

GENERAL TECHNICAL SPECIFICATIONS

1.0 General :

All measurements shall be made in the metric system. Different items of work shall be measured in accordance with the procedures set forth in the relevant sections read in conjunction with General Conditions of Contract. The same shall not however apply in the case of lump-sum items. All measurements and computations unless otherwise indicated shall be carried nearest to the following limits :

- (i) length and breadth..... 10 mm
 - (ii) height, depth or thickness of earthwork, sub-base, bases, surfacing, and structural members5 mm
 - (iii) areas,0.01 Sq. Metre
 - (iv) cubic contents..... 0.01 cubic metre
- in recording dimensions of work the sequence of length, width and height or depth or thickness shall be followed.

2.0 Measurement of lead for Materials :

Where lead is specified in the contract for construction materials, the same shall be measured as described hereunder.

Lead shall be measured over the shortest practicable route and not the one actually taken and the decision of the Engineer-in-charge in this regard shall be taken as final. Distance upto and including 100 metres shall be measured in units of 50 metres, exceeding 100 metres but not exceeding 1 KM. in units of 100 metres and exceeding 1 km. in units of 500 metres. The half and greater than half of the units shall be reckoned as one and less than half of the units ignored. In this regard, the source of the material shall be divided into suitable blocks and for each block the distance from the centre of the block to the centre of placing pertaining to that block shall be taken as the lead distance.

3. Surface Regularity of Sub grade & Pavement Courses :

The surface regularity of completed sub-base courses and wearing surfaces in the longitudinal and transverse directions shall be within the tolerances indicated in Table below. The longitudinal profile shall be checked with a 3 metre long straight edge, at the middle of each traffic lane along a line parallel to the centre line of the road. The transverse profile shall be checked with a set of three camber boards at intervals of 10 metres.

PERMITTED TOLERANCES OF SURFACE REGULARITY FOR PAVEMENT COURSES

Sr. No.	Type of Construction	Longitudinal Profile with 3 metre straight edge					Cross Profile
		Maximum Permissible undulation in mm	Maximum number of undulation permitted in any 300m. length exceeding in mm.				Maximum permissible variation from specified profile camber template-mm
			18	12	10	6	
1	2	3	4	5	6	7	8
1	Earth Sub grade	36	30	-	-	-	15
2	Granular / lime / Cement Stabilised Sub – base.	23	-	30	-	-	12
3	Water Bound Macadam with nominal size metal (20-50) mm	18	-	-	30	-	8
4	Semi – Dense Carpet @	15	-	-	-	20	6

Notes:-

1 . These are for machine laid surfaces. If laid manually, due to unavoidable reason, tolerance upto 50 percent above these values in this column may be permitted. However, this relaxation does not apply to the values of maximum undulation for longitudinal and cross profiles mentioned in columns 3 and 8 in the table.

2. Surface evenness requirements in respect of both the longitudinal and cross profiles should be simultaneously satisfied.

3. **Rectification** : Where the surface irregularity of subgrade and the various pavement courses fall outside the specified tolerances, the contractor shall be liable to rectify these in the manner described below and to the satisfaction of the Engineer-in-charge at his own cost.

(i) **Subgrade** : Where the surface is high, it shall be trimmed and suitably compacted. Where the same is low, the deficiency shall be corrected by adding fresh material. The degree of compaction and the type of material to be used shall conform to the specified requirements.

(ii) **Granular/Sub-base** : Same as at (i) above except that the degree of compaction and the type of material to be used shall conform to the specified requirements.

(iii) **Lime/Cement stabilized soil sub-base** : For Lime/Cement treated materials where the surface is high, the same shall be suitably trimmed while taking care that the material below is not disturbed due to this operation. However, where the surface is low, the same shall be corrected as described herein below.

For cement treated material, when the time elapsed between detection of irregularity and the time of mixing of the material is less than 2 hours, the surface shall be scarified to a depth of 50 mm, supplemented with freshly mixed material as necessary and recomposed to the relevant specification. When this time is more than 2 hours, the full depth of the layer shall be removed from the pavement and replaced with fresh material to specification. In either case, the area treated shall not be less than 5 metres long by 2 metres wide. This shall also apply to lime treated material except that the time criterion shall be 3 hours instead of 2 hours.

(iv) **Water Bound Macadam Base** : Where the surface is high or low, the top 75mm shall be scarified, reshaped with added material as necessary and recompacted. The area treated at a place shall not be less than 5 metres long and 2 metres wide.

(v) **Bituminous Constructions** : For bituminous constructions, other than wearing course, where the surface is low, the deficiency shall be corrected by adding fresh material and recompaction to specifications.

Where this surface is high, the full depth of the layer shall be removed and replaced with fresh material and compacted to specifications. For wearing course, where the surface is high or low; the full depth of the layer shall be removed and replaced with fresh material and compacted to specifications in all cases where the removal and replacement of a bituminous layer is involved, the area treated shall not be less than 5 metre long and not less than 1 lane wide.

4. Quality Control Tests During Construction :

The materials supplied and the works carried out by the Contractor shall conform to the enclosed relevant specifications. For ensuring the requisite quality of construction, the materials and works shall be subjected to quality control test as described hereinafter, by the Engineer-in-charge. The testing frequencies set forth are the desirable minimum and the Engineer-in-charge shall have the full authority to carry out test as frequently as he may deem necessary to satisfy that the materials at work comply with the appropriate specifications. Test procedures for the various quality control tests are indicated in the respective sections of the specifications or for certain tests within this section. Where no specific testing procedure is mentioned, the test shall be carried out as per prevalent accepted engineering practice to the directions of the Engineer-in-charge.

5. Tests on Earthwork for Embankment Construction :

5.1 Borrow Material :

- (a) Sand Content (IS : 2720 Part IV)
Two test per 8000 Cubic Metres of soil.
- (b) Plasticity Test (IS : 2720 Part-V)
Each type to be tested. Two tests per 8000 Cubic Metres of soil.
- (c) Density test (IS : 2720 Part VII)
Each soil type to be tested. Two tests per 8000 Cubic Metres of soil.
- (d) Moisture Content Test (IS : 2720 Part-II)
One test for every 250 Cubic Metres of soil.

5.2 Compaction Control :

Control shall be exercised by taking at least one measurement of density for each 1000 square metres of compacted area, or closer as required to yield the minimum number of test results for evaluating day's work on statistical basis. The determination of density shall be in accordance with IS : 2720 (Part XXVMI). Test locations shall be chosen only through random sampling techniques. Control shall not be based on the result of any one test but on the mean value of a set of 5-10 density determinations. The number of tests in one set of measurements shall be 5 as long as it is felt that sufficient control over borrow material and the method of compactions is being exercised. If considerable variations are observed between individual density results, the minimum number of tests in one set of measurement shall be increase to 10. The acceptance of work shall be subject to the condition that the mean dry density equals or exceeds the specified density and the standard deviation for any set of results is below 0.08 gm/cc. However for earthwork in shoulders and in top 500 mm portion of the embankment below the sub grade, at least one density measurement shall be taken for every 500 square meters of the compacted area provided further that the number of the tests in each set-of measurement shall be at least 10. In other respects, the control shall be similar to that described earlier.

6. Following materials shall conform to the Indian Standards shown against them :

- (1)Cement.....
- (2)Sand for masonry.

- (3).....Sand for concrete.
 (4).....Coarse aggregate.
 (5).....Mild Steel...
 (6)High yield strength deformed bars
 (a) Hot Rolled..... IS : 1139
 (b) Cold Twisted..... IS : 1786

7. Barrel thickness of pipes of different class shall be as under :

Sr. No.	Internal Diameter of pipe in mm	Barrel thickness (in mm).		
		NP1	NP2	NP3
1	80	25	25	-
2	100	25	25	-
3	150	25	25	-
4	250	25	25	-
5	300	30	30	-
6	350	32	32	75
7	400	32	32	75
8	450	35	35	75
9	500	-	35	75
10	600	-	40	80
11	700	-	40	80
12	800	-	45	90
13	900	-	50	100
14	1000	-	55	100
15	1100	-	60	115
16	1200	-	65	115

Item No.1: Excavation for foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto any lead. (B) Dense or Hard soil

304.1 Scope

Excavation for structures shall consist of the removal of material for the construction of other similar structures, in accordance with the requirements of these Specifications and the lines and dimensions shown on the drawings or as indicated by the Engineer. The work shall include construction of the necessary cofferdams and cribs and their subsequent removal; all necessary sheeting, shoring, bracing, draining and pumping; the removal of all logs, stumps, grubs and other deleterious matter and obstruction, necessary for placing the foundations; trimming bottoms of excavations; backfilling and clearing up the site and the disposal of all surplus material.

304.2 Classification of Excavation

301.2.1. Classification: All materials involved in excavation shall be classified by the Engineer in the following manner:

(a) Soil

This shall comprise topsoil, turf, sand, silt, loam, clay, mud, peat, black cotton soil, soft shale or loose murrum, a mixture of these and similar material which yields 10 the ordinary application of pick, spade and/or shovel, rake or other ordinary digging equipment. Removal of gravel or any other modular material having dimension in any one direction not exceeding 75 mm shall be deemed to be covered under this category.

(b) Ordinary Rock (not requiring blasting) this shall include:

- (i) Rock types such as laterites, shales and conglomerates, varieties of limestone and sandstone etc., which may be quarried or split with crow bars, also including any rock which in dry state may be hard, requiring blasting but which, when wet, becomes soft and manageable by means other than blasting;
- (ii) macadam surfaces such as water bound and bitumen bound; soling of roads, cement concrete pavement, coddle stone etc. compacted murrum or stabilized soil requiring use of pick axe or shovel or both.
- (iii) lime concrete, stone masonry and brick work in lime/cement mortar below ground level, reinforced cement concrete which may be broken up with crow bars or picks and stone masonry in cement mortar below ground level; and
- (iv) boulders which do not require blasting found lying loose on the surface or embedded in river bed, soil, talus, slope wash and terrace material of dissimilar origin.

(c) Hard Rock (requiring blasting)

This shall comprise:

- (i) any rock or cement concrete for the excavation of which the use of mechanical plant and/or blasting is required;
- (ii) reinforced cement concrete below ground level and in bridge / ROB / RUB / fly over piers and abutments,
- (iii) boulders requiring blasting.

- (d) Hard Rock (using controlled blasting)
Hard rock requiring blasting as described under (c) but where controlled blasting is to be carried out in locations where built-up area, huts and are situated at within 200m of the blast site.
- (e) Hard Rock (blasting prohibited)
Hard rock requiring blasting as described under (c) but where blasting is prohibited for any reason like people living within 20m of blast sites etc. and excavation has to be carried out by chiselling, wedging or any other agreed method.
- (f) Marshy Soil
This shall include soils like soft clays and peats excavated below the original ground level of marshes and swamps and soils excavated from other areas requiring continuous pumping or bailing out of water.

304.3 Construction Operations

304.3.1 Setting Out

After the site has been cleared according to Clause 201, the limits of excavation shall be set out true to lines, curves and slopes, curves, slopes, grades and sections as shown on the drawings or as directed by the Engineer. The Contractor shall provide all labour, survey instruments and materials such as strings, pegs, nails, bamboos, stones, lime, mortar, concrete etc. required in connection with the setting out of works and the establishment of bench marks. The Contractor shall be responsible for the maintenance of bench marks and other marks and stakes as long as in the opinion of the Engineer, they are required for the work.

304.3.2 Excavation

Excavation shall be taken to the width of the lowest step of the footing including additional width as required for construction operation. The sides shall be left plumb where the nature of soil allows it. Where the nature of soil or the depth of the trench and season of the year do not permit vertical sides, the Contractor at his own cost shall put up necessary shoring; strutting and planking or cut slopes to a safer angle or both with due regard to the safety of personnel and works and to the satisfaction of the Engineer.

The depth to which the excavation is to be carried out shall be as shown on the drawings, unless the type of material encountered is such as to require changes, in which case the depth shall be as ordered by the Engineer. Propping shall be undertaken when any foundation or stressed zone from an adjoining structure is within a line of 1 vertical to 2 horizontal from the bottom of the excavation.

Where blasting is to be resorted to, the same shall be carried out in accordance with Clause 302 and all precautions indicated therein observed. Where blasting is likely to endanger adjoining foundations or other structures, necessary precautions such as controlled blasting, providing rubber mat cover to prevent flying of debris etc. shall be taken to prevent any damage.

304.3.3 Dewatering and Protection

Normally, open foundations shall be laid dry. Where water is met with in excavation due to stream flow, seepage, springs, rain or other reasons, the Contractor shall take adequate measures such as bailing, pumping, constructing diversion channels, drainage channels, bunds, depression of water level by well-point system, cofferdams and other necessary works to keep the foundation trenches dry when so required and to protect the green concrete/ masonry against damage by erosion or sudden rising of water level. The methods to be adopted in this regard and other details thereof shall be left to the choice of the Contractor but subject to the approval of the

Engineer. Approval of the Engineer shall, however, not relieve the Contractor of the responsibility for the adequacy of dewatering and protection arrangements for the quality and safety of the works.

Where cofferdams are required, these shall be carried to adequate depths and heights, be safely designed and constructed and be made as watertight as is necessary for facilitating construction to be carried out inside them. The interior dimensions of the cofferdams shall be such as to give sufficient clearance for the construction and inspection and to permit installation of pumping equipment's etc. inside the enclosed area.

If it is determined beforehand that the foundations cannot be laid dry or the situation is found that the percolation is too heavy for keeping the foundation dry, the foundation concrete shall be laid under water by tremie pipe only. In case of flowing water or artesian springs, the flow shall be stopped or reduced as far as possible at the time of placing the concrete.

Pumping from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of the movement of water through any fresh concrete. No pumping shall be permitted during the placing of concrete and for a period of at least 24 hours thereafter, unless it is done from a suitable sump separated from the concrete work by a watertight wall or other similar means.

At the discretion of the Contractor, cement grouting or other approved methods may be used to prevent or reduce seepage and to protect the excavation area.

The Contractor shall take all precautions in diverting channels and in discharging the drained water as not to cause damage to the works, crops or any other property.

304.3.4 Preparation of Foundation

The bottom of the foundation shall be levelled both longitudinally and transversely or stepped as directed by the Engineer. Before footing is laid, the surface shall be slightly watered and rammed. In the event of excavation having been made deeper than that shown on the drawings or as otherwise ordered by the Engineer, the extra depth shall be made up with concrete as per Clause 2104.1 at the cost of the Contractor. Ordinary filling shall not be permitted to bring the foundation to the design level as shown in the drawing.

When rock or other hard strata is encountered, it shall be freed of all soft and loose material, cleaned and cut to a firm surface either level or stepped as directed by the Engineer. All seams shall be cleaned out and filled with cement mortar or grout to the satisfaction of the Engineer. In the case of excavation in rock, annular space around footing shall be filled with lean concrete M 15 up to the top level of rock.

If the depth of fill required is more than 1.5 m in soft rock or 0.6 m in hard rock above the foundation level, the filling up to this level shall be done with M-15 concrete and portion above shall be filled by concrete or by boulders grouted with cement.

When foundation piles are used, the excavation for pile cap shall be done after driving / casting of all piles forming the group. After pile driving operations in a given pit are completed, all loose and displaced materials therein shall be removed to the level of the bottom of the pile cap.

