm	80 mm



(ii)	Beams, slab and columns simply reinforced.	25mm to 40 mm	100mm to 120 mm
(iii)	Thin RCC section or section with congested	40mm to 50mm	125mm to 150mm

25. Works strength test shall be made in accordance with IS 516. Each test shall be conducted on ten specimens five of which shall be tested at seven days and the remaining five at 28 days. The sample of concrete shall be taken on each day of concreting and cubes shall be made at the rate of one for every 5 Cu.M. of concrete or a part thereof. However if concreting done in a day is less than 15 Cu.M. the minimum number of cubes can be reduced to 6 with the specific permission of the Engineer in charge. Similar works test shall be carried out whenever the quality and grading of materials is charges irrespective of the quantity concrete proud. The number of specimens may be suitably increased as deemed necessary by the Engineer in charge, when procedure of tests given above reveal a poor quality of concrete and in other special cases.

26. The average strength of the group of cubes cast for each day shall not be less than the specified work cub strength 20 percent of the cubes cast for each day may have values less than the specified strength, provided the lowest value is not less than 85 percent of the specific strength.

27. R.C.C. work shall have exposed concrete surfaces. Centering design and its erection shall approved by the Engineer in charge. One carpenter with helper will invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited over reinforcement laid in position. For access to different parts, suitable mobile platforms shall provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber kapachi or metal pieces shall not be used for this purpose. Concreting of important structural members shall always be done in the presence and under the supervision of departmental person not below the rank of Assistant Engineer / Addl. Asst. Engineer, Overseer or as instructed by the Engineer in charge. After removal work checks that concrete produced is of good quality. Plastering shall not be allowed to the expressed faces of concrete.

28. In reinforced concrete the volume occupied by reinforcement shall not be deducted. The slab shall be measured as running continuously through and the beam as the portion below the slab.

29. All necessary labours, materials, equipment etc for sampling preparing test cubes, curing etc. comp. shall be provided by the contractor. Testing of the materials and concrete may be arranged by the Engineer in charge in an approved laboratory at the cost of contractor

30 The payment shall be made on Cu.M. basis for the finished work.

31. The unit rate for concrete shall include the cost of all materials, labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing as per the directions of the Engineer in charge, curing and all other incidental expenses for producing concrete of specified strength to complete the structure or its components as shown on the drawings and according to these specifications. The rate shall also include the cost of making / fixing and removing of all centers and forms required for the work.

#### **Item No. - 4**

**Uncoursed rubble masonry with hard stone of approved quality in foundation and plinth in cement mortar 1:5 (1-Cement 4-Course sand) including levelling up etc. complete**

**1.0 Materials:** The cement mortar shall conform to M-11. Stones shall conform 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 stones shall be dressed in such a manner as to give a specified Pattern such as Blygonal tucing etc. The race of the stones shall be so dressed that bushing 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:** All the stones shall be sufficiently wetted before laying to prevent absorption of water from mortar. The wall shall be built true to plumb (or true to required batter when so specified). All connected walls in a structures 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 metre in height.

**2.3** The stones shall be laid in an uncoursed fashion or randon facint etc. However, the masonry is required to be brought to level at various stages viz. plinth level, window still level, roof level and any other level specifically shown in the drawings. This may be done by first by adjusting the laying or stones to one 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) or as otherwise specified.

**2.4** Proper bonding shall be achieved by closely filing in adjacent stones as well as by using bond stones ore 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 inwards shall not be less than weight 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.

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

**2.6 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 atleast 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 Sq.m. of wall surface. The bond stone shall be marked by a distinguishing letter during construction of subsequent verification and shall be laid staggered in subsequent layers.

**2.7 Quoins:** The quoins or corners stone shall be selected stone nearly 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 quoins stone shall be smaller than 0.025 Cum. in volume.

**2.8 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.

**2.9 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 flush and finished simultaneously while laying the stone. Otherwise the joints shall be raked to a minimum depth of 20mm. by a racking tools, during progress of laying while the mortar is still green.

**2.10 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.

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

**3.0 Mode of Measurement & 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 be ignored. The masonry work in foundation and plinth shall be measured under this item. No deduction shall be made nor extra payment made for the following:

- a) Ends of joints, beams, posts, girders, rafters, trusses, corbels, etc. each upto 500 sq.cm. in section.
- b) Opening each upto 0.1 sq.m.
- c) Wall plates and bed plates bearings of chajja and like upto 10 cm. depth (bearing of floor and roof slabs shall be deducted from masonry).
- d) Drain holes and recesses for cement concrete blocks to embed hole fasts for doors windows.
- e) Building in the masonry iron fixtures pipes upto 300 mm. dia. hold fasts of doors and windows.
- i) Forming cheses in masonry upto section of 350 sq.cm.