304.3.5 Slips and Slip-Outs

If there are any slips or slip-outs in the excavation, these shall be removed by the Contractor at his own cost.

304.3.6 Public Safety

Near towns, villages and all frequented places, trenches and foundation pits shall be securely fenced, provided with proper caution signs and marked with red lights at night to avoid accidents. The Contractor shall take adequate protective measures to see that the excavation operations do not affect or damage adjoining structures. For safety precautions, guidance may be taken from IS:3764.

304.3.7 Backfilling

Backfilling shall be done with approved material after concrete or masonry is fully set and carried out in such a way as not to cause undue thrust on any part of the structure. All space between foundation masonry or concrete and the sides of excavation shall be refilled to the original surface in layers not exceeding 150 mm compacted thickness. The compaction shall be done with the help of suitable equipment such as trench compactor, mechanical tamper, rammer, plate vibrator etc. after necessary watering, so as to achieve the maximum dry density.

304.3.8 Disposal of Surplus Excavated Materials

All the excavated materials shall either be reused with the approval of the Engineer or disposed off with all leads and lifts as directed by Engineer in charge.

304.4 Measurements for Payment

Excavation for structures shall be measured in Cu.m for each class of material encountered, limited to the dimensions shown on the drawings or as directed by the Engineer. Excavation over increased width, cutting of slopes, production/support to the existing structures shoring, shuttering and planking shall be deemed as incidental to the main work and shall not be measured and paid separately.

304.5 Rates

304.5.1 The Contract unit rate for the items of excavation for structures shall be payment in full for carrying out the required operations including full compensation for:

- i. setting out;
- ii. transporting the excavated materials for use or disposal with all leads and lifts;
- iii. construction of necessary cofferdams, cribs/sheeting, shoring and bracing and their subsequent removal;
- iv. removal of all logs, stumps, grubs and other deleterious matter and obstructions, for placing the foundations including trimming of bottoms of excavations;
- v. foundation sealing, dewatering including pumping when no separate provision for it is made in the Contract;
- vi. backfilling, clearing up the site and disposal of all surplus material with all leads and lifts or as otherwise specified; and
- vii. all labour, materials, tools, equipment, safety measures, diversion of traffic and incidentals necessary to complete the work to Specifications.

304.5.2 The Contract unit rate for preparation of rock foundation shall be full compensation for cutting, trimming and cleaning the foundation surface and filling/sealing of all seams with cement grout or mortar including all materials, labour and incidentals required for completing the work.

Item No.2: Excavation for foundation for depth from 1.5 m to 3.0 m including sorting out and stacking of useful materials and disposing off the excavated stuff upto any lead. (B) Dense or Hard soil

1.0. Workmanship

- 1.1. The relevant specification of **Item No.1** shall be followed except that the excavation work shall be carried out from **1.5 M to 3.0 M** Loose or Soft soil.

2.0. Mode of Measurement & Payment

- 2.1. The relevant specification of **Item No. 1** shall be followed.
- 2.2. The excavation work from **1.5 M. to 3.0 M.** lift shall be measured under this item.
- 2.3. The rate shall be for a unit of one cubic meter.**

Item No. 3:- Providing and laying cement concrete work 1:2:4 (1- Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete Including cost of formwork But Excluding The Cost Of reinforcement for reinforced concrete work in (A) Foundations, footings, Base or columns and Mass concrete. (For PCC).

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. 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 testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 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. correspond 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 CuM.) for different proportions of mix shall be as under:

TABLE

Grade of concrete	Mix by volume	Total quantity of dry aggregates by volume per 50 kg. cement to be taken as sum aggregate of the individual volumes of fine & coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
(1 cubic metre : 1000 Liters)				
1	2	3	4	5
Ordinary	Liters			Liters
M-100	1:3:6	300	Generally 1:2 for fine aggregate to Coarse aggregate by volume but subject to a upper limit of 1:1.1/1 & a lower limit of 1:3.	34
M-150	1:2:4	220		32
M-200	1:1.1/2:3	160		30
M-250	1:1:2	100		27

- 2.4.** The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements 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 found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.
- 2.6.** The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one forth 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 corners 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 bar 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 so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.
- 2.10. Admixture maybe 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 not 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 which shall be measured in terms of bags of 50 kg. weight, the volume of one such bag being taken as 0.0342 cu. meter Boxes of suitable size shall be used for measuring sand aggregate. The size of boxes (internal) shall be 35 x 25 cms. and 40 cms deep while measuring the aggregate and sand the boxes 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 saner, allowances for bulk age shall be made.

3.2. **Mixing :**

- 3.2.1. For all work, concrete shall be mixed in a mechanical mixed which along with other accessories shall be. Kept in first class working condition and so maintained throughout the construction Measured quantity of aggregate, sand and cement required for each batch shall be poured into the claim of the mechanical mixer while it is continuously running. After 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 he done for less than 2 minutes after-oil 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 tuning over the ingredients of concrete before and after adding water Mixing platform shall be so arranged that no foreign malarial gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be spread in n layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly be turning over to get a mixture to uniform colour. Specified quantity 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 haw 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. 1199-193. The skimp of 10 mm. to 25 mm shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

3.4. **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 proper contraction 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 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.

3.5.3. Unless otherwise agreed to by the Engineer-in-charge concrete shall be dropped in to place from a height exceeding 2 meters. When trucking 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 against weather including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking or jute 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 and 28 days as per requirements in accordance with I.S. 526-1959. 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
1-5 cmt.	1	16-30 cmt.	3
6-15 cmt.	2	31-50 cmt.	4
51 and above	4 ± one additional for each additional 50 mm. 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 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.** The average of the group of cubes cast for each day shall not be less than the specified cube strength of 150 K/g Cm² 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:

- 3.8.1.** The Engineer-in-charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time of removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other conditions 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 periods specified in item No.9.1 (A) for respective item of form work.
- 3.8.2.** All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soles and struts are removed, the concrete surface shall be gradually exposed, where necessary in order to ascertain that concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a 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.
- 3.8.3.** 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 fins, caused by form joints, all cavities produced by the removal of form tiles and all other holes and depressions, honeycomb spots, broken edges or comers 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 proportions used in the grade of concrete that is being furnished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surface 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 as 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 structure affected.

4.0. Mode of Measurement & Payment

- 4.1.** The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for (a) Ends of dissimilar materials such as joints, beams, posts, girders, falters, purling trusses, corbels and steps etc. up to 500 Sq.Cm. in section.
- 4.2.** The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate **including** the cost of form work.
- 4.3.** The rate shall be for a unit of **one cubic meter**.

Item No. 04 : Providing and laying controlled cement concrete M.250 and curing complete including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (A) Foundations, footings, Base of columns and Mass concrete. (For Footing).

1.0. Materials

- 1.1.** Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Coarse aggregate shall conform M-12.
- 1.2.** The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.
- 1.3.** The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

2.0. General

- 2.1.** The concrete mix shall be designed from preliminary tests. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.
- 2.2.** The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days works cube compressive strength of 250 mm. cubes of the mix expressed in Kg./cm.
- 2.3.** The proportion of cement, sand and coarse aggregate shall be determined of weight. The weigh batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under:

Grade of Concrete		Compressive strength of 15 cms. cubes in kg/cmt. at 28 days, conducted in accordance with I.S. 516-1959.		
		Preliminary test Min.	Work Test Min.	
	M 150	200	150	
	M 200	260	200	
	M 250	320	250	
	M 300	380	300	
In	M 350	440	350	all cases,
the	M 400	500	400	28 days

compressive strength specified in above the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for purpose as concrete belonging to the lower of the grades between which its strength lies.

3.0. Workmanship

- 3.1.** The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be property compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to

ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.

- 3.2.** In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.
- 3.3.** It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg./m^3 in plain concrete and not less than 250 kg/m^3 in reinforced concrete.
- 3.4** The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.
- 4.0. Clearing and Treatment of forms:**
- 4.1.** All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars..
- 5.0 Stripping time:**
- 5.1.** In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.
- (a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.
 - (b) Beam soffits, (props, left under).....7 days.
 - (c) Removal of props slabs:
 - (i) Slabs spanning up to 4.5. m.....7 days.
 - (ii) Spanning over 4.5 mm.....14 days.
 - (d) Removal of props t beams and Arches:
 - (i) Spanning up to 6 mm.....14 days.
 - (ii) Spanning over 6 m.....21 days.
- 6.0 Procedure when removing the form work :**
- 6.1.** All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.
- 7.0 Centering:**

- 7.1. The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.
- 7.2. The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.
- 7.3. The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.
- 8.0 Scaffolding:**
- 8.1. All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to withstand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.
- 8.2. The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.
- 8.3. The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :
- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
 - (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
 - (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
 - (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
 - (e) Raking or circular cutting.
- 9.0 Re-Use:**
- 9.1. Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.
- 10.0 Mode of measurement & payment**
- 10.1. The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for
- (a) Ends of dissimilar materials such as joints, beams, posts, girders, fenders, purling trusses, corbels and steps etc. up to 500 Sq. Cm. in section.
- 10.2. Form work shall be measured as the area in square meters to shuttering in contact with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.
- 10.3. Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.

- 10.4.** The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate **excludes** the cost of form work.
- 10.5.** The rate shall be for a unit of **one cubic meter**.

Item No. 05 :- Providing and laying controlled c.c. M.250 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Collumns, pillars, posts & struts upto floor two level for G.F. (For Column Up to PL)

The relevant specifications of **Item No. 04** shall be followed accept for the work of **Providing and laying controlled c.c. M.250 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Collumns, pillars, posts & struts upto floor two level for G.F. (For Column Up to PL)**

The rate shall be for a unit of one Cubic meter.

Item No. 06 :- Providing and laying controlled cement concrete M.250 and curing complete including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (C) Slabs, landing, shelves, Balconies, Lintels, Beams, Girders and Cantilever upto floor two level.(For Ground Beam).

The relevant specifications of **Item No. 04** shall be followed accept for the work of **Providing and laying controlled cement concrete M.250 and curing complete including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (C) Slabs, landing, shelves, Balconies, Lintels, Beams, Girders and Cantilever upto floor two level.(For Ground Beam)**

The rate shall be for a unit of one Cubic meter.

Item No.07 :- Filling available excavated earth (excluding rock) in trenches. plinth, sides of foundations etc. in layers not exceeding 20 cm. in depth consolidating each deposited layer by ramming and watering.

1.0 WORKMANSHIP

- 1.1. The earth/weathered rock to be used for filling shall be free from salts, organic or other foreign matter all clots of earth shall be broken.
- 1.2. 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 ends of crow-bars, where rammer cannot be used.
- 1.3. The plinth shall be similarly filled with earth in layers not exceeding 20 cms adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 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.

2.0. Mode of Measurements & 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 meter**.

Item No. 8 :- Filling in foundation and plinth with murrum or selected soil in layers of 20cm. thickness including watering, ramming and consolidating etc. complete.

1.0 MATERIALS

- 1.1. Murrum or selected soil shall be clean, of good binding quality and of approved quality obtained from approved pots / quarries of disintegrated rocks which contain silicon's material and natural mixture of clay of clark's origin. The size of murrum or selected soil shall not be more than 20 cm. The P.I. value of selected soil used shall not be more than 6.0.

2.0 WORKMANSHIP

- 2.1 The murrum or selected soil to be used for filling shall be free from salts, organic or other foreign matter all clods of murrum or selected soil shall be broken.
- 2.2 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 murrum or selected soil in layers of 20 cms. each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The murrum shall be rammed with iron rammers where feasible and with the but ends of crow bars. Where rammer cannot be used.
- 2.3 The plinth shall be similarly tilled with murrum or selected soil in layers not exceeding 20 cms adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.
- 2.4 The finished level of filling shall be kept to shape intended to be given to floor.
- 2.5 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.

3.0. MODE OF MEASUREMENTS & PAYMENT

- 3.1 The payment shall be made for filling in plinth and foundations no deduction shall be made for shrinkage or voids, if consolidated as instructed above.
- 3.2 The rate includes cost of collecting and carting murrum / or selected earth of approved quality with all lead and labour required for filling in foundations and plinth.
- 3.3 The rate shall be for a unit of one **Cubic Meter**.

Item No.9 :- Filling in plinth with sand under floors including watering ramming, consolidating and dressing complete.

1.0. Materials

1.1. Sand shall conform to M-6.

2.0. Workmanship

2.1. The sand to be used for filling shall be free from salts, organic or other foreign matter all clots of earth shall be broken.

2.2. 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 sand shall be rammed with iron rammers where feasible and with the ends of crow-bars, where rammer cannot be used.

2.3. The plinth shall be similarly filled with sand in layers not exceeding 20 cms adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.

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

2.5. 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.

3.0. Mode of Measurements & Payment

3.1. 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.

3.2. The rate includes cost of collecting, carting sand with all lead and labour for filling the same in plinth under floors.

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

Item No. 10:- **Anti-Termite System:** Providing and laying of permanent piping technology anti-termite treatment before flooring work by installing LLDP (Low linear density polyethylene) tube of 8 mm O.D. & 6.4 mm I.D. with inbuilt pressure compensation chip every 30 cm interval in the tube, having working pressure of 2 Kg/cm² and release rate of 1.9 ltr/hour fixed by P-clips and nails. The LLDP pipe shall be installed at the entire periphery of the building and at internal network of building at a depth of 20 to 200 mm under floor at every 2 to 3 mtr. c/c distance (adjusted as per building layout) & Ends of loop pass through a PVC elbow of minimum 32 mm ID at junction box of wall and floor level, entering into a steel reinforced grooved flexible pipe of minimum 22 mm ID leading into junction box and the loops shall terminate in junction boxes & test every junction during injecting chemicals for termite control treatment. The anti termite chemical Imidacloprid 30.5% SC mix as per IS-6313 (part III) shall be injected by the pressure pump diluted with water @ 10.5 ml/5 ltr of water at the rate of 2 Kg/sq.cm @ 5 Ltr/SMT. The contractor shall submit approved line plan for piping system and junction boxes dully approved by Engineer-in-Charge with bond of 5 year warranty.(i)Anti Termite chemical injected area (Chemical injecting incl. labour cost)

Providing and laying a permanent anti-termite piping system prior to flooring work by installing LLDP (Low Linear Density Polyethylene) tubes of 8 mm O.D. and 6.4 mm I.D., having inbuilt pressure-compensation chips at every 30 cm interval. The system shall meet the following requirements:

1. PIPE AND SYSTEM REQUIREMENTS

- LLDP tube with:
 - **Outer Diameter (O.D.):** 8 mm
 - **Inner Diameter (I.D.):** 6.4 mm
 - **Pressure Compensation Chip:** Provided every 30 cm
 - **Working Pressure:** 2 kg/cm²
 - **Chemical Release Rate:** 1.9 litres/hour
- Tubes shall be fixed using **P-clips and nails**.

2. LAYOUT & INSTALLATION

- Tubes shall be installed:
 - Along the **entire periphery** of the building.
 - Across the **internal network** of the building as per approved layout.
 - At a depth of **20 mm to 200 mm** below floor level.
 - At spacing of **2 to 3 metres c/c** depending on layout requirements.
- **Loop Termination:**
 - Each loop shall pass through a **minimum 32 mm I.D. PVC elbow** at wall–floor junction.
 - Tube shall enter into a **steel-reinforced grooved flexible pipe** (min. 22 mm I.D.) leading to junction box.
 - All loops to **terminate in junction boxes**.

- All junction boxes shall be tested during chemical injection.

3. CHEMICAL INJECTION

- Anti-termite chemical: **Imidacloprid 30.5% SC**.
- Chemical dilution as per **IS: 6313 (Part III)**.
- **Mixing Ratio:**
 - 10.5 ml of chemical in 5 litres of water.
- **Injection Rate:**
 - At **2 kg/cm²** pressure,
 - **5 litres per square metre (5 L/SMT)**.
- Injection shall be carried out using a **pressure pump**.

4. DOCUMENTATION

- Contractor shall submit:
 - **Approved line plan/layout** of piping system.
 - **Junction box installation diagram**.
 - Submission must be **approved by the Engineer-in-Charge**.

5. WARRANTY

- Contractor shall provide a **5-year warranty bond** for the installed anti-termite piping system.

6.0. Mode of Measurements & Payment

- 6.1.** The rate shall be for a unit of one **Square meter**.

Item No.11 :- Providing and laying damp proof course 25mm thick cement concrete 1:2:4 (1-Cement : 2 coarse sand : 4 stone aggregate 10 mm nominal size) and curing complete.

- 1.0. The specifications of **item No. 3** with or without reinforcement shall be followed except that the size of the stone aggregate shall be 10 mm nominal size and the concrete work shall be carried out in 25 mm. thick damp proof course
- 2.0. Mode of measurements & payment**
- 2.1. The rate includes cost of all materials and labour required to complete the item
- 2.2. The rate shall be for a unit one Square meter.**

Item No. 12 :- Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in foundation and plinth in Cement Mortar 1:6 (1-Cement : 6 -fine sand)(B) Conventional (For B/w Up to Plinth)

1.0. Materials

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

2.0. Workmanship

2.1. Proportion:

2.1.1. The proportion of the cement mortar shall be 1:6 (1 cement : 6 fine sand) by volume.

2.2. Wetting of bricks:

2.2.1. The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water is an indication of through wetting of bricks.

2.3. Laying:

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

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

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

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

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

2.3.6. All fixtures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

2.4. Joints:

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

2.4.2. The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.

2.5. Curing:

2.5.1. Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.

2.6. Preparation of foundation bed:

2.6.1. If the foundation is to be laid directly on the excavated bed, the shall be leveled, cleared of all loose materials, cleaned and wetted before stating masonry, If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.

3.0. Mode of measurements & payment

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

3.2. No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry of marking holes in respect of following item.

(1) Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps, etc. where cross sectional area does not exceed 500 sq.cm.

(2) Opening not exceed in 1000 sq.cm.

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

(4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.

(5) Iron fixtures, pipes up to 300 mm. dia. hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.

(6) Forming charges of section not exceeding 350 sq.cm. in masonry.

3.3 Apparatuses for fire places shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.

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

Item No. 13 :- Brick work using Common burnt clay building bricks having crushing strength not less than 35 kg/sq.cm in Super Structure above floor Two Level in cement mortar 1:6 (1 cement : 6 fine sand) (B) Conventional.(For B/W Up to GF Slab)

1.0. Materials

Bricks shall conform to M-15. Cement mortar shall conform to M-11.

2.0. Workmanship

2.1. Proportion:

2.1.1. The proportion of the cement mortar shall be 1:6 (1 cement : 6 fine sand) by volume.

2.2. Wetting of bricks:

2.2.1. The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water is as indication of through wetting of bricks.

2.3. Laying:

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

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

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

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

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

2.3.6. All futures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

2.4. Joints:

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

2.4.2. The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.

2.5. Curing:

2.5.1. Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.

2.6. Preparation of foundation bed:

2.6.1. If the foundation is to be laid directly on the excavated bed, it shall be leveled, cleared of all loose materials, cleaned and wetted before starting masonry. If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.

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

2.8. Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied, together with horizontal pieces over which the scaffolding plunks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole shall rest in hole header horizontal course only. Minimum number of holes be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.

2.9. For the face of brick work, where plastering is to be done, joints shall be racked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.

3.0. Mode of measurements & payment

3.1. The masonry work of G.F. & First floor shall be measured and paid under this item rate includes cost of all materials & labour.

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

3.3. No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry of marking holes in respect of following item.

(1) Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps, etc. where cross sectional area does not exceed 500 sq.cm.

(2) Opening not exceed in 1000 sq.cm.

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

(4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.

(5) Iron fixtures, pipes up to 300 mm. dia. hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.

(6) Forming charges of section not exceeding 350 sq.cm. in masonry.

(7) Apparatuses for fire places shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.

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

Item No.14 :- Half brick masonry in common brunt clay building bricks having crushing strength not less than 35 Kg/Sq.Cm. in Cement mortar 1:4 (1- Cement : 4 -coarse sand) in Superstructure above plinth level up to floor two Level (B) Conventional

1.0. Materials

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

2.0. Workmanship

- 2.1. Relevant specifications of bricks, wetting and laying of bricks, joints, curing etc shall conform to **Item No. 13** except that the brick work of half brick shall be carried out.
- 2.2. Cement mortar used in masonry work shall be in proportion of 1 part of cement and **4 parts of coarse sand** by volume.
- 2.3. All bricks shall be laid stretcher wise, breaking joints with those in the upper and lower courses. The wall shall be taken truly plumb. All courses shall be said truly horizontal and all vertical joints shall be truly vertical. The bricks shall be laid with frogs upwards. A set of masons tools shall be maintained on work as required for frequent checking. After every three course 2 nos. of 6mm mild steel bars shall be embedded in cement mortar.

3.0. Mode of measurement and payment

- 3.1. The half brick masonry work in **Super Structure** shall be measured under this item the limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over the specified dimensions shall be ignored.
- 3.2. The relevant specifications of **Item No. 13** shall be followed. The length shall be measured nearest to one cm.
- 3.3. The rate includes the cost of providing 2 nos. of 6mm steel bars after every three course.
- 3.4. **The rate shall be for a unit of one square meter.**

Item No. 15 :- Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- crushed stone aggregates 20 mm nominal size) and curing complete including cost of formwork in (A) Wall Caps / Coping

1.0. Materials

- 1.1. Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Machine crushed stone aggregate 20 mm. nominal size shall conform to M-12.

2.0. Workmanship

2.1. General

- 2.1.1. Before stating concrete the bed of [Wall caps / Coping](#) trenches shall be cleared of all loose materials, leveled, watered and rammed as directed

2.2. Proportion of Mix:

- 2.2.1. The proportion of cement, sand and coarse aggregate shall be one part of cement. 3 parts of sand and 6 parts of machine crushed [stone aggregate](#) and shall be measured by volume.

2.3. Mixing:

- 2.3.1. The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by the Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case "of break-down of machineries and in the interest of the work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency, However in such case 10% more cement than otherwise period 1 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the purpose.

2.4. Transporting & Placing the Concrete:

- 2.4.1. The concrete shall be handed from the place, of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final-position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.
- 2.4.2. The concrete shall be laid in layers of 15 cms. to 20 cms.
- 2.5.1. The concrete shall be rammed with heavy iron rammers and rapidly to get the required compaction and to allow all the interstices to be filled with mortar.

2.6. Curing:

- 2.6.1. After the final set, the concrete-shall be kept continuously wet if required by ponding for a period of not less then 7 days form the date of placement.

2.7. Mode of Measurement & Payment:

- 2.7.1. The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plan or as directed includes cost of necessary form work.
- 2.7.2. The rate shall be for a unit of one **cubic meter**.

Item No. 16 :- Providing and laying controlled cement concrete M.200 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in (C) Slabs, landing, shelves, Balconies Lintels, Beams, Girders and Cantilever upto floor two level. (For Lintel).

The relevant specifications of **Item No. 04** shall be followed accept for the work of **Providing and laying controlled cement concrete M.200 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in (C) Slabs, landing, shelves, Balconies Lintels, Beams, Girders and Cantilever upto floor two level. (For Lintel).**

The rate shall be for a unit of one Cubic meter.

Item No. 17 :- Providing and laying controlled c.c. M.200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Collumns, pillars, posts & struts upto floor two level for G.F. (For Column).

The relevant specifications of **Item No. 04** shall be followed accept for the work of **Providing and laying controlled c.c. M.200 & curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Collumns, pillars, posts & struts upto floor two level for G.F. (For Column).**

The rate shall be for a unit of one Cubic meter.

Item No. 18:- Providing and laying controlled cement concrete M.200 and curing complete Including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (C) Slabs, landing, shelves, Balconies Lintels, Beams, Girders and Cantilever upto floor two level. (For Beam)

The relevant specifications of **Item No. 04** shall be followed accept for the work of **Providing and laying controlled cement concrete M.200 and curing complete Including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (C) Slabs, landing, shelves, Balconies Lintels, Beams, Girders and Cantilever upto floor two level. (For Beam)**

The rate shall be for a unit of one Cubic meter.

Item No. 19 :- Providing and laying controlled cement concrete M.200 and curing complete including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (C) Slabs, landing, shelves, Balconies Lintels, Beams, Girders and Cantilever upto floor two level.(For Grade slab)

The relevant specifications of **Item No. 04** shall be followed accept for the work of **Providing and laying controlled cement concrete M.200 and curing complete including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (C) Slabs, landing, shelves, Balconies Lintels, Beams, Girders and Cantilever upto floor two level.(For Grade slab).**

The rate shall be for a unit of one Cubic meter.

Item No. 20 :- Providing and laying controlled cement concrete M.200 and curing complete including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (C) Slabs, landing, shelves, Balconies Lintels, Beams, Girders and Cantilever upto floor two level.(For slab)For GF Slab.

The relevant specifications of **Item No. 04** shall be followed accept for the work of **Providing and laying controlled cement concrete M.200 and curing complete including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in (C) Slabs, landing, shelves, Balconies Lintels, Beams, Girders and Cantilever upto floor two level.(For slab)For GF Slab**

The rate shall be for a unit of one Cubic meter.

Item No.21:- Providing TMT Bar FE 500D reinforcement for R.C.C. work including bending, binding and placing in position complete up to floor two level.

1.0. GENERAL

This work shall consist of furnishing and placing coated, or uncoated or high strength deformed reinforcement, bars (intentioned) of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

2.0. MATERIAL

2.1. T.M.T. Bars

Reinforcements may be either T.M.T. tensile steel, confirms to IS 1786-2008 bars. They may be uncoated or coated with epoxy or with approved protective coatings.

2.2. T.M.T. bars reinforcement for R.C.C. work shall conform IS 432 (Part II) 1982 (Reaffirmed 1995) and shall be of tested quality. It shall also comply with relevant part of IS 456-2000.

2.3. All reinforcement shall be clean and free from dirt, paint, grease or oil, all scale or loose or thick rust at the time of placing.

2.4. All steel shall be procured from original producers no re-rolled steel shall be incorporated in the work.

2.5. Only new steel shall be delivered to the site every bar shall be inspected before placing to its position and defective brittle or burnt bar shall be discarded cracked ends of bars shall be discarded.

3.0. Pitch

3.1. Distance between bars shall be as specified in drawings and as directed by the Engineer in charge all bars shall be placed at an accurate distance from each other and shall be bind tightly to maintain the desired pitch suitable means shall be provided for holding bars securely in position.

4.0. Binding wire

4.1. Mild steel binding wire shall be of 1.63 mm or 1.22 mm (16 to 18 gauge) diameter and shall conform IS 280-2006.

4.2. The use of black wire will be permitted for binding reinforcement bars. It shall be free from dirt, paint, grease or oil, oil scale or loose or thick rust and any other undesirable coating which may prevent adhesion of cement mortar at the time of binding.

4.3. Only new binding wire shall be delivered to the site all binding wire shall be inspected before binding to its position and defective brittle, rusted, used wire, shall be discarded.

5.0. PROTECTION OF REINFORCEMENT

5.1. Uncoated reinforcing steel shall be protected from rusting or chloride contamination. Reinforcements shall be free from rust, mortar, loose mill scale, grease, oil or paints. This may be ensured either by using reinforcement fresh from the factory or thoroughly cleaning all reinforcement to remove rust using any suitable method such as sand blasting, mechanical wire brushing, etc. as directed by the Engineer. Reinforcements shall be stored on bricks, racks or platforms and above the ground in a clean and dry condition and shall be suitably marked to facilitate inspection and identification.

5.2. Portions of uncoated reinforcing steel and dowels projecting from concrete shall be protected within one week after initial placing of concrete with a brush coat of neat cement mixed with water to a consistency, of thick paint. This coating shall be removed by lightly tapping with a hammer or other tool not more than one week before placing of the adjacent pour of concrete. Coated reinforcing steel shall be protected against damage to the coating. If the coating on the bars is damaged during transportation or handling and cannot be repaired, the same shall be rejected.

6.0. Workmanship

- 6.1. The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed by The Engineer in charge.
- 6.2. Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawing

7.0. BENDING OF REINFORCEMENT

- 7.1. Bar bend g schedule shall be furnished by the Contractor and got approved by the Engineer before start of work.
- 7.2. Reinforcing steel shall conform to the dimensions and shapes given in the approved bar bending Schedules.

7.3. Bars shall be bent cold to the specified shape and dimensions or directed by the Engineer using a proper bar bender operated by hand power to obtain the correct radius of bends and shape.

Bars shall not be bent or straightened in a manner that will damage parent material or the coating bars bent during transport or handling shall, be straightened before being used on work and shall not be heated to facilitate straightening.

8.0. PLACING OF REINFORCEMENT

8.1. The reinforcement cage should generally be fabricated in the yard at ground level, and then shifted and placed in position. The reinforcement shall be placed strictly, in accordance with the drawings and shall be assembled in position, only when structure is otherwise ready for placing of concrete. Prolonged time gap, between assembling of reinforcements and casting of concrete, which may result in rust formation on the surface, shall not be permitted.

8.2. Reinforcement bars shall be placed accurately in position as shown on the drawings. The bars, crossing one another shall be tied together at every intersection with binding wire (annealed), conforming to IS:280 to make the skeleton of the reinforcement rigid such that the reinforcement does not get displaced during placing of concrete, or any other operation. The diameter of binding wire shall not be less than 1 mm.

8.3. Bars shall be kept in position usually by the following methods:

In case of beam and slab construction, industrially produced polymer cover blocks of thickness equal to the specified cover shall be placed between the bars and formwork subject to Satisfactory evidence that the polymer composition is not harmful to concrete and reinforcement. Cover blocks made of concrete may be permitted by the Engineer, provided they have the same strength and specification as those of the member.

8.4. In case of dowels for Columns and walls the vertical reinforcement shall be kept in position by means of timber templates with slots in them accurately, or with cover blocks tied to the reinforcement timber templates shall be removed after the concreting has progressed up to a level just below their location.

8.5. Layers of reinforcements shall be separated by spacer bars at approximately One meter intervals. The minimum diameter of spacer bars shall be 12 mm or: equal to maximum size of main reinforcement or maximum size of coarse aggregate, whichever is greater. Horizontal reinforcement shall not be, allowed to sag between supports.

8.6. Necessary stays, blocks, metal chairs, spacers, metal hangers supporting wires etc, or other subsidiary, reinforcement shall be provided to fix the reinforcements firmly in its correct position.

8.7. Use of pebbles, broken stone, metal pipe, brick, mortar or wooden blocks etc as devices for positioning reinforcement shall not be permitted.