**3.2** The rate shall be for a unit of one cubic metre.

## **Item no. 7**

**Filling in plinth with sand under floors including watering ramming, consolidating and dressing etc. comp.**

### **1.0. Workmanship:**

1.1. Materials: 1.1. Sand shall conform to M. 6.

#### **1.2.**

1.3. The sand to be used for. filling shall be free from salts, organic or other foreign matter.

1.4. As soon as the work in foundation has been completed and measured, the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc; and filled with earth in layers not exceeding 20 Cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the butt ends of crow-bars, where rammer cannot be used.

1.5. The plinth shall be similarly filled with sand in layers not exceeding 20 Cms. adequately watered and consolidated

ramming with iron or wooden rammers. When filling reaches finished level, the surface shall be flooded with water for atleast 24 hours and allowed to dry and then rammed and consolidated.

1.4. The finished level of filling shall be kept to shape intended to be given to floor.

1.5. In case of large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation required shall also be as specified.

1.6. The excavated stuff of the selected type shall be allowed to be used in filling the trenches and plinth. Under no circumstances black cotton soil be used for filling the plinth.

#### **2.0. Mode of measurement and payment:**

2.1. The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids, if consolidated as instructed above.

2.2. The rate shall be for a unit of one cubic metre.

#### **Item No. 8**

**Precast concrete block masonry (including quoin blocks Jamb blocks, closer etc.) with solid concrete blocks of approved size made of cement concrete 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate of 20mm. and down gauge) for super structure in cement mortar 1:4 (1-Cement 4-Course sand)**

**1.0 Materials :** (a) Aggregate shall conform to M-12 (b) Sand shall conform to M-6. Cement shall conform to M-3.

1.1. The solid cement concrete block shall be precast with concrete of 1: 3 :6 mix (1 cement; 3 coarse sand: 6 graded stone aggregate).

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

1.3. The concrete mix used for blocks shall not be richer than 1 part by volume of cement 3 to 6-parts by volume of combined aggregate. The actual size of the blocks shall be one of the following. Size-A 39 x 23 x 15 cms.

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

1.5. The blocks may be either machine made or hand made. The concrete mix, the mixii g of concrete, the manufacture of b socks, curing arid drying shall be in accordance with para-6 to 10 under I.S. 2185-1967.

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

1.7. The average compressive strength of eight blocks when determined in the manner described in I.S.: 2185 1967 shall not be less than 50 Kg/Sq. Cm. of gross area. The strength of lowest individual block shall not be less than 75 percent of average compressive strength of eight blocks.

1.8. Concrete blocks shall be stored and stacked properly in such a way as to avoid any contact with moisture at site. They snail be stock plied on planks or other supports free from contact with ground and covered to protect against wetting. Cement under 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 moistured so as to prevent absorption of water from the mortar and ensure the development of required bond with mortar.

2.2. Operations of laying precast cement concrete block masonry shall be carried out in accordance with instructions detailed in I.S. 6042-1962. The mortar shall not be spread so much ahead of the actual laying of the units that it tends to stiffon and loose its plasticity, thereby resulting in poof bond. For most of the work; the joints, both horizontal and vertical 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 ool. 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 it and obtained a weather tight joint.

2.3 Quoins & closers: Special quoins blocks (with a return face equal to half the length of normal face) shall be cast for all building blocks and slabs for external work. Proper half length closers shall be cast and rot 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.

2.4. 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 for 7 days.

**3.0. Mode of measurements & payment:**

3.1. The relevant specifications of item No. 7.6 (I) shall be followed.

3.2. The work of concrete block masonry in foundation and plinth shall be measured under this item.

3.3. The rate shall be for a unit of one cubic metre

**Item – 13**

**Providing TMT Bar FE 500/500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto TWO LEVEL**

The work include P & L. in position / HYSD / Mild Steel / Thermo – Mechanically Treated bar of the following grade.

Grade Designation	Bar Type Conforming to governing IS specification	Characteristic strength Fy MPa	Elastic Modulus GPa
S 500/500D	IS 1786 High yield strength deformed bar	500	200
S 240	IS 432 Part II	240	

**TMT Bar**

415 TMT Bar shall conform to min 415 MPa yield strength. Tensile strength of min 500 MPa and elongation percentage min 32. The chemical composition of bars shall be as below:-

	Max
Carbon	0.25
Sulphur	0.05
Phosphorus	0.05
Sulphur & Phosphorus	0.01

1. All steel shall be procured from original producers, no re-rolled steel shall be incorporated in the work. Only new steel bars shall delivered to the site, Every bar shall be inspected before assembling in the work and defective brittle or brunt bar shall be discarded Cracked ends of bars shall be discarded.
2. The work shall consist of furnishing and placing reinforcement of the shape and dimensions shown on the drawings or as directed by the Engineer in charge.
3. Steel shall be clean and free from loose rust and loose mill scale at the tune of fixing in position and subsequent concreting .Steel shall apply treatment of anticorrosive with powder of polymer base material before use.
4. Reinforcing steel conform accurately to the dimensions given in Bar bending schedules shown on relevant drawings. Bars shall be bent cold to the specified shape and dimensions or as directed by the Engineer in charge using a proper bar bender operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used on work they shall be not heated to facilitate bending. Unless otherwise specified a 'U' type hook at the end of each bar shall invariably provided. The radius of the bend shall not be less than twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In the case of bars which are not round and in the case of deformed bars ten diametre shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.
5. All reinforcement bars shall be accurately placed in exact position shown on the drawings and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm in size and conforming to IS: 280 and by using stay blocks or metal chairs, spacers, metal hangers supporting wires or other approved device at sufficiently close intervals. Bars will not be allowed to sag between supports nor displaced during concreting or any other operation of the work. All devices used for positioning shall be of non corrodible material wooden and metal supports will not extent to the surface of concrete except where shown on the drawings, placing bars on layers of freshly laid concrete laid concrete as the work progresses for adjusting bar spacing will not be allowed pieces of broken stone or brick and wooden blocks shall not be used layers of bars shall be separated by spacer bars precast mortar blocks or other approved devices. Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in

concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To protect reinforcement from corrosion concrete cover shall be provided as indicated on the drawings. All bars protruding from concrete and to which other bars are to be spliced and which are likely to be exposed for an indefinite period shall be protected by a thick coat of neat cement grout.

6. Bars crossing each other where required, shall be secured by binding wire (annealed) of size not less than 1 mm and conforming to IS:280, in such a manner that they do not slip over each other at the time of fixing and concreting.

7. As far as possible bars of full length shall be used. In case this is not possible overlapping of bars shall be done as directed by the Engineer in charge when practicable overlapping bars shall not touch each other but be kept apart of 25 mm or 1.25 times the maximum size of the coarse aggregate whichever is greater by concrete between them where not feasible overlapping bars shall be bound with annealed steel wire, not less than 1 mm thickness twisted tight. The overlaps shall be staggered for different bars and located at points along the span where neither shear nor bending moment is a normal.

8. Whenever indicated on the drawings of desired by the Engineer-in-charge bar shall be jointed by couplings which shall have a cross-section sufficient to transmit the full stresses of bars. The ends of the bars that are jointed by couplings shall be upset for a sufficient length so that the effective cross-section at the base of threads is not less than the normal cross-section of the bar. Threads shall be standard white wash threads steel for coupling shall conform to IS :226

9. When permitted or specified on the drawings joints of reinforcement bars shall be butt welded so as to transmit their full stresses welded joints shall preferably be located at points where steel not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded metal and conforms to any or all other special provisions for the work will be accepted suitable means shall be provided for holding the bars securely in position during welding. It must be ensured that no voids are left in welding and when welding is done in 2 or 3 stages, previous scale, rust, grease, paint and other foreign matter before welding shall conform to IS 814 welded pieces of reinforcement shall be tested specimen shall be taken from the actual site and their number and frequency of tests shall be as directed by the Engineer – in – charge.

10. Reinforcement shall be measured in length excluding overlaps, separately for different diameters as actually used in the work, where welding or coupling is restored in place of lap-joints such joints shall be measured for payment as the equivalent length of overlap as per design requirement, From the length so measured the weight of reinforcement shall be calculated in tones on the same basis of IS : 1732. Length shall include hooks at ends wastage and annealed steel wire for binding shall not be measured and cost of these items shall be deemed to be included in the rates for reinforcement.

11. Rates for reinforcement shall include cost of all steels carrying to work site and cutting, bending , placing, binding and fixing in position as shown on the drawings and as directed by the Engineer – in – Charge. It shall also include cost of all devices for keeping reinforcement in approved position cost of joint age as per approved methods and all wastage and spacer bars.

12. Payment shall be made one Kg. basis.

#### **Item-14**

**Providing and laying 20mm thick granite mirror polished (telephone black coloured) with exposed edge quarter round for platform,door/window cill and jams,treads and risers for steps fixed to wall with neat cement as directed by Engineer-in-charge.**

##### **1.0. Materials:**

Water shall conform to M-I. Cement mortar shall conform to M-I I. Black Granite shall be approved by the Engineer-in-charge.

##### **2.0. Workmanship:**

###### **2.1. Bedding:**

**2.1.1.** The sub-grade shall be cleaned, wetted and mopped. The bedding shall then be laid evenly over the surface tamped and corrected to desired level and allowed to harden enough to offer a rigid cushion to tiles and to enable the mason to place wooden planks across and squat on it.

**2.1.2.** The Granite shall be laid on cement mortar bedding of 30 to 40mm. thick in C.M. 1 : 3. The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10 mm. at any place and average 12 mm. thickness. The proportion of the cement mortar shall be as specified in the item.