8.8. Bars coated with epoxy or any other approved protective coating shall be placed on supports that do not damage the coating. Supports shall be installed in a manner such that planes of weakness are not created in hardened concrete. The coated reinforcing steel shall be held in place by use of plastic or plastic coated binding wires especially manufactured for the purpose.

8.9. Placing and fixing of reinforcement shall be inspected and approved by the Engineer before concrete is deposited.

9.0. Lapping

9.1. All reinforcement shall be furnished in full lengths as indicated on the drawing. No splicing of bars, except where shown on the drawing; will be permitted without approval of the Engineer. The lengths of the splice shall be as indicated on drawing or as approved by the Engineer. Where practicable, overlapping bars shall not touch each other, and shall be kept apart by 25 mm or 1 1/4

times the maximum size of coarse aggregate, whichever is greater, If this is not feasible, overlapping bars shall be bound with annealed steel binding wire, not less than 1 mm diameter and twisted tight in such a manner as to maintain minimum clear cover to the reinforcement from the concrete surface. Lapped splices shall be staggered or located at points, along the span where stresses are low.

10.0. Welding

10.1 Splicing by welding of reinforcement will be permitted only if detailed on the drawing or approved by the Engineer. Weld shall develop an ultimate strength equal to or greater than that of the bars connected.

10.2. While welding may be permitted for T.M.T. reinforcing bars conforming to IS:432, welding of deformed bars conforming to IS: 1786 shall in general be prohibited. Welding may be permitted in case of bars of other than S 240 grade including special. Welding grade of S 415 grade bars conforming to IS:1786, for which necessary chemical analysis has been secured and the carbon equivalent (CE) calculated from the chemical composition using the formula:

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mg + V}{5} + \frac{Ni + Cu}{15}$$

is 0.4 or less.

10.3. The method of welding shall conform to IS:2751 and IS:9417 and to any supplemental specifications to the satisfaction of the Engineer

10.4. Bars shall be bent cold to the specified shape and dimensions or as directed by Engineer in charge using the proper bender tool, operated by hand or power to attain proper radius of bends. Bars shall not be bend or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used in the work. Bars shall not be heated to facilitate bending

10.5. Unless otherwise specified a 'U' type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bane shall not be less then 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 of the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any spiting of the concrete

10.6. 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 by using say blocks or metal chairs spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals, Bars shall not be allowed to sag between supports not displaced during concreting or any other operations of the work All devices used for positioning shall be of not corrodible material wooden and metal supports shall not extended to the surface of the concrete, except where shown in drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wooden blocs shall not be used Layers of bars shall be separated by spacer bars pre-cast mortar blocks or other approved devices. Reinforcement after bending 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 prevent reinforcement form corrosion, concrete cover shall be provided as indicated on drawings. All bars protruding from concrete and to which other bars are to be sliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout

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

As far 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 by 25 mm Where no feasible overlapping bars shall be bound with annealed wires not less than 1 mm thick twisted tight The overlaps shall be staggered for different bars and located at points along the span where neither sheer not bending moments is maximum.

10.8. Whenever indicated on drawing or desired the Engineer in charge bars shall be jointed by coupling which shall have a cross section sufficient to transmit the full stresses of bars The end of the

bars that are jointed by coupling shall be upset for 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 standards threads Steel for coupling shall conform to IS 226

10.9. When permitted or specified on the drawings joints of reinforcement bars shall butt-welded so as to transmit their full stresses Welded joints shall preferably be located at points when steel will 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 Only electric are welding using a process which excludes air form the molten metal and conforms to any or other special provisions for the work shall be accepted Suitable means shall be provided for holding bars securely in position during welding It shall be ensured that no voids are left in welding and when welding is done in two or three stages previous surface shall be cleaned properly Ends of bars shall be cleaned of all loose scale rust stages paint and other foreign matter before welding Only competent welders shall be employed on the work. The M S electrodes used for welding shall conform IS 814 Welded pieces of reinforcement shall be tested. Specimen shall be taken form the actual site and their number shall frequency to test shall be as directed by the Engineer in charge

11.0 MODE OF MEASUREMENTS & PAYMENT

11.1. For the purpose of payment the bar shall be measured correct up to 10 mm length and weight payable works out at the rate specified below

Sr. No	Diameter of steel	weight of steel per running meter	Sr. No	Diameter of steel	weight of steel per running meter
1	6 mm	0.22 Kg / Rmt	8	20 mm	2.47 Kg / Rmt
2	8 mm	0.39 Kg / Rmt	9	22 mm	2.98 Kg / Rmt
3	10 mm	0.62 Kg / Rmt	10	25 mm	3.85 Kg / Rmt
4	12 mm	0.89 Kg / Rmt	11	28 mm	4.83 Kg / Rmt
5	14 mm	1.21 Kg / Rmt	12	32 mm	6.31 Kg / Rmt
6	16 mm	1.58 Kg / Rmt	13	36 mm	7.99 Kg / Rmt
7	18 mm	2.00 Kg / Rmt	14	40mm	9.86 Kg / Rmt

11.1. Excess consumption over 5% will be charged at penal rate.

11.2. Reinforcement shall be measured in length including hooks, if any, separately for different diameters as actually used in work, excluding overlaps. From the length so measured, the weight of reinforcement shall be calculated in tonnes on the basis of IS: 1732. Wastage, overlaps, couplings, welded joints, spacer bars, chairs, stays, hangers and annealed steel wire or other methods for binding and placing shall not be measured and cost of these items shall be deemed to be included in the rates for reinforcement..

11.3. The contract unit rate for coated/uncoated reinforcement shall cover the cost of material, fabricating, transporting, storing, bending, placing, binding and fixing in position as shown on the drawings as per these specifications and as directed by the Engineer, including all labour, equipment, supplies, incidentals, sampling, testing and supervision.

The unit Rate for coated reinforcement shall be deemed to also include cost of all material, labour, tools and plant, royalty, transportation and expertise required to carry out the work. The rate shall also cover sampling, testing and supervision required for the work.

11.4. The rate shall be for a unit of **one Kg**.

Item No. 22 :- Providing and fixing M.S. Fan clamps type 1 to 16mm dia M.S. bar bent to shape with hooked ends to R.C.C. slabs curing, laying including painting the exposed portion of loops, all as per standard design complete.

1.0. Materials

1.1. M.S. Bar shall conform to M-18.

2.0. Workmanship

2.1. The shape and size of fan clamp shall be directed!

2.2. The fixing M.S. fan clamp in existing R.C.C. slab a chase of size 150 mm. x 75 mm. shall be cut from the ceiling so as to expose the reinforcement and up to 25 mm. clear round the reinforcement bar. This shall be done without any damage to adjoining portion of ceiling. The two arms of the ends of the clamp shall be passed through the space over reinforcement bar from the bottom of the slab. Then the two arms shall be bent down about 16 mm. by means of crow bar. The clamp shall be held in position and the chase in ceiling filled with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size). The ceiling shall be then finished to match the existing surface and properly cured.

3.0. Mode of measurements and payment

3.1. The rate includes cost of all materials and labour required for satisfactory completion of this item as described above.

3.2. The rate shall be for a unit of One number.

Item No.23 :- Providing & fixing 40 mm thick Single shutter flush door solid core finished with both side 1 mm thick lamination both side like 'NOVAPAN 'or equivalent, of natural wood grain shade as approved by this office having telephone black granite 18 mm thick frame with double stone as per the instruction of Engineer in charge. with necessary SS hinges and fixtures etc. complete.

1.0. Materials

Flush door shall conform to M-30. Teak wood shall confirm to M-29. S.S. fixtures and fastening at all places.

2.0. Workmanship

2.1. The item covers the requirement of preparation of shutters for doors, windows, clerestory windows, their supply and fixing.

2.1.1. Ready made shutters shall be of correct size and shall fit into the door or other openings without excessive scraping of edges. Adding of battens etc. to make up to the size shall not be allowed. **40 mm thick Single shutter Entry door having Opening size (1.5 x 2.1m) And Fixed Size (0.75 x 2.1m) solid core finished with both side 1 mm thick lamination both side like 'NOVAPAN 'or equivalent, of natural wood grain shade as approved by this office having telephone black granite 18 mm thick frame with double stone as per the instruction of Engineer in charge with necessary SS hinges and fixtures etc. complete with all labour & material as per detail colour & pattern approved by Engineer in charge, manufacture's specification and drawing.**

2.3. Timber paneling:

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 of shutter while framing the panels in it.

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

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

2.3.4. The thickness specified shall be finished thickness and no tolerance will be permitted.

2.5. Fixtures and Fastenings:

2.5.1. The rate shall include aluminium fixtures and fastenings including fixing with iron screws. The size and number of hinges shall be as per table given in annexure-1. Floor spring, door lock & stainless steel handles are to be provided as directed.

3.0. Mode of measurement & payment

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

- 3.2. The dimension of the shutter shall be measured clear size of the shutter in close position between the grooves of the frame.
- 3.3. The rate includes the cost of water proof plywood, laminated sheet, floor spring & all fixtures & fastenings as directed in item.
- 3.3. **The rate shall be for a unit of one square meter.**

Item No. 24 :- Providing & fixing 35 mm thick Single shutter flush door solid core finished with both side 1 mm thick lamination both side like 'NOVAPAN 'or equivalent, of natural wood grain shade as approved by this office having telephone black granite 18 mm thick frame with double stone including fixed ventilation above lintel level as per drg and as per the instruction of Engineer in charge .with necessary SS hinges and fixtures etc. complete.

1.0. Materials

Flush door shall conform to M-30. Teak wood shall confirm to M-29. S.S. fixtures and fastening at all places.

2.0. Workmanship

2.1. The item covers the requirement of preparation of shutters for doors, windows, clerestory windows, their supply and fixing.

2.1.1. Ready made shutters shall be of correct size and shall fit into the door or other openings without excessive scraping of edges. Adding of battens etc. to make up to the size shall not be allowed. **35 mm thick Single shutter flush door solid core finished with both side 1 mm thick lamination both side like 'NOVAPAN 'or equivalent, of natural wood grain shade as approved by this office having telephone black granite 18 mm thick frame with double stone and as per the instruction of Engineer in charge with necessary SS hinges and fixtures etc. complete with all labour & material as per detail colour & pattern approved by Engineer in charge, manufacture's specification and drawing.**

2.3. Timber paneling:

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 of shutter while framing the panels in it.

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

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

2.3.4. The thickness specified shall be finished thickness and no tolerance will be permitted.

2.5. Fixtures and Fastenings:

2.5.1. The rate shall include aluminium fixtures and fastenings including fixing with iron screws. The size and number of hinges shall be as per table given in annexure-1. Floor spring, door lock & stainless steel handles are to be provided as directed.

3.0. Mode of measurement & payment

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

- 3.2. The dimension of the shutter shall be measured clear size of the shutter in close position between the grooves of the frame.
- 3.3. The rate includes the cost of water proof plywood, laminated sheet, floor spring & all fixtures & fastenings as directed in item.
- 3.3. **The rate shall be for a unit of one square meter.**

Item No.25 :- Providing and fixing window having extruded aluminum colour anodized section frame main outer size 95mm x 24mm x 1.17mm (of Jindal section no.2459 @ Wt. 0.738 Kg/mt), horizontal three track member size 92mm x 31.75mm x 1.30mm (of Jindal section no. 8688, @ Wt. 1.07 Kg/mt), vertical member of size 92mm x 31.75mm x 1.50mm (of Jindal section no. 8933 @ Wt. 1.06 Kg/mt) with sliding shutters of horizontal member size 40mm x 18mm x 1.29mm (of Jindal Section No. 8947 @ Wt. of 0.456 Kg/mt), vertical member of size 40mm x 18mm x 1.29 mm (of Jindal section no: 8949 @ Wt. of 0.456 kg / mt) with 5 mm th transparent bronze colour tinted float glass with powder coated aluminum fittings and fixtures and transparent silicon sealant glass fixing Including 18 mm Granite Frame as per details etc.

1.0 MATERIAL

1.1 Aluminum standard section

1.1.1 Window having extruded alluminium colour anodized section Jindal series E

Aluminum alloy used in the manufacture of window section shall confirm to I.S. designation HEA-WP of I.S. 733-1975 and also designation WVG-WP of I.S. 1285-1975 section shall be as specified in the drawing and design.

The works included window having extruded aluminum colour anodized section frame main outer size 95mm x 24mm x 1.17mm (of Jindal section no.2459 @ Wt. 0.738 Kg/mt), horizontal three track member size 92mm x 31.75mm x 1.30mm (of Jindal section no. 8688, @ Wt. 1.07 Kg/mt), vertical member of size 92mm x 31.75mm x 1.50mm (of Jindal section no. 8933 @ Wt. 1.06 Kg/mt) with sliding shutters of horizontal member size 40mm x 18mm x 1.29mm (of Jindal Section No. 8947 @ Wt. of 0.456 Kg/mt), vertical member of size 40mm x 18mm x 1.29 mm (of Jindal section no: 8949 @ Wt. of 0.456 kg / mt) with 5 mm th transparent bronze colour tinted float glass with powder coated aluminum fittings and fixtures and transparent silicon sealant glass fixing Including Granite Frame as directed by Engineer in charge.

All sections shall be free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides

1.1 Glass : The transparent bronze colour tinted float glass shall be of approved make having thickness of **5mm**. The glass shall be clear and free from scratches and cracks. The glass shall be provided on wall panel and fixed with transparent silicon gasket

1.2 Glazing clips: Glazing clips (structural glass) shall be of size as directed by the Engineer in charge around the glass allover shall be free from any scratches or holes or any damage of on surface all section shall have finished luster surface on all sides.

1.3 Rubber Gasket

Rubber gasket shall be of approved make shall be free from any scratches or holes or any damages on surface, and shall have finished luster surface on all sides.

1.4 Fixtures

Hinges shall be of approved make shall be free from any scratches or holes or any damages on surface and shall have finished luster surface on all sides.

1.5 Handles

Handles shall be of approved make shall be free from any scratches or holes or any damages on surface, and shall have finished luster surface on all sides.

1.6 Bolts

All Bolts shall be of approved make shall be free from any scratches or holes or any damages on surface and shall have finished luster surface on all sides.

1.7 Stoppers

Stoppers shall be of approved make shall be free from any scratches or holes or any damages on surface, and shall have finished luster surface on all sides.

Product is from reputed company having ISO 9001-2000 certificate and with three years performance guarantee.

2.0 WORKMANSHIP

The work of window having extruded aluminium colour anodized section frame shall be done with extreme finishing the partial board shall be fixed in the bottom panel and glass shall be fitted on top panel as directed by Engineer in charge, using glazing clips and rubber gaskets as required. All the fixtures and fastenings shall be fitted at right place and as directed by Engineer in charge floor spring shall be fitted properly so as to align the window properly and shall be given trial of opening and closing properly.

3.0 Mode of Measurement & Payment

3.1. The unit rate of window having extruded aluminium colour anodized section frame shall include the cost of all materials, cost of anodizing, cost of all necessary fixtures and fastenings, labour charges for fixing frames, shutters and fixing the window in wall at the place shown in drawing and as instructed by Engineer in charge, all tools and plant required for assembling and fixing in position, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for preparing frame and shutter of specified size to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and making walls good by plaster patch colour etc as required.

3.2. The Window shall be measured for its improvising and fixing window having extruded aluminium colour anodized section frame having heavy handle, heavy lock, bracket, stoppers, 5mm thick transparent glass panel of approved make with S.S. fixtures and transparent silicon glass fixings to from as detail including PVC T in frame silicon based linings handles, locks two nos. PVC gasket screws aluminum joints special runner etc. complete.

3.3 The rate shall be for a unit of **one square meter**.

Item No.26 :- Providing and fixing FRP frame size 125x65 mm and 35mm thick FRP shutter with wood grain raised paneled design finish shutter having extra reinforcement on sides & edges in Gel coat finish. The core of the shutter & frame is to be filled up with injected polyurethane foam done in situ alongwith embedded wooden pieces for stiffening & also taking hinges & fixtures. The whole FRP frame & shutter is to be water proof weather proof, termite proof & resistance to mild acid/alkali. Rates are to be inclusive of S.S hinges with fastener sleeve & aluminium fixtures & fastenings.

1.0 SHUTTER MATERIAL :

35 mm thick FRP shutter in depress panel design shall be having frame size 125 x 65 mm FRP thickness fire retardant grade FRP skin and embedded wooden pieces for stiffening as well as holding hinges and fixtures all moulded into one piece shutter. Core material shall be injected fire retardant grade rigid polyurethane foam done in situ having density 32 to 36 Kg/m³, compressive strength 1.8 to 2.0 kg/cm², flexural strength 3.5 to 4.5 kg/cm². Whole shutter shall be water proof, weather proof, termite proof and mild acid / alkali resistance.

2.0 SHUTTER :

35 mm thick wood grain raised panel FRP shutter shall be jointless. It shall be straight and smooth and of standard shape finished in gel coat. All necessary fixtures and fastening shall be fixed where wooden piece provided.

3.0 SHUTTER WORKMANSHIP :

Shutter shall be fixed in line, level and proper manner having 2.0 to 3.0 mm play i.e. air space for smooth and easy working. Three S.S. hinges shall be fixed properly with necessary screws.

4.0 SHUTTER TOLERANCE :

1.5 mm tolerance will be allowed in thickness of shutter.

5.0 SHUTTER FIXTURES AND FASTENING :

All fixtures & fastening like S.S. aldrop, tadi or baby-latch, stopper, handle shall be fixed with shutter in usual manner.

The shutter shall be fixed to frame using fixing necessary Khila or screws including drilling in granite frame as directed.

During fixing of shutter if the granite frame is damage the same will be replaced by contractor's own cost without any extra payment.

Product is from reputed company having ISO 9001-2000 certificate and with three years performance guarantee.

6.0 MODE OF MEASUREMENT AND PAYMENT :

Rate includes the cost of all materials, S.S. fixtures and fastening with necessary screws for fixing in position, labour, tools, equipments etc. required for satisfactory completion of item as directed by the Engineer in charge with all lead and lift.

The payment shall be made on unit of **square meter basis**.

Item No. 27 :- Providing and fixing Louverd type ventilators with powder coated aluminum fittings and fixtures and Blur glass fixing to Adjustable louverds and black granite frame as per details and executed as per directed by Engineer In charge.

1.0 MATERIALS

- 1.1 The standard powder coated Alluminium Ventilator with louvers allows used in the manufacture of extruded section shall confirm to I.S. designation HEA - WP of IS 733 - 1975 and also designation WVG-WP of IS 1285 - 1975 section shall be as specified in the drawing a design or as directed by Engineer-in-charge. All section shall be free from scratches holes or any damages on surface. All section shall have finished plaster surface on all sides.

Standard powder coated Alluminium Ventilator with louvers with anodized section for outer frame bottom member size 92 x 29.50 x 1.20 mm size weight per Rmt = 1.005 Kg and outer frame top and side member size 62 x 29.50 x 1.30 mm size weight per Rmt = 0.907 Kg and providing rubber gasket and Glassing clits 19.00 x 17.30 x 1.20 mm size section weight per Rmt = 0.154 kg all around the glass on both sides of approved shade louvers from alluminium standard section as directed by Engineer in charge.

- 1.2 The [Blur float glass](#) shall be of the best quality, free from specks, bubbles, smoken veins, air holes bistress and other defects. The kind of [float glass](#) to be used shall be as mentioned in the item or as shown in detailed drawing or as directed by Engineer-in-charge.

WORKMANSHIP

The work of standard powder coated Alluminium Ventilator with louvers shall be done with extreme finishing. The inclined blades shall be fixed as directed by Engineer-in-charge. 5 mm thick [blur float glass](#) shall be fixed on blades.

MODE OF MEASUREMENT & PAYMENT

The unit rate of standard powder coated Alluminium Ventilator with louvers shall include the cost of all labours, materials, anodizing charges, tools, plants, cost of necessary fixtures & fastenings.

The rate shall be for a unit of one square meter.

Item No. 28 :- Providing and fixing M.S. grills of required pattern to wooden/Marble/Granite/Stone 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 (A) Ornamental Grill.

1.0. Materials

The structural steel shall conform to M-22

2.0. Workmanship

- 2.1.** The M.S. grill shall be prepared as per the drawing or as directed for fixing to **wooden / Wall / Marble / Granite / Stone** frames of windows etc.
- 2.2.** The grill shall be fabricated to the designs and patterns shown in the drawings and the weight shall be as directed, and the joints shall be reverted or welded as shown in the plan or as directed. The grill so formed shall be fixed into the frames of the windows etc. before they are erected in position. The outside strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc. The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/screw per 30 cm. of the length of outer strip subject to minimum of 2 Nos. on each side of the frame or as indicated in the drawing or as directed.
- 2.3.** The bolts and nuts or screws shall be counter sunk and shall be fixed with the top of their heads flush with the face of the frame strips.
- 2.4.** No payment shall be made for weight of screws, bolts nuts etc. only weight of grill shall be paid.
- 2.5.** The rate shall include S.S. fixtures and fastenings including fixing with **round headed bolts and nuts or by screws including cutting, welding and fabrications etc. complete as directed.**
- 2.6.** The rate shall be for a unit of one **Kg.**

Item No. 29 :- Providing and fixing M.S. grills of required pattern to wooden/Marble/Granite/Stone 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 (A) Ornamental Grill.

The relevant specifications of **Item No. 29** shall be followed accept for the work of **Providing and fixing M.S. grills of required pattern to wooden/Marble/Granite/Stone 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 (A) Ornamental Grill.**

The rate shall be for a unit of one Kg.

Item No.30:- Providing and fixing rolling shutters of approved make made of 80 mm wide M.S. laths inter-locked together through their entire length and jointed together at the ends by end locks mounted on specially designed pipe shaft with bracket plates, guide channels and arrangements for inside and outside locking with push-pull operation including the cost of hood cover and spring etc. complete. (B) Shutter shaving width 3.5 M. and above.

32. Rolling Shutters

- 32.1.** The rolling shutters shall conform to I.S.6248-1979. Rolling shutters shall be supplied of specified type with accessories. The size of the rolling shutters shall be specified in the drawings. The shutters shall be specified in the drawings. The shutters shall be constructed with interlocking lath sections formed from cold rolled steel strips not less than 0.9 mm. thick and 80 mm. wide for shutters below 3.5 m width not less than 1.25 mm. thick and 80 mm wide for shutters 3.5 m. in width and above unless otherwise specified.
- 32.2.** Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) joint less construction. The thickness of sheet used shall not be less than 3 15 mm.
- 32.3.** Hood covers shall be made of M S. Sheets not less than 0.90 mm. thick. For shutters having width below 3.5 Meter and the thickness of M.S. sheet for the hood cover shall be not less than 1.25 mm.
- 32.4.** The spring shall be of best quality and shall be manufactured from tested high tensile spring steel wire of strip of adequate strength to balance the shutters in all position. The spring pipe shaft etc. shall be supported on strong M S of malleable C. I. brackets. The brackets shall be fixed on or under the lintel as specified with raw plugs and screws bolts etc.
- 32.5.** The rolling shutters shall be of self rolling up to 8 Sq. m. clear area without ball bearing and up to 12 Sq.m. clear area with ball bearing. If the rolling shutters are of larger, then gear operated type shutters shall be used.
- 32.6.** The locking arrangement shall be provided at the bottom of shutter at both ends. The shutters shall be opened from outside.
- 32.7.** The Shutters shall be completed with door suspension shafts, looking arrangements, pulling hooks, handles and other accessories.

The payment shall be made on **Square meter basis.**

Item No. 31:- P & L 24" x 24" vitrified 8 mm thick tile flooring over 20 mm(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 finised 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. **Vitrified flooring tiles** shall conform to M-55

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 monsoon to place wooden planks across and squat on it.

2.1.2. The **Vitrified flooring tiles** shall be laid on cement mortar bedding of **12 mm 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 18 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 tow hours. Neat gray cement grout at 33 kg/Cement/Sq.mt. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles shall 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 Nahni 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 or trowel to a depth of 5 mm. and loose material removed. White cement shall be used for pointing the joints. After fixing the tiles 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 cleaned off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precautions and measures shall be taken to ensure that the tiles are not damaged in any 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 length and width of the flooring shall be measured not between the faces of skirting or dedos or plastered face of wall as the case may be. The paving under dedo or skirting shall not be measured. No deduction shall be made not extra paid for any opening in the floor of area upto 0.1 sq.mt. 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 square meter.

Item No. 32 :- P & L 24" x 24" vitrified 8 mm thick tile flooring over 20 mm (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 antiskit.

The relevant specifications of **Item No. 31** shall be followed accept for the work of **P & L 24" x 24" vitrified 8 mm thick tile flooring over 20 mm (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 antiskit.**

The rate shall be for a unit of one Square meter.

Item No. 33:- Providing and laying Marbo Grenite tiles 8 to 10 mm thick , 24" x 24" in skirting risers of steps and dedo on 10mm thick cement plaster 1:3 (1-cement : 3-coarse sand) and jointed with white cement slurry.

1.0. Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. **24" x 24" size vitrified tiles 8mm to 10mm thick as approved by the Engineer in charge** shall conform to relevant Indian standard.

2.0. Workmanship

2.1. Preparation of Surface:

In case of brick masonry wall, the joints shall be raked out to a depth of least 10 mm. while the masonry is being laid. In case of concrete wall the surface shall be chiseled and roughed 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 with 10 mm. thick plaster of cement plaster 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 set and edges with white cement slurry in bedding mortar. The tiles shall be gently tapped in position on after the other keeping the joints as thin as possible. Top of skirting or dedo shall be truly horizontal and the joints vertical or as per required pattern.

2.2.2. Risers of steps, skirting, dedo and pillars shall rest on top of treads or flooring where full size tiles cannot 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 / with coloured pigment and curing etc. complete. The surface shall be kept wet for seven days. After curing the surface shall be washed clean.

3.0. Mode of measurements and payment

3.1. The rate shall include the cost of all materials and labour required for various operations described above.

Risers of steps: skirting and dedo shall be measured in square meters, length and height shall be measured along the finished face of the skirting or dedo 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 square meter.

Item No. 34 :- Providing and laying polished Kota stone slab flooring over 20mm (Average) thick base of cement mortar 1:6 (1-cement : 6-coarse sand) or L.M. 1:1.5 (1-Lime putty :1.5 - coarse sand) laid over and jointed with grey cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete. (B) 30mm thick.

1.0. Materials

- 1.1. Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11. Hand dressed machine polished blue kota stone slab 30mm thick shall conform to M-49,
- 1.1. Kota stone slab shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown coloured shall not be allowed for use. They shall be without any soft veins cracks or flaws Kota stone slab shall be hard, even, and regular in shape and it should be without fault.
- 1.2. The size of the polished blue kota stone slab to be used for flooring shall be of size 600 mm x 450 mm and or as approved by Engineer in charge or Architect. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified.
- 1.3. Tolerance of minus 30 mm. on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be +3 mm.
- 1.4. The edges of Kota stone slab shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones shall be true, square and free chipping and surface shall be true and plain.
- 1.5. When machine cut edges are specified the exposed and the edges at joints shall be machine cut the thickness of the exposed machine cut edges shall be uniform.
- 1.6. The stones shall have machine polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. The stones to be used for dado, skirting, sink, veneering, sills, steps etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished.

2.0. Workmanship

- 2.1. Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving a plane surface. The thickness shall be 20 mm. (Average) as specified in the item but not less than 25 mm. at any place of the slab.
- 2.2. Bedding for the polished blue kota stone slabs shall be of cement mortar 1:6 (1 cement : 6 coarse sand) or L.M. 1:1.5 of average thickness 20 mm given in the description of the item. Sub grade shall be cleaned wetted and mopped mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one blue kota stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining, the walls shall enter not less than 10 mm.

under the plaster, skirting or dedo. The junction between the wan and floor shall be finished neatly. The finished surface shall be true to levels and slopes as directed.

- 2.3. The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly
- 2.4. Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stones of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone of 220 to 350 grade grit fitted in heavy machine. Water shall be properly used during polishing. The stone shall then be washed clean with water When directed by the Engineer-in-charge, wax polish of approved quality shall be applied on the surface with the help of soft cloth over a clean and dry surface. Then the polishing machine fitted with bobs shall be run over it.
- 2.5. The holes required for Nahni traps, pipes and any other fittings shall be made, without any extra cost.
- 3.0. **Measurement & payment**
- 3.1. The rate shall include the cost of all materials and labour involved in all the operations described above. The kota stone flooring shall be measured in square meters correct to two places decimal, length and breadth shall be measured correct to a centimeter and between the finished face of skirting dedo plaster and no deduction shall be made nor extra paid for any opening in floor of areas upto 0.1 sq.
- 3.2. The rate shall be for a unit of one **square meter**.

Item No. 35 :- Providing and laying 18 mm thick machine cut, free edges, machine polished Black Granite tread and risers in single piece with 1 cm nosing and necessary grooves on treads etc. complete.

General

This work shall consist of providing and fixing **machine cut free edge machine polished granite stone 16mm to 18mm thick in flooring, treads and risers in single piece** as per design of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

1.0 MATERIAL

Water shall confirm to M-1. Cement Mortar shall confirm to M-11. Granite slab shall confirm to M-52. Sand shall conform to M-6.

1.0 GRANITE SLAB

1.1. Granite slab shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Only approved coloured shall not be allowed for use. They shall be without any soft veins cracks or flaws Granite slab shall be hard, even, and regular in shape and it should without fault.

1.2. The size of the Granite slab to be used as approved by Engineer in charge or Architect. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified. **For flooring, treads and** risers the Granite slab shall be in single piece.

1.3. Tolerance of minus 30 mm. on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be +3 mm.

1.4. The edges of Granite slab shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones shall be true, square and free chipping and surface shall be true and plain.

1.5. The Granite slab shall have machine cut free edges with half round pipe moulding mirror polished surface. When brought on site. The stones to be used for flooring dado, skirting, sink, veneering, sills, steps, etc.

2.0 WORKMANSHIP

2.1 Granite slab shall be of approved quality shall be laid evenly to level and slope as directed by Engineer in charge over a bed of a base layer consisting of cement mortar 1:6 (1 cement: 6 coarse sand by volume) or Lime Mortar 1:1.5 (1 lime : 1.5 lime putty by volume).