###### **2.2. Fixing :**

**2.2.1.** The edge of granite for frames of doors and windows shall be ornamental finished Edges shall be got half round as directed by Engineer-in-charge

###### **2.3. Cleaning:**

**2.3.1.** The surplus cement grout that may have come out of the joints shall be cleared off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precaution and measures shall be taken to ensure that the tiles are not damaged many way till the completion of the construction.

##### **3.0. Mode of measurements & payment:**

**3.1.** The work done shall be measured in sq mt. for visible area of work done. The item includes all material,labour and machinaries required for all operation.

3.2. The rate shall be for a unit of one sq. meter.

#### Item No. 15

**Providing and fixing 35 mm thick double shutter flush door with 75x35 MM teak wood beading finished with pattern laminate on both side in situ laminate work with all S.S. fixtures and fastenings and aldrops as directed by engineer -in-chage including 18mm th Granite Frame telephone black colour fixing with wall properly etc complete.**

##### **1. Materials:**

1.1. Wood for shutter shall conform to M-29. (2) Glass shall conform to M-28. (3) Anodised aluminium butt hinges shall conform to M-43.

**2.0 Workmanship:** The item covers the requirement of preparation of shutters for doors, windows, clerestory windows, their supply and fixing.

##### **2.2. Shutters:**

2.2.1. Panelled shutters shall be constructed in the form of timber frame work of styles and rails with panel inserted of type

as specified in the detailed drawings. Panel shall be fixed by providing grooves in the style and rails. The styles and rails shall

be joined to each other by mortise and tenon joints at right angles.

2.2.2. All members of the shutters shall be straight without any warp or bow and shall have smooth, well planed faces at right

60

angles to each other.

2.2.3. The size of styles and rails shall be as per drawing or as directed. Styles and rails of shutters shall be made of one piece

only.

##### **2.3. Timber panelling:**

2.3.1 Thickness of the panel shall be as specified in the item as shown in the drawing or as directed. If the panel is made from

more than one piece, the pieces shall be finished as shown in the detailed drawings and shall be joined with continuous groove

with specified size. The end pieces of the panel and the top and bottom of the panel shall be provided with continuous tongue

to frame into groove of the frame shutter. An air space of 1.5 mm. shall be left in the groove of frame shutter while fixing the

panel in it.

2.3.2 The faces of the panel as well as various pieces of the panel shall be closely filled to the sizes of the grooves.

2.3.3. Finishings of the corners of raised panel edges shall be done as shown in drawings or as directed.

**2.5. Fixtures & Fastenings: 2.5.1.** The rate shall include anodised aluminium butt hinges including fixing with iron screws.

The size and number of hinges shall be as per table given in annexure-1.

##### **3.0. Mode of measurements & payment:**

3.1. The rate for shutter includes cost of providing block and clear for keeping the shutter in open position as directed.

3.2. The dimensions of the shutter shall be measured clear size of the shutter in close position between the grooves of the frame.

3.3. The rate shall be for a unit of one sq. metre.



**Item No. 16**

**Providing and fixing standard extruded of aluminium section of size 63mm x 38.10mm x 1.2mm (Jindal Section :2434, @ Wt. 0.643 Kg/mt) with colour anodized aluminium frame for ventilation with 5 mm thick transparent tinted float glass as details etc complete for Ventilation**

- 1.0 Materials:** Aluminium section for door and windows shall confirm to M-31 of vol.-1. The section shall be specified in the drawing and design. A suitable lock for the door openable either from outside or inside shall be pivoted.
- 2.0 Workmanship :-** The aluminium frame of section as specified by Engineer-in-charge shall be fixed in true line and level. The glass paneling 5mm thick shall be fixed with PVC and necessary fittings, and windows shall be fixed as per direction of Engineer-in-charge.
- 3.0 Mode of Measurement:-** The measurement shall be taken in Sqmt. of net area. Payment shall be for one Sqmt. unit. The rate shall include cost of all materials, labour, fixture, fastening, mortise lock, glasses etc. required in operation described under workmanship.

**Item No. 17**

**Providing and fixing M.S. grill of required pattern to wooden frames of windows etc. with M.S. flats at required spacings and frame around square or round bars with round headed bolts and nuts or by screws.- Plain grill**

**1.0 Materials:**

Aluminium section for windows shall confirm to M-31 of vol.-1. The section shall be specified in the drawing and design. A suitable lock for the window shall be provided.

**2.0. Workmanship:**

2.1. The M.S. bars shall be fabricated as shown in the drawing or as directed. It shall conform to I.S. 226-1975 and I.S. 961 and I.S. 1977-1975. The M.S. bars shall be fixed at the required spacing in mild steel flats, after drilling holes in the latter. The diameter and spacing of these bars shall be as mentioned in the drawing or as directed. The bars shall be passed through drill holes drilled into the mild steel flats, fixed in the recess in the frames. The flats shall be fixed with iron screws.