2.2 Granite slab shall be laid evenly as per detailed drawing or as directed by Engineer in charge. Width, length and shape of stone shall be as per pattern shown in detailed drawing.

2.3. Cement and sand for base layer shall be mixed in proportions of 1:6 (1 cement : 6 coarse sand by volume). Cement and sand shall be proportioned by volume after making due allowance for bulking. The required quantity of water shall then be added and the mortar mixed to produce workable consistency before mixing platform shall be thoroughly cleaned before changing from one type of cement to another.

2.4. The mixing for base layer shall be done intimately. The operation shall be carried out on clean water tight platform, and cement sand shall be first mixed dry in the required proportion to obtain uniform colour and then the mortar shall be mixed for at least two minutes after addition of water. In case of cement mortar, that has suffered because of evaporation of water the same shall be re-tempered by adding water as frequently as needed to restore the requisite consistency but its re-tempering shall be permitted only within thirty minute from the time of addition to water at the time of initial mixing.

- 2.5. Cement and sand for base layer shall be mixed in proportion as specified in the item, Cement and sand shall be proportioned by volume after making due allowance for bulking. The required quantity of water shall then be added and the mortar mixed to produce workable consistency.
- 2.6. Curing shall be started as soon as the mortar used for finished has hardened sufficiently so as not to be damaged when watered. It shall be kept wet for a period of at least 7 days. During this period, it shall be suitably protected from all damages;
- 2.7. During hot weather, all finished or partly finished work shall be covered or wetted in such manner as will prevent rapid drying of the flooring work.
- 2.8. Joints of Granite slab flooring shall be through and continuous throughout the building as directed by Engineer in charge.
- 2.9. Joints shall be filled with a stiff mixture of gray cement slurry.
- 2.10. The Granite slab flooring work shall be finished by rubbing and mirror polishing after the work of flooring is set properly.

3.0 MODE OF MEASUREMENT & PAYMENT :

- 3.1. The unit rate **Granite stone slab** flooring shall include the cost of all materials, tools and plant required for mixing, laying of base layer in true level and slope as required applying & placing stones in position, finishing, curing etc. flooring all over the length of walls and corners and sill of doors etc. and all other incidental expenses for producing flooring work to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work. The rate includes cost of mirror polishing of flooring and dado work.
- 3.2. The rate shall include the cost of all materials and labours involved in all the operations described above. The **granite stone slab** flooring shall be measured in Square meter correct to 2 places of decimal. Length and breadth shall be measured to correct to a centimeter and between the finished the finished face of the skirting, dado or wall plaster and no deduction shall be made nor extra paid for any opening in floors or areas up to 0.1 square meter.
- 3.3. The rate shall be for a unit of **one Square meter**.

Item No. 36 :- Providing and laying BBCC of 75mm th. Layer in CM (1:3) including spraying two coat of water proofing chemical with selected brand by engineer incharge i.e. perma or other with leveling complete for ready base of china mosaic treatment.

1.0. Materials

1.1. Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6. water proofing chemical of approved brand.

2.0. Workmanship

2.1. Before spreading the mortar, the sub-base of the floor shall be cleaned of all dirt, scum and loose materials and then well wetted without forming any pools of water on the surface.

2.2. In case; of R.C.C. floors, the top shall be left a little rough, all points of level for the finished surface shall be marked out. The cement mortar of proportion 1:3 (1 cement : 3 fine sand) as directed shall be then evenly and smoothly spread over the base. Bedding layer of mortar shall be not less than 75 mm. and average thickness of bedding shall be 75 mm.

2.7. Mode of Measurement & Payment:

2.7.1. The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plan or as directed includes cost of necessary form work.

2.7.2. The rate shall be for a unit of one **square meter**.

Item No. 37:- Providing and laying broken china mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 to plain or slope and to be tempered to bring mortar creme out upto surface using white cement including rounding off junctions and extending them upto 15 cm along the wall, clearing with water and oxalic acid etc. as directed.

1.0. Materials

- 1.1. Water shall conform to M-1. Cement shall conform to M-3. Lime Mortar shall conform to M-10 cement mortar shall conform to M-1. The Glazed tiles of 12 to 20 mm. thick shall be light shade using white cement and conform to M-47.

2.0. Workmanship

- 2.1. The work shall be carried out as per I.S. 1443-1972.

2.2. Bedding:

- 2.2.1. Before spreading the mortar, the sub-base of the floor shall be cleaned of all dirt, scum and loose materials and then well wetted without forming any pools of water on the surface.
- 2.2.2. In case; of R.C.C. floors, the top shall be left a little rough, all points of level for the finished surface shall be marked out. The lime mortar of proportion 1:1.5 (1 lime putty : 15 fine sand) or cement mortar of proportion C.M. 1 : 3 as directed shall be then evenly and smoothly spread over the base. Bedding layer of mortar shall be not less than 10 mm. and average thickness of bedding shall be 25 mm.

2.3. Laying:

- 2.3.1 Before laying the terrazzo (Mosaic) tiles, the tiles shall be thoroughly wetted with water. Neat cement grout of required-consistency at 4.4. Kg. cement/sq. mt. shall be spread on the mortar bed. The tiles shall be laid on the neat cement float and shall be evenly and firmly bedded to the required level and slope, There shall be no hollows left. The joints shall be uniform thickness and in straight line as per the pattern.
- 2.3.2 The surface of flooring shall be checked frequently with a straight edge at least two meters long so as to obtain a true surface with required slope.
- 2.3.3. The tiles which are fixed in the floor adjoining the wall shall go about 10 mm. under plaster. Skirting or dedo shall be left unfinished for about 50 mm. above finished floor level and unfinished strip then left earlier shall be finished.
- 2.3.4. In places where full tiles cannot be fixed, the tiles shall be cut to the size and smoothened at edges to give straight and true joints.
- 2.3.5. After the tiles have been laid, the surplus cement slurry and the joints shall be cleaned and washed fairly deep before cement hardens.
- 2.3.6. The day after tiles have been laid, the joints shall be cleaned or gray cement grout with a wire brush to a depth of about 5 mm. and then grouted with white cement with or without pigment to match the shade of the topping of tiles. The same cement slurry shall then be spread over the whole surface in a thin coat to protect the surface from abrasive damage and to fill pin holes that may exist on the surface.

2.4. Curing:

2.4.1. The flooring shall be kept wet with damp sand or water for seven days. It shall be kept undisturbed at least for 14 days. The grinding shall normally be commenced after 14 days.

2.5. Polishing:

2.5.1. After the tiles are properly cured, first grinding shall be done with carborundum stone of 48.to 60 grade grit fitted in machine. Water shall be properly used during grinding. When the chips show up and the floor has been uniformly rubbed, it shall be cleaned with water, baring all pin holes. It shall then be covered with a thin coat of white cement mixed with or without pigments to match the colour of the topping of the tiles. Pin holes if any shall thus be filled. This grout shall be kept .moist for a week. Thereafter second grinding shall be done when other works are finished The machine shall be fitted with carborundum of grit 220 to 350 using water in abundance. The floor shall then be washed clean with water. Oxalic acid powder shall then be dusted at 33 grams per square meter on the surface and the surface rubbed with machine fitted with Hessian bobs or rubbed hard with pad of woolen rags. The floor shall then be washed clean and dried with a soft cloth or linen. The finished floor shall not sound hollow when tapped with mallet.

2.5.2. If any tile is disturbed or damaged it shall be refitted or replaced properly jointed and polished.

2.5.3. Testing of the tiles shall be carried out by the contractor at his own cost as per I.S. requirement for required test.

3.0. Mode of measurements & payment

3.1. The terrazzo tiles flooring shall be measured in sq. meters for visible area of work done.

3.2. No deductions shall be made nor extra paid for any opening in the floor area up to 0.1 sq. mt. Nothing extra shall be paid for use of cut tiles or for laying the floors at different levels in the same room or court yard. Mosaic tiles laid in floor borders and bands etc.-shall be measured in the same item and nothing extra shall be payable on account of these or similar bonds formed of half or multiples of half size, standard tiles or other uncut tiles.

3.3. The treads of stairs and steps paved with tiles without nosing shall also be measured under this item.

3.4. Extra rate shall however be paid for such area where width of treads does not exceed 30 cms.

3.5. The rate shall be include the cost of all materials, labour involved in all the operations as described above.

3.6. The rate shall be for a unit of one square meter.

Item No. 38 :- Providing and cement vata (10cm x 10cm size) quarter round in cement mortar 1:1 including neat cement finishing watering etc. complete..

1.0. Materials

1.1. Water shall conform to M-1. Cement mortar shall conform to M-11.

2.0. Workmanship

2.1. The work of cement vata of 10 cms x 10 cms. size shall be earned out at Functions of parapets and terraces as directed. The vata shall be finished in quarter round shape. The work shall be earned out in the best workman like manner. The inter portion of rain water pipe shall be rounded off properly during constructing the vata. The work shall be cured for 7 days.

3.0. Mode of measurements and payment

3.1. The work shall be measured for finished item in running meter.

3.2. The rate shall be for a One running meter.

Item No. 39:- Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (ii) Cement mortar 1:4 (1-cement :4-sand) (Interior Plaster)

1.0. Materials

- 1.1.** Water shall conform to M-1. The cement mortar of proportion **1:3** shall conform to M-13. Galvanized iron chicken mesh.

2.0. Workmanship

2.1. Scaffolding:

Wooden bullies, bamboos, planks, trestles 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 back ground :

- 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 toughened by wire brushing if it is not hard and by hacking if it is hard. In case of concrete surface, if a chemical retarded 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 readers if left on the surface. Trimming of projections on brick/concrete surfaces 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 top 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 supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2:3. Application of plaster :

- 2.3.1.** The plaster about 15x15 cms. 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 movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

- 2.3.2.** Cement plaster shall be used within half an hour after addition of water and 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. It shall not be closed on the body of features such as plaster bands and cornices not at the 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.
- 2.3.5.** The plastering work shall be in single coat on brick / concrete wall for interior plastering up to floor two level, finished even and smooth **in C.M. 1:4.**
- 2.3.6** The coat of cement and fine sand mortar of proportion 1:1 (15 mm thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the base coat is still plastic.
- 2.3.7.** In any continuous face of wall the finishing treatment should be carried out continuously and day to day breaks made to coincide with architectural breaks in order to avoid unsightly Junctions
- 2.3.8. Curing :** All the plaster work shall be kept damp continuously for a period 7 days.
- 2.3.9.** Providing necessary grooves between structural members as directed by Engineer in charge.
- 3.0. Mode of measurements & payment**
- 3.1.** The rate shall include the cost of all materials, labour 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 **15 mm** at any point on this surface.
- 3.4.** This item includes plastering for **all floors.**
- 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, following soffits shall be measured separately.
- 3.7.** For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq.mt each in area and for openings exceeding 0.5. sq.mt and not exceeding 3.00 sq.mt. in each area deductions and additions shall be made in the following manners.

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

(b) Deduction 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 ravel, 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 areas of plaster and / or pointing as the case may be.

3.8. For openings having door frames equal to or 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.mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.

3.10 The payment shall be made for a unit of 1.0 sq.mt of work done over and above the finishing of work of base coat.

4.0. The rate shall be for a unit of **One square meter**.

Item No. 40 :- Providing 15 mm 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 1:4 (1-cement : 4-sand) (ceiling Plaster).

The relevant specifications of **Item No. 39** shall be followed except for the work of **Providing 15 mm 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 1:4 (1-cement : 4-sand) (ceiling Plaster)**

The rate shall be for a unit of one Square meter.

Item No.41:- 20mm thick sand faced cement plaster on walls upto height 10 metres above ground level consisting of 12mm thick backing coat of C.M. 1:3 (1-cement : 3-sand) and 8mm thick finishing coat of C.M. 1:1 (1-cement : 1-sand) etc. complete.

1.0. Materials

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

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.

2.2. Scaffolding:

Wooden bullies, bamboos, planks, trestles 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.

2.3. Preparation of back ground:

2.3.1. 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 toughened by wire brushing if it is not hard and by hacking if it is hard. In case of concrete surface, if a chemical retarded 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 readers is left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

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

2.3.3. 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.

2.3.4. For external plaster, the plastering operation shall be started from top 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 supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.4. Application of plaster :

2.4.1. The plaster about 15x15 cms. 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 movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

- 2.4.2.** Cement plaster shall be used within half an hour after addition of water and mortar or plaster which is partially set shall be rejected and removed forthwith from the site.
- 2.4.3.** 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. It shall not be closed on the body of features such as plaster bands and cornices not at the 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.
- 2.4.4.** 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 oh the outside of the plaster and keeping them wet.
- 2.4.5.** Before the first coat hardens its surface shall be beaten up by edges of wooden tapers 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.
- 2.4.6.** 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.
- 2.4.5.** The plastering work shall be in single coat on rough side of half brick wall for interior plastering up to floor two level, finished even and smooth in C.M. 1:3.

2.4.6 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.

2.4.7. **The finishing shall be gutkha finishing with 1 cm x 1 cm grooves shall be done as directed.**

3.0. Mode of measurements & payment

- 3.1.** The rate shall include the cost of all materials, labour 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 **20 mm** at any point on this surface.
- 3.4.** This item includes plastering up to floor two level including making necessary cornices as directed.

- 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, following soffits shall be measured separately.
- 3.7.** For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq.mt each in area and for openings exceeding 0.5 sq.mt and not exceeding 3.00 sq.mt. in each area deductions and additions shall be made in the following manners.
- (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.
- (b) Deduction 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, 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 areas of plaster and / or pointing as the case may be.
- 3.8.** For openings having door frames equal to or 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. mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.
- 3.10.** The rate shall be for a unit of **One Square meter. No extra payment for making necessary cornices shall be made.**

Item No. 42:- Providing throating or plaster drip and moulding to R.C.C. Chhajja.

1.0. Materials

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Cement mortar shall conform to M-11.

2.0. Workmanship

- 2.1.** The work shall be carried out as directed. The proportion of mix for finishing shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and moulding shall be one centimeter in thickness.

3.0 Mode of Measurement & Payment :

- 3.1.** The payment will be made on running meter basis of the finished work.
- 3.2.** All necessary labour, materials equipment etc. shall be provided by the Contractor.
- 3.3** The unit rate plaster drip molding shall include the cost of all materials, tools and plant required for molding and finishing as per direction of the Engineer-in-charge, curing and all other incidental expenses for producing plaster drip molding of specified size to complete the item or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all centering and forms required for the work.
- 3.4** The throating or plaster drip shall be measured for its length, limiting dimensions to those specified on plan or as directed.
- 3.5** The rate shall be for a unit of one **running meter**.

Item No.43:- Applying two coats of Birla or Asian acrylic lappy (putty) and 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. (Interior Wall Putty).

1.0. Materials

1.1. Lappy (putty) and primer shall be of approved brand and manufacture.

2.0. Workmanship

The lappy (putty) shall be carried out on wall surfaces to give an even shade.

2.1. Scaffolding

Where scaffolding is required, it shall be erected in such a way that as far as possible no pail of scaffolding shall rest against the surface to be distempered. A properly secured and well tied suspended platform (Joola) may be used for distempering. Where ladders are used, pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the walls and floors. For distempering to ceiling, proper stage scaffolding shall be erected where necessary.

2.2. Preparation of surface :

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

2.2.2. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster 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 01) 1966. Before applying distempering, any unevenness shall be made good by applying putty made of plaster of pairs mixed with water on entire surface including filling up the undulation and then sand papering the same after it is dry.