**3.0. Mode of measurements & payment:**

3.1. The rate shall be for the M.S. round or square bars with M.S. provided and fixed in position as per the specifications for the completed item.

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

**Item No. 18**

**Providing 10mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand) G.F.**

**And**

**Item No. 19**

**Providing 15mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two level and finished even and smooth in (i) Cement mortar 1:3 (1-cement:3-sand) G.F.**

**1.0. Materials:**

1.1. Water M-1. The cement mortar of proportion 1 :3 shall conform to M-13.

**2.0. Workmanship:**

**2.1. Scaffolding:** Wooden baulks, bamboos, planks, trellises and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

**2.2. Preparation of background:**

**2.2.1.** The surface shall be cleaned of all dust, loose mortar droppings, (traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surface where necessary shall be carried out to get an even surface.

**2.2.2.** Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

**2.2.3.** The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such area shall be moistened again.

**2.2.4.** For external plaster the plastering operation shall be started from (op floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and (the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

**2.3. Applications of plaster:**

**2.3.1.** The plaster about 15x15 cm. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arises, angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arises junctions etc. shall be carried out with proper templates to the size required.

**2.3.2.** Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site.

**2.3.3.** In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

**2.3.4.** Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags on the outside of the plaster and keeping them wet.

**1.0. Materials & Workmanship for floating coat :**

**1.1.** The relevant specifications of plastering shall be followed for materials and workmanship except that this work is only of providing smooth cement finish with floating coat of neat cement slurry.

**1.2.** The coat of cement and fine sand mortar of proportion 1:1 (1.5. mm. thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the base coat is still plastic.

**1.3.** In any continuous face of wall the finishing treatment should be carried out continuously and day to day break made to coincide with architectural breaks in order to avoid unsightly junctions.

**1.4. Curing:** All the plaster work shall be kept damp continuously for a period of 7 days.

**3.0. Mode of measurements & payment ( Plastering & floating coat ) :**

**3.1.** The rate shall include the cost of all materials, labor and scaffolding etc. involved in the operations described under workmanship.

**3.2.** All plastering shall be measured in square meters unless, otherwise specified. Length, breadth or height shall be measured correct to a centimeter.

**3.3.** Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10 mm. at any point on this surface.

**3.4.** This item includes plastering up to floor two level.

**3.5.** The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

**3.6.** Soffits of stairs shall be measured as plastering on ceilings. Flowing soffits shall be measured separately.

**3.7.** For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. m. each in area for ends of joints, beams, posts, girders, steps, etc. not exceeding 0.5 sq. m. each in area and for openings exceeding 0.5 sq. m. and not exceeding 3.00 sq. m. in each area deductions and additions shall be made in the following manner:

(a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. m. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these opening for finish to plaster around ends of joints, beams posts etc.

(b) Deduction for openings exceeding 0.5 sq. m. but not exceeding 3 sq. m. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings.

(i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.

(ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the case may be.

**3.8.** For openings having door frames equal to projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.



**3.9.** In case of openings of area above 3 sq. m. each, deduction shall be made for opening but jambs soffits and sills shall be measured.

**3.10.** The rate shall be for a unit of one sq. meter.

3.2. The rate shall be for a unit of one sq. meter

#### **Item No. 20**

**20mm. thick sand faced cement plaster on walls up to height 10meters above ground level consisting of 12mm. thick backing coat of c.m. 1:3 (1cement : 3 sand) and 8mm. thick finishing coat of c.m. 1:1 (1cement : 1 sand) etc. complete.**

1.0. Materials:

1.1. Water shall conform to M-12. Cement mortar shall conform to M-11.

2.0. Workmanship:

2.1. The work shall be carried out in the coats. The backing coat (base coat) shall be 12 mm. thick in C. M. 1 : 3. The relevant specifications of item No. 48 shall be followed except that the thickness of back coat shall be 12 mm. average & without floating coat. Before the first coat hardens its surface shall be beaten up by edges of wooden tappers and close dents shall be made on the surface. The subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days depending upon the weather conditions. The surface shall not be allowed to dry during this period.

2.2. The second coat shall be completed to 8 mm. thickness in C. M. 1:1 as described above, including raising sand facing by bushing. The sample of sand face shall be got approved before the work is started. The whole work shall be carried out uniformly as per sample approved.

2.3. Curing: The curing shall be started overnight after finishing of plaster. The plaster shall be kept wet for a period of 7 days. During this 'period, it shall be protected from all damages.

3.0. Mode of measurements & payment:

3.1. The relevant specifications of item No. 35 shall be followed except that the sand face plaster on outside up to in. above ground level shall be measured under this item.

3.2. The rate shall be for a unit of one sq. meter.

#### **Item No. 21**

**P & L 24" x 24" vitrified 8 mm thick tile flooring over 20mm (average) base of cement mortar 1:6 ( 1 cement: 6 coarse sand) on new surface or fixing on existing flooring by adhesive material including dismantling of existing flooring and jointed with color cement slurry including finished with flush pointing & cleaning the surface etc. complete for light shade**

**1.0. Materials:**

Water shall conform to M-1. Cement mortar shall conform to M-11. ceramic vitrified tiles shall be approved by the Engineer-in-charge.

**2.0. Workmanship:**

**2.1. Bedding:**

**2.1.1.** The sub-grade shall be cleaned, wetted and mopped. The bedding shall then be laid evenly over the surface tamped and corrected to desired level and allowed to harden enough to offer a rigid cushion to tiles and to enable the mason to place wooden planks across and squat on it.

**2.1.2.** The ceramic tiles shall be laid on cement mortar bedding of 30 to 40mm. thick in C.M. 1 : 3. The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10 mm. at any place and average 12 mm. thickness. The proportion of the cement mortar shall be as specified in the item.

**2.2. Fixing tiles:**

**2.2.1.** The tiles before laying shall be soaked in water for at least two hours. Neat grey cement grout at 3.3. Kg/Cement/ Sq. m. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in straight line or as per pattern.

**2.2.2.** The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nehni trap coming in the flooring shall be so positioned that its grating shall replace only one tile as far as possible. Where full size tiles cannot be fixed, they shall be cut (Swan) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with grey cement grout with wire brush of trowel to a depth of 5 mm and loose material removed. White cement shall be used for pointing the joints. After fixing the tile finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days.

**2.3. Cleaning:**

**2.3.1.** The surplus cement grout that may have come out of the joints shall be cleared off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precaution and measures shall be taken to ensure that the tiles are not damaged many way till the completion of the construction.

**3.0. Mode of measurements & payment:**

**3.1.** The work done shall be measured in sq ml. for visible area of work done. The length and width of the flooring shall be measured not between the faces of skirting or dados or plastered face of wall as the case may be. The paving under dado or skirting shall not be measured. No deduction shall be made nor extra paid for any opening in -the floor of area up to 0.1 sq. ml. Nothing extra shall be paid for laying the floors at different levels in the same rooms.

**3.2.** The rate shall be for a unit of one sq. meter.

**Item No. 22**

**Finishing wall with water proffing cement paint of on wall surface (two coats) to give an approved brand and manufature and of required shape even shade with extra every subsequent coat of water proofing cement paint of approved brand and manufacture after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials.**

**1.0. Materials:**

1.1. The water shall conform to M-l. Cement water proofing shall conform to I.S. 5410-1969.

**2.0. Workmanship:**

2.1. Scaffolding: The relevant specifications of item No. 46 shall be followed.

2.2. Preparation of surface: The relevant specifications of item No. 49 shall be followed except that the word white wash color wash shall be substituted with water proofing cement paint. The surface shall be thoroughly wetted with clean water before cement water proofing paint is applied.

2.3. Preparation of paint: Portland cement shall be prepared by adding paint powder to water and stirring to obtain a thick paste, which shall then be diluted to a brushable consistency. Generally, equal volumes of paint powder and water make a satisfactory paint. In all cases, the manufacture's instructions shall be followed. The paint shall be mixed in such quantities as can used up within an hour of mixing as otherwise the mixture will set and thickness, affecting flowing and finish. The labs of cement paint drums shall be kept tightly when not in use.

**2.4. Application of Paint:**

2.4.1. No painting shall be done when the paint is likely to be exposed to a temperature of below 7°C within 48 hours after application.

2.4.2. When weather conditions are such as to cause damage the work shall be carried out "in the shadow" as far as possible. This helps the proper hardening of the paint film by keeping the surface moist for a longer period.

2.4.3. To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.

2.4.4. For undercoated surfaces, the surfaces shall be treated with minimum two coats of water proof cement paint. Not less than 24 hours shall be allowed between two coats. Next coat shall not be started until the preceding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather, the proceeding coat shall be allowed between two coats. Next coat shall not be started until the preceding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather, the preceding coat shall be slightly moistened before applying the subsequent coat.

2.4.5. The finished surface shall be even and uniform in shade, without patches, brush masks, paint drops etc.

2.4.6 The cement paint shall be applied with a brush with relatively short stiff hog or fiber bristles. The paint shall be brushed in uniform thickness and shall be free from excessive heavy brush marks. The lamps shall be well brushed out.

2.4.7. Water proof cement paint shall not be applied on surfaces already treated with white wash color wash, distemper dry or oil bound varnishes, paint etc. It shall not be applied on gypsum, wood and metal surfaces.

2.5. Curing: Painted surfaces shall be sprinkled with water two or three times a day. This shall be done between coats and for at least two days following the final coat. The curing shall be started as soon as the paint has hardened so as not to be damaged by the sprinkling of water say about 12 hours after the application.