2.3. Priming coat :

2.3.1. A priming coat of primer of approved manufacture and shade shall be applied over the papered surface in case of new work on undecorated surface. If the distemper priming is done after the wall surface dries completely, the distemper primer shall be applied.

2.3.2. Application of primer shall be done as under: The primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for at least 48 hours before oil bound distemper or paint is applied.

3.0. Mode of measurements and payment

3.8. The rate includes cost of all materials, labours, scaffolding, protective measures etc. involved in all the operations described above. This shall also include conveyance, delivery, handing, unloading, storing work etc.

3.9. The rate shall be for a unit of one **Square Meter**.

Item No. 44 :- Applying two coats of Birla or Asian acrylic lappy (putty) and 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. (Ceiling Putty).

The relevant specifications of **Item No. 43** shall be followed accept for the work of **Applying two coats of Birla or Asian acrylic lappy (putty) and 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. (Ceiling Putty).**

The rate shall be for a unit of one Square meter.

Item No.45 :- Wall painting two coats with plastic emulsion paint of approved brand and manufacture on wall surfaces to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth. (Interior Wall Paint)

1.0. Materials

Water shall be conform M-1. The plastic emulsion paint shall conform to I.S.: 5411-1969 (Part-I).

2.0. Workmanship

The painting work shall be for subsequent coat of plastic emulsion paint of approved brand & manufactures on undecorated wall surfaces to give an even shade as directed.

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 bags 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.

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

2.2.1. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster 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 01) 1966. Before applying distempering, any unevenness shall be made good by applying putty made of plaster of pairs mixed with water on entire surface including filling up the undulation and then sand papering the same after it is dry.

2.3. Preparation of Mix :

This shall be done as per manufacture's 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.

2.4. Application :

2.4.1. Before pouring into small containers for use, the paint shall be stirred thoroughly in item 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 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 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 moldings, 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 three coats of cement water proofing paint. The second or subsequent coat shall not be started until the proceeding coat as become sufficiently hard to resist marking by brushing 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 or oil paint by washing in warm soap water. Brushes shall be quickly washed in water immediately after use and kept immersed in water fusing break periods to prevent the paint from hardening on the brush.

(b) In the preparation of wall for plastic emulsion painting, no oil base petals shall be sued in filling cracks, holes etc.

(c) Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

(d) Washing or surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application.

2.6. Protective measures : 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 and 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 item 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 openings not exceeding 0.5 sq.mt. each in area, for ends of joists, posts, beams, girders, steps etc. not exceeding 0.5 sq.mt. each in area and for openings exceeding 0.5 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 joists, 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 not for finish around ends of joints, beams, posts etc.

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

(a) When both the faces of 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 to be made for reveals, jambs, soffits, sills etc.

- 3.4** In case of area of openings exceeding 3 sq. mt. each, deductions shall be made for openings but jambs, soffits, sills shall be measured.
- 3.5.** No deductions 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) Naintial pattern roof (Plain sheeting sheets)..... 10%
 - (e) Naintial 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** Extra payment shall be done on ceiling and sloping roofs.
- 3.9.** The rate shall include the cost of ail materials, labour, scaffolding, protective measures etc. involved in all the operations described above.
- 4.0** The rate shall be for a unit of **One square** meter.

Item No. 46:- Finishing wall with weather proof exterior emulsion paint on wall surface (two coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt, and remains of loose powdered materials etc. complete (Exterior Wall Paint).

General

This work shall consist of painting the walls with weather proof exterior emulsion paint two coats on wall surfaces of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

MATERIALS

1.0 Exterior emulsion paint

Exterior emulsion paint shall be of specified colour as approved by Engineer in charge the ready mixed exterior emulsion paint shall not be allowed, If however ready mix emulsion paint of specified shade or tint is not available white ready mixed paint with approved Steiner will be allowed in such case the contractor shall ensure that the shade of the paint so allowed shall be uniform exterior emulsion paint shall meet with the following general requirements

1. Exterior emulsion paint shall not show excessive setting in freshly opened full can and shall easily be redepressed with a paddle to a smooth homogeneous state. The APEX exterior emulsion paint shall show no curding, livering cracking or colour separation and shall be free from lumps and skins.
2. The exterior emulsion paint as received shall brush easily possess good leveling properties and show no running or sagging tendencies.
3. The exterior emulsion paint shall not skin within 48 hours in a three quarters filled closed container
4. The exterior emulsion paint shall dry to a smooth uniform finish free from roughness grit unevenness and other imperfections
5. Ready mix exterior emulsion paint if allowed for specified shade, shall be used exactly as received from the manufacturers and generally according to their instruction and without any admixtures whatsoever.

2.0 WORKMAN SHIP

2.1 Scaffolding :

Where scaffolding is required, it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be distempered. A properly secured strong and well tied suspended platform (joola) may be used for distempering. Where ladders are used, pieces of old gunny bags.

3.0 Application coat :

The exterior emulsion paint on wall surfaces shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturer only. Sufficient quantity of distemper required for a day's work shall be prepared.

- 3.1** For undecorated surfaces, after the primer coat is dried for at least 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the exterior emulsion paint, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. Minimum two coats of the exterior emulsion paint shall be applied with brushes in horizontal strokes followed immediately by vertical strokes which together shall constitute one coat. The subsequent coats shall be applied after a time interval of at least 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surface shall be even and uniform without patches, brush marks, distemper drops etc.
- 3.2** Sufficient quantity of the [exterior emulsion paint](#) shall be mixed to finish one room at a time.

3.0 MODE OF MEASUREMENT & PAYMENT :

- 3.1.** The unit rate wall painting with [two coats of exterior emulsion paint and one coat of priming coat](#) shall include the cost of all materials, tools and plant required for mixing, cleaning brushing sand papering & painting with all required specials and Lapi compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing pipe line work of specified diameter to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.
- 3.2** The rate of wall painting with [exterior emulsion paint](#) shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.
- 3.3.** The wall painting with [exterior emulsion paint](#) shall be measured for its length and height limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.
- 3.4.** The payment will be made on **square meter** basis of the finished work.

Item No. 47 :- Wall painting two coats with plastic emulsion paint of approved brand and manufacture on wall surfaces to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth on ceiling. (Ceiling Paint)

The relevant specifications of [Item No. 45](#) shall be followed accept for the work of **Wall painting two coats with plastic emulsion paint of approved brand and manufacture on wall surfaces to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth on ceiling. (Ceiling Paint)**

The rate shall be for a unit of one Square meter.

Item No.48 :- Providing laying and jointing in true line and level 40mm dia. U.P.V.C. Pipe (SCH-40) for cold water including fittings make PRINCE /SUPREME/ ASTRAL / FINOLEX or equivalent as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.

1.0. Materials

- 1.1. The pipes shall be standard I.S.I. mark U.P.V.C. pipe (SCH-40) of specified dia.
- 1.2. The fittings, clamps etc. required for specified dia. bore pipes shall be of best quality and makes as approved by the Engineer-in-charge. Necessary accessories with inner/ outer brass thread shall be used as required and instruction by Engineer in charge.

2.0. Workmanship

2.1. Cutting, Laying & Jointing

- 2.1.1. When the tubes are to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bore in offered. The ends of the tubes shall then be threaded conforming to the requirements of I.S. 554-1955 with pipe dies and taps carefully in such a manner that it will not result in slackness of joints when the two pieces are screwed together.
- 2.1.2. The taps and dies shall be used only for straightening screw threads which have becoming bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the water tight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.
- 2.1.3. In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all times free from dust and dirt during fixing. But from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temperately plugged to prevent access of water, soil, or any other foreign matter. Jointing shall be carried out with proper chemical adhesive material and allow to dry.
- 2.1.4. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.

2.2. Fixing concealed to wall, ceiling & floors.

- 2.2.1. In case of fixing concealed cement point to walls or ceilings, these shall run on the surface of the wall, or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or pipe fixed in ducts or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls or solid floors, where unavoidable, pipe may be buried for short distances provided that adequate protection is given against damage and where so required joints are not buried. Where required M.S. tube sleeve shall be fixed at a place a pipe is passed through a wall or floor for expansion and contraction and other

movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.

- 2.2.2.** All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight lengths at 2 MC/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to 25 mm. dia the holes in the walls and floors shall be made by drilling with chisel or jumper and not by dismantling the brick work or concrete. However for bigger diameter pipes the holes shall be carefully made (1 cement : 3 coarse sand), and properly finished to match the adjacent surface.

2.3. Testing of joints :

- 2.3.1.** After laying and jointing, the pipes and fillings shall be inspected under working conditions of pressure and flow. Any joints found liken shall be redone, and ail leaking pipes removed and replaced without extra cost.
- 2.3.2.** The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg./Sq cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shocks and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work laying proceeds, keeping, the joints exposed for inspection during the testing.

3.0. Mode of measurements and payment

- 3.1.** The description of the item shall, unless otherwise stated be held to include where necessary conveyance and delivery, handling, unloading, storing fabrication, hoisting, all labour for finishing to required shape and size, setting, fitting in position straight, cutting and waste return of packing etc.
- 3.2.** The length shall be measured on [running meter](#) basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed to wall, ceiling. floors etc shall be measured and paid under this item.
- 3.3.** All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.
- (i) Dimension shall be measured to the nearest 0 01 meter.
- (ii) Area shall be worked out to the nearest 0.01 sq. meter.
- 3.4.** All measurements of cutting shall unless otherwise stated by held to include the consequent waste.
- 3.5.** In case of fitting of unequal bore, the targets bore shall be measured for the test.
- 3.6.** Testing of pipe lines fittings, and joints include for providing all plant appliances necessary for obtaining access to the work to be tested an carrying out the tests.

- 3.7. The rate includes **U.P.V.C. pipe** (SCH-40) with screwed socket joints to gather with all fittings (such as bends, sockets springs, elbows, test, crosses, short pieces, clamps and plugs, unions etc.) and fixing complete with clamping wall hooks, wooden plug etc. and also curing, screwing and waste and for making forged (or hand made) bends on piping as required. Connector shall be inserted where required or directed. The rate also includes cutting through walls, floors etc. and their making good and painting exposed threads with anti-corrosive paint as above and testing where tubes are to be fixed to wall, ceiling and flooring, the rates shall not include painting of pipes, providing sleeves and sand filling under floor for which separate payment shall be made.
- 3.8. The rate shall be for a unit of one running meter.

Item No. 49 :- Providing laying and jointing in true line and level 32mm dia. U.P.V.C. Pipe (SCH-40) for cold water including fittings as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.

The relevant specifications of **Item No. 48** shall be followed accept for the work of **Providing laying and jointing in true line and level 32mm dia. U.P.V.C. Pipe (SCH- 40) for cold water including fittings as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.**

The rate shall be for a unit of one running meter.

Item No. 50 :- Providing laying and jointing in true line and level 15mm dia. U.P.V.C. Pipe (SCH-40) for cold water including fittings as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.

The relevant specifications of **Item No. 48** shall be followed accept for the work of **Providing laying and jointing in true line and level 15mm dia. U.P.V.C. Pipe (SCH- 40) for cold water including fittings as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.**

The rate shall be for a unit of one running meter.

Item No. 51:- Providing and fixing concealed center point to wall ceiling & floor CPVC (SDR 13.5) PIPE having National Sanitation Foundation (NSF) seal for potable water of following dia. nominal bore tube fittings and clamps including making good the wall, ceiling and floor etc. complete. [F] 50mm.

1.0. Materials

- 1.1. The pipes shall be standard C.P.V.C. (SDR 13.5) pipe having National Sanitation Foundation (NSF) seal for potable water of specified dia.
- 1.2. The fittings, clamps etc. required for specified dia. bore pipes shall be of best quality and makes as approved by the Engineer-in-charge.

2.0. Workmanship

2.1. Cutting, Laying & Jointing

- 2.1.1. When the tubes are to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bore in offered. The ends of the tubes shall then be threaded conforming to the requirements of I.S. 554-1955 with pipe dies and taps carefully in such a manner that it will not result in slackness of joints when the two pieces are screwed together.
- 2.1.2. The taps and dies shall be used only for straightening screw threads which have becoming bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the water tight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.
- 2.1.3. In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all times free from dust and dirt during fixing. But from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temperately plugged to prevent access of water, soil, or any other foreign matter.
- 2.1.4. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.

2.2. Fixing of tube fittings to wall, ceiling & floors.

- 2.2.1. In case of fixing of tubes and fittings concealed center point to the walls or ceilings, these shall run on the surface of the wall, or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or pipe fixed inducts or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls or solid floors, where unavoidable, pipe may be buried for short distances provided that adequate protection is given against damage and where so required joints are not buried. Where required M.S. tube sleeve shall be fixed at a place a pipe is peasant through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in

contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.

- 2.2.2.** All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight lengths at 2 MC/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to 25 mm. dia the holes in the walls and floors shall be made by drilling with chisel or jumper and not by dismantling the brick work or concrete. However for bigger diameter pipes the holes shall be carefully made (1 cement : 3 coarse sand), and properly finished to match the adjacent surface.

2.3. Testing of joints :

- 2.3.1.** After laying and jointing, the pipes and fillings shall be inspected under working conditions of pressure and flow. Any joints found liken shall be redone, and ail leaking pipes removed and replaced without extra cost.
- 2.3.2.** The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg./Sq cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shocks and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work laying proceeds, keeping, the joints exposed for inspection during the testing.

3.0. Mode of measurements and payment

- 3.1.** The description of the item shall, unless otherwise stated be held to include where necessary conveyance and delivery, handling, unloading, storing fabrication, hoisting, all labour for finishing to required shape and size, setting, fitting in position straight, cutting and waste return of packing etc.
- 3.2.** The length shall be measured on [running meter](#) basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed [concealed center point](#) to wall, ceiling. floors etc shall be measured and paid under this item.
- 3.3.** All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.
- (i) Dimension shall be measured to the nearest 0 01 meter.
- (ii) Area shall be worked out to the nearest 0.01 sq. meter.
- 3.4.** All measurements of cutting shall unless otherwise stated by held to include the consequent waste.
- 3.5.** In case of fitting of unequal bore, the targets bore shall be measured for the test.
- 3.6.** Testing of pipe lines fittings, and joints include for providing all plant appliances necessary for obtaining access to the work to be tested an carrying out the tests.
- 3.7.** The rate includes [C.P.V.C. \(SDR 13.5\) pipe having National Sanitation Foundation \(NSF\) seal for potable water](#) with screwed socket joints to gather with all fittings (such as bends, sockets

springs, elbows, test, crosses, short pieces, clamps and plugs, unions etc.) and fixing complete with clamping wall hooks, wooden plug etc. and also curing, screwing and waste and for making forged (or hand made) bends on piping as required. Connector shall be inserted where required or directed. The rate also includes cutting through walls, floors etc. and their making good and painting exposed threads with anti-corrosive paint as above and testing where tubes are to be fixed to wall, ceiling and flooring, the rates shall not include painting of pipes, providing sleeves and sand filling under floor for which separate payment shall be made.

3.8. The rate shall be for a unit of one running meter.

Item No. 52 :- Providing and fixing concealed center point to wall ceiling & floor CPVC (SDR 13.5) PIPE having National Sanitation Foundation (NSF) seal for potable water of following dia. nominal bore tube fittings and clamps including making good the wall, ceiling and floor etc. complete. [C] 25 mm.

The work shall be executed as per specification of **Item No. 51** except for the item is work of **Providing and fixing concealed center point to wall ceiling & floor CPVC (SDR 13.5) PIPE having National Sanitation Foundation (NSF) seal for potable water of following dia. nominal bore tube fittings and clamps including making good the wall, ceiling and floor etc. complete. [C] 25 mm.**

The rate shall be for a unit of one running meter.

Item No.53 :- Providing laying and jointing in true line and level 110 diameter U.P.V.C. SWR Type B pipe conforming to IS 13592-1992 with one end plain and other end socketed with rubbering, & fitting conforming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointed with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 110 mm diameter x 149 mm length x 145 mm high at every 2000 mm center to center or shall be concealed in walls as directed including necessary fittings such as Cowel vent, bends, shoes etc. including testing of pipes and joints and jointed with adhesive solvent cement including cost of all materials.

1.0. Materials

- 1.1.** The specified dia. of **U.P.V.C. SWR Type B pipe conforming to IS 13592-1992 (I.S.I.)** shall conform M-68.

2.0. Workmanship

- 2.1.** Asbestos cement rain water pipes and fittings shall be of the diameter, size and type specified in the item. The pipe shall be full lengths of 2 meter as far as possible. All the pipes shall be fixed on wall face at locations indicated on drawings or as ordered by the Engineer-in-charge. Pipe shall be secured to face of wall below all joints by M.S. clamps with wooden gut ties.
- 2.2.** The spigot of the upper pipe shall be properly fitted into the socket of the lower pipe such that there is uniform annular space for fitting with the jointing materials. One third depth of annular space between the item. The pipe shall be full lengths of 2 meter as far as possible. All the pipes shall be fixed on wall face at locations indicated on drawings or as ordered by the Engineer-in-charge. Pipe shall be secured to face of wall below all joints by M.S. clamps with wooden gut ties.
- 2.2.** The spigot of the upper pipe shall be properly fitted into the socket of the lower pipe such that there is uniform annular space for fitting with the jointing materials. One third depth of annular space between the socket and the spigot shall be filled with spun-yarn soaked in bitumatic jointing compound and shall be pressed home by means of caulking tool. The remaining 2/3 depth of the joints shall be filled in with stiff cement mortar 1:2 and shall be pressed with caulking tool and finished smooth at top at an angle of 45 sloping up.
- 2.3** The joints shall be filled with cement mortar 1:2 (1 cement : 2 sand) span spun yarn. The joints shall be filled with cement mortar 1.2 (1 cement : 2 sand) and spurn yarn. The pipes without care shall be fixed to wall with M.S. clamps The pipes will earns shall be secured with 40 mm before steel or iron barrel distance pieces or boils and stout galvanised iron nails 10 cms long into hand wool plug fixed in walls. Access doors to fittings shall be provided with 3 mm. rubber insertion packing and secured without screws to made air and water tight
- 2.4.** All soil pipes shall be earned up above the roof and shall have a wire ball on guarded or a cowl.
- 2.5.** The ventilating pipe or shaft shall be carried out to a height of at least one meter above the outer covering of the roof of the building or in the case of windows in a gable wall or a dormer windows, it shall carried up to a ridge of the roof or at least tow meters above the top of the windows. In case of flat roof to which access for use is provided, it shall be carried out up to a height of at least on meter above the parapet or two meters measured vertically from the top of any windows or opening which any exist up to a horizontal distance of five meters from the vent pipe into such building and in no case shall be carried out to a height less then three meters.

- 2.6.** Where ventilating pipes are carried in pipe shafts, the shaft shall be of a minimum size of one meter. If the shells are also used to give light and air to rooms, the ventilating pipes must be carried out to a horizontal distance at roof level not less than five meter from the site of the shaft.
- 2.7.** The sand cast iron pipes above parapet shall be fixed with M.S. clamps and stays. The clamps shall be made from 1.5 mm. thick MS flat or 3 mm. width band to the required shape and size to fit tightly on the sockets when tightened with screw bolts. It shall be formed of two semi circular pieces with flanged ends on both sides, with holes to fit in the screw bolts and nuts 40 mm. dia. M.S. Bars, One end of the stay shall be bent to form a hook to be fixed with clamps by means of bolts and the other end shall be bent for embedding in wall in cement concrete block of size 200 mm. x 100 mm. x 100 mm. in 1:2:4 mix. The concrete shall be finished to match the surrounding surfaces.
- 2.8.** The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning
- 2.9.** The waste from lavatories, kitchens basins, sinks, baths and other floor traps shall be separately connected to respective stacks of upper floor. The waste stack of lavatories shall be connected directly to main hole while the waste stack of other shall be separately discharged over gulley trap.
- 3.0. Mode of measurements and payment**
- 3.1.** The length of pipe shall be measured including all fittings along its length in running meters correct to a centimeter. No allowance shall be made for the portion of pipe length entered in the sockets of the adjacent pipe or fittings.
- 3.2.** The rate includes all labour and materials, tools and plant etc. required for satisfactory completion of this item.
- 3.3.** The rate shall be for a unit of One **running meter**.

Item No.54 :- Providing and fixing screw down bib taps of following size.(A) Brass screw down bib tap polished bright. (ii) 20mm dia.

General

This work shall consist of providing and fixing screw down bib taps of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

1. 0 MATERIAL

1.0 Bib Cock

1.1. Bib cock of specified 15 mm diameter nominal bore shall conform to I.S. 781-1977 The Bib Cock shall be best Indian make and quality .

1.2 Bib cock shall be chromium polished of best quality.

1.3 A Bib cock is a draw off tap with a horizontal inlet and free outlet. A stop cock is a valve with a suitable means of connection of insertion in a pipe line for controlling or stopping the flow.

1.4 They shall be screw down type and or brass chromium plated and of diameter as specified in the description of the item. They shall conform to I.S 781-1977 and they shall be of best Indian make. They shall be polished bright.

1.5 The minimum finished weight of bib cock and stop cock shall be as given below

Diameter	Bib cock	Stop Cock	Diameter	Bib cock	Stop cock
8 mm	0.25 kg.	0.25 kg.	15 mm	0.40 kg.	0.40 kg.
10 mm	0.30 kg.	0.35 kg.	20 mm	0.75 kg.	0.75 kg.

1.2. The Necessary galvanized fittings like Nipple, Casing etc, of best quality and makes as approved by the Engineer-in-charge. required for specified dia. bore Bib cock shall be used for fitting Bib cock as necessary .

2.0. WORKMANSHIP

Curing, Laying & Jointing

2.1. When the Bib cock are to be Fitted, the ends shall be carefully filed out so that no obstruction to bore in offered. The Bib cock shall be fitted with pipes carefully in such a manner as will not result in slackness of joints when the two pieces are screwed together

2.2 In jointing the Bib cock the inside of the socket and the screwed end of the Bib cock shall be oiled and smeared with the white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the Bib cock. The end shall then be tightly screwed in the socket, Tees etc with a pipe wrench Care shall be taken that all items are free from dust, dirt and rust during fixing Burr from the

joints shall be removed after screwing After laying the open ends of the Bib cock shall be temporarily plugged to prevent excess of water soil or any other foreign matter.

2.3. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti corrosive paint to prevent corrosion

TESTING OF JOINTS

After fitting, the Bib cocks shall be inspected under working conditions of pressure and flow. Any joints found liken shall be redone, and all leaking Bib cocks shall be removed and replaced without extra cost.

The Bib cocks after they are fitted shall be tested to hydraulic pressure of 6 kg / sq. cm. The Bib cock shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The Bib cocks shall be tested in sections as the work laying proceeds, veeping the joints exposed for inspection during the testing.

3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate of Bib cock shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings, and as directed by Engineer in charge finishing structure, etc, and all other incidental expenses for producing Bib cock work to complete the structure or its components as shown on the drawings, and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of Bib cocks shall include the cost of all labour, materials, G I fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

3.2. The Bib cock shall be measured for its **Number**, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Number.

3.3. The payment will be made on number basis of the finished work.

Item No. 55 :- Providing and fixing pillar tap, capstan head, screw down high pressure with screws, shanks and back nuts. (ii) 20mm dia.

- 1.0. Materials:** The C.P. brass capstan head, pillar tap of specified dia. shall be best quality and shall conform to I.S. : 1975 - 1961. The pillar taps shall be tested quality & as approved by Engineer in charge.
- 2.0. Workmanship**
 - 2.1.** The C.P. brass capstan head pillar tap of specified dia. shall be fixed as directed with required washers of selected leather or rubber asbestos composition or of plastic as directed. The cock shall fixed with pipe line white Zink end spun yarn, to make joint water tight. The work shall be carried out in best workman like manner.
- 3.0. Mode of measurements and payment**
 - 3.1.** The rate shall be for a unit of one number.

Item No.56: Providing and fixing chromium plated brass half turn flush cock of approved quality including fixing in pipe line etc. complete. (ii) 25mm dia.

1. 0 MATERIAL

2.0 Flush cock

1.1. Flush cock of specified 25 mm diameter nominal bore The Flush cock shall be best Indian make and quality of heavy Wight and shall be half turn flush cock as approved by Engineer in charge. The Flush cock shall conformed to relative Indian standard.

1.2 Flush cock shall be chromium polished of best quality as approved by Engineer in charge.

1.3 A Flush cock is a draw off tap with a horizontal inlet and outlet. A stop cock is a valve with a suitable means of connection of insertion in a pipe line for controlling or stopping the flow.

1.4 They shall be Half turn type and or brass chromium plated and of diameter as specified in the description of the item. They shall conform to I.S 781-1977 and they shall be of best Indian make. They shall be polished bright. The Flush cock supplied on side shall be in good condition without any damages in it and the surface shall be bright and smooth without any scratch etc.

1.5 The minimum finished weight of flush cock and stop cock shall be as given below

Diameter	Flush cock	Stop Cock	Diameter	Flush cock	Stop cock
8 mm	0.25 kg.	0.25 kg.	15 mm	0.40 kg.	0.40 kg.
10 mm	0.30 kg.	0.35 kg.	20 mm	0.75 kg.	0.75 kg.

1.2. The Necessary galvanized fittings like Nipple, Casing etc, of best quality and makes as approved by the Engineer-in-charge required for specified dia. bore Flush cock shall be used for fitting Flush cock as necessary .

2.0. WORKMANSHIP

Curing, Laying & Jointing

2.1. When the Flush cock are to be Fitted, the ends shall be carefully filed out so that no obstruction to bore in offered. The Flush cock shall be fitted with pipes carefully in such a manner as will not result in slackness of joints when the two pieces are screwed together

2.2 In jointing the Flush cock the inside of the socket and the screwed end of the Flush cock shall be oiled and smeared with the white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the Flush cock. The end shall then be tightly screwed in the socket, Tees etc with a pipe wrench Care shall be taken that all items are free from dust, dirt and rust during fixing Burr from the joints shall be removed after screwing After laying the open ends of the Flush cock shall be temporarily plugged to prevent excess of water soil or any other foreign matter.

2.3. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti corrosive paint to prevent corrosion

TESTING OF JOINTS

After fitting, the Flush cocks shall be inspected under working conditions of pressure and flow. Any joints found liken shall be redone, and all leaking Flush cocks shall be removed and replaced without extra cost.

The Flush cocks after they are fitted shall be tested to hydraulic pressure of 6 kg / sq. cm. The Flush cock shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The Flush cocks shall be tested in sections as the work laying proceeds, veeping the joints exposed for inspection during the testing.

3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate of Flush cock shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings, and as directed by Engineer in charge finishing structure, etc, and all other incidental expenses for producing Flush cock work to complete the structure or its components as shown on the drawings, and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of Flush cocks shall include the cost of all labour, materials, G I fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

3.2. The Flush cock shall be measured for its **Number**, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Number.

3.3. The payment will be made on number basis of the finished work.

Item No. 57 :- Providing and fixing Gun metal check or non return full way wheel valve. 40 mm dia..

1.0. Materials :

The gun metal or non return full way wheel valve / handle valve or specified dia. shall conform to I.S. : 778-1964. The non-return valve shall be of tested quality and approved by Engineer in charge.

2.0. Workmanship

2.1. The gun metal or non return wheel valve / handle valve shall be fully cleared of all foreign matter before fixing. The fixing of shall be done by means of bolts nuts and 3 mm. rubber insertions with flags of spigot and socketed tail pieces, drilled to the same specifications as in case of socket and spigot flanges in case of flanged pipes. The joining shall be done leak proof. All necessary testing should be carried out.

3.0. Mode of measurements and payment

3.1. The rate includes all labours, materials, tools and plant etc. required for satisfactory completion of this item.

3.2. The rate shall be for a unit of **One number.**

Item No. 58 :- Providing and fixing Gun metal check or non-return fullway wheel valve. (C) 25mm dia.

The relevant specifications of above **Item No. 57** shall be followed except that the size of wheel valve is **25mm dia.** instead of **40mm dia.** shall be considered and approved by Engineer in charge.

Item No.59 :- Providing and fixing Granite of 18 to 20mm thick having minimum single piece length of 210mm to be fixed on Walls to act as Study Table/ Wash Basin, including fixing the same using cement mortar in proportion 1:1 etc. comp, Necessary Groove in Walls By Machine, Front Side Round the edge and cutting hole in granite stone for wash basin, Computer Wire, including rubbing and polishing finishing jointed with grey cement slurry including rubbing and polishing finishing etc complete. etc complete.. with all labour & material & equipment.....etc. Completed as directed by Engineer-in-charge (A) Granite slab 18mm thick.

General

This work shall consist of providing and fixing laying machine cut free edge machine polished granite stone 16mm to 18mm thick in flooring, treads and risers in single piece of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

1.0 MATERIAL

Water shall confirm to M-1. Cement Mortar shall confirm to M-11. Granite slab shall confirm to M-52. Sand shall conform to M-6.

1.0 GRANITE SLAB

1.1. Granite slab shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Only approved coloured shall not be allowed for use. They shall be without any soft veins cracks or flaws Granite slab shall be hard, even, and regular in shape and it should be without fault.

1.2. The size of the Granite slab to be used as approved by Engineer in charge or Architect. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified. For treads and risers, risers the Granite slab shall be in single piece.

1.3. Tolerance of minus 30 mm. on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be +3 mm.

1.4. The edges of Granite slab shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones shall be true, square and free chipping and surface shall be true and plain.

1.5. The Granite slab shall have machine cut free edges with half round pipe moulding mirror polished surface. When brought on site. The stones to be used for flooring, dado, skirting, sink, veneering, sills, steps, etc.

2.0 WORKMANSHIP

2.1 Granite slab shall be of approved quality shall be laid evenly to level and slope as directed by Engineer in charge over a bed of a base layer consisting of cement mortar 1:6 (1 cement: 6 coarse sand by volume) or Lime Mortar 1:1.5 (1 lime : 1.5 lime putty by volume).

2.2 Granite slab shall be laid evenly as per detailed drawing or as directed by Engineer in charge. Width, length and shape of stone shall be as per pattern shown in detailed drawing.

2.3. Cement and sand for base layer shall be mixed in proportions of 1:6 (1 cement : 6 coarse sand by volume). Cement and sand shall be proportioned by volume after making due allowance