2.6. Protection measures shall be taken as per item No. 46

**3.0. Mode of measurements & payment:**

3.1. The relevant specifications of item No. 46 shall be followed.

3.2. The rate shall be for a unit of one sq. meter

**Item No. 23**

**Wall painting (three coats) with plastic emulsion paint of approved brand and manufacture on undecorated wall surface to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth. including applying two coats of Birla or Asian acrylic lapy ( putty) & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand papered smooth.**

**1.0 Materials :** Water shall be conform to M-1. The plastic emulsion shall conform to I.S. 5411-1969 (part-I).

**2.0. Workmanship:**

**2.1. Scaffolding :** Wherever scaffolding is necessary it shall be erected in such a way that as far as possible on part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Where ladders are used, pieces of old gunny bag shall be tied at top and bottom to prevent scratches to the floors and walls. For white washing of ceilings proper stage scaffolding shall be erected where necessary..

**Preparation of surface :**

2.2. The undecorated surface to be distempered shall be thoroughly brushed off from dust, dirt, grease, mortar dropping and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry for atleast 2 months before applications of distemper.

2.3. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster of paris mixed with dry distemper of colour to be used. The surface shall then be rubbed down again with a fine grade sand paper and made smooth. A coat of distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distemper is allowed. The surface affected by moulds, moss, fungi algae lichens, efflorescence etc. shall be treated in accordance with I.S. 2395 (Part-I) 1966. Before applying distempering, any unevenness shall be made good by applying putty made of plaster of paris mixed with water on entire surface including filling up the undulation and then sand papering the same after it is dry.

2.4. Preparation of Mix : This shall be done as per manufacturers instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacturer instructions.

**2.5. Applications:**

2.4.1. Before pouring into small containers for use, the paint shall be stirred thoroughly in its container. When applying also, the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform.

2.4.2. The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and laying off consist of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of mouldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

2.4.3. The paint shall be applied with brush or rollers. For undecorated surfaces, the surface shall be treated with minimum two coats of cement water proofing paint. The second or subsequent coat shall not be started until the preceeding coat has become sufficiently hard to resist marking by brush being used.

2.4.4. The surface on finishing shall present a flat velvety smooth finish. It shall be even and uniform in shade without patches, brush marks, paint drops etc.

**2.5. Precautions:**

(a) Old brushes if they are to be used with emulsion paints, shall be completely dried of turpentine oil paint by washing in warm soap wafer. Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush. In the preparation of wall for plastic emulsion painting, no oil base putties shall be used in filling cracks, holes etc.

(b) Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening. Washing of surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application.

**2.6. Protective measures: 2.6.1.** The surface of doors, windows, floors, articles of furniture etc, and such other

parts of the building not to be white washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any:

### **3.0. Mode of measurements & payment :**

3.1. All the work shall be measured in the decimal system as under :

(a) Dimensions shall be measured to the nearest 0.01 M.

(b) Area in individual items shall be worked out to the nearest 0.01 Sq. M.

All the work shall be measured in sq. mt. Deductions for jambs, soffits, sills etc. for opening not exceeding 0.5 sq. mt. each in area for ends of joints, posts, beams, girders, steps etc. not exceeding 0.5 sq. mt. each in area and for opening exceeding 0.3 sq. mt. and not exceeding 3.0 sq. mt. each in area deductions and additions shall be made as under :

3.2. No deductions shall be made for ends of joints beams, posts etc. and openings not exceeding 0.5 sq. mt. each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finish arounds ends of joints, beams, posts etc.

3.3. Deductions for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits etc. of these openings:

(a) When both the faces or walls are provided with finish, deduction shall be made for one face only.

(b) When each face of wall is provided with different finish deduction shall be made for that side of frame for door, windows etc. on which width of reveals is less than that of the other side, where width of reveals on both faces of wall are equal,

deduction of 50% of area of opening on each face shall be made from total area of finish.

(c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than on the untreated side neither deductions nor additions be made for reveals, jambs, soffits, sills etc.

3.4. In case of area of opening exceeding 3 sq. mt. each, deduction shall be made for openings but jambs, soffits, shall be measured.

3.5. No deduction shall be made for attachment such as casing, conducts, pipe, electric wiring and the like.

3.6. Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas.

(a) Corrugated steel sheets 14%

(b) Corrugated A. C. Sheets 20%

(c) semi corrugated A. C. Sheets 10%

(d) Nainital pattern roof (Plain sheeting with rolls) 10%

(e) Nainital pattern roof (with corrugated sheets) 25%

3.7. Cornices and other wall features, when they are not picked out in a different finish/colour shall be girthed and included in the general area

3.8. The rate shall include the cost of all materials, labour, scaffolding, protective measures etc. involved in all the operations described above.

3.9. The rate shall be for a unit of one sq. metre.

### **Item No. 24**

**Providing and laying white glazed tiles 6mm thick in flooring treads of steps and landing laid on a bed of 12mm thick cement mortar 1:3 (1-cement : 3-coarse sand ) finishing with flush pointing in white cement.**

### **1.0. Materials:**

Water shall conform to M-I. Cement mortar shall conform to M-I I. ceramic vitrified tiles shall be approved by the Engineer-in-charge.

### **2.0. Workmanship:**

**2.1. Preparation of Surface:** In case of brick masonry wall, the joints shall be raked out to a depth of at least 15 mm. while the masonry is being laid. In case of concrete wall, the surface shall be chiseled and roughened with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

### **2.2. Laying:**

**2.2.1.** The wall surface shall be covered 10 mm. thick plaster of cement mortar 1: 3 mix and allowed to harden. The plaster shall be roughened with wire brushes both way. The back of tiles shall be floated with grey cement slurry and edges with white cement slurry set in bedding mortar. The tiles shall be gently tapped in position one after the other keeping the joints as thin as possible. Top of skirting or dado shall be truly horizontal and the joints vertical or as per required pattern.

**2.2.2.** Risers of steps, skirting and dado shall rest on top of treads or flooring. Where full size tiles can not be fixed, they shall be cut to the required size and the edges be smoothened.

**2.2.3.** The joints shall be cleaned and flush pointed with white cement. The surface shall be kept wet for seven days. After curing the surface shall be washed clean.

### **3.0. Mode of measurements & payment:**

**3.1.** The rate shall include the cost of all materials and labor required for various operations described above. Risers of steps, skirting and dado shall be measured in square meters. Length and height shall be measured along the finished face of the skirting or dado including curves, where special such as covers, internal and external angles, etc. used. The length and height shall be measured correct to the centimeter except in case of risers and skirting where height shall be measured correct to 3 mm.

**3.2.** The rate shall be for a unit of one sq. meter.

### **Item No. 25**

**Providing and fixing to wall ceiling and floor 10.0 Kg. F/Cm<sup>2</sup> working pressure poluthene pipes of the following outside Dia. Low density, complete with special falnge compression type fittings, wall clipsetc. including making good the wall ceiling and floor.(G)110 mm**

**1.0. Materials:** **1.1.** The low density polythene pipe of specified diameter with 6 Kg./Sq.Cm. working pressure shall conform

to I.S. 3076-1968. The specials and fitting required shall be of best quality.

### **2.0. Workmanship:**

**2.1.** The P. V. C. Pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P. V. C. Pipes, due

allowance shall be made particularly in over ground pipe lines for any change in length of pipe line which may occur during,

installation or when pipe line is in service.

**2.2.** Above ground installation of rigid P.V.C. pipe should be undertaken after preparations are observed for their protection

against direct sun rays and mechanical damage.

**2.3.** The rigid P.V.C. pipe lines should not be kept exposed above ground when it passes through public places, railway lines,

road side and footpaths.

**2.4.** P.V.C. pipes shall be supported at the following intervals:

20 mm dia. 500 mm. 32 mm. dia. 900 mm.

25 mm. dia. 750 mm.

**2.5.** Closer support spacings shall be provided if recommended by the manufacture.

**2.6.** The guide lines indicated by the manufacturer regarding, handling, transportation, storing laying and jointing of pipes

shall be kept in view during execution.

**2.7.** P.V.C. pipes shall be fixed on wall with wooden plugs and suitable plastic clamps.

**2.8.** Jointing the pipes :

**2.8.1** The pipes and sockets shall be accurately cut. The ends of the pipes and fittings should be absolutely free from dirt and

dust. The outside surface of the pipes and the inside of the fillings shall then be roughened with emery paper, and then solvent

cement joint. Since solvent cement is aggressive to P.V.C., care must be taken to avoid applying excessive cement to the

inside of pipe sockets as any surplus cement cannot be wiped off after jointing. Empty solvent cement tins, brushes rags, or

paper unpregnated with cement should not be buried in the trenches. They should be gathered, not left scattered about, as they

can prove to be a hazard to animals, which may chew them.

2.8.2. If manufacture recommends its own methods of jointing, the same shall be adopted after necessary approval from the

Engineer- in-charge.

### **2.9. Laying pipes in Trenches :**

2.9.1. The pipe shall be laid over uniform relatively soft fine grained soil found to be free of presence of hard objects such as

large flints, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.

2.9.2. The pipes laid underground shall not be less than one metre from the ground level. The pipe shall be positioned in the

trenches so as to avoid any induced stresses due to deflection. Any deviation required shall be obtained by using proper type

of rubber ring joints.

### **3.0. Mode of measurements & payment:**

3.1. The relevant specifications of item 23.2. (A) shall be followed except that the P. V. C. pipes of specified dia. shall be paid under this item.

3.2. The unit rate shall be for a unit of one running metre.

**Signature of  
contractor**

**Deputy Executive Engineer  
Panchayat R. & B. Sub Division  
Bhuj-Kachchh**

**Executive Engineer  
Panchayat R. & B. Division  
Bhuj-Kachchh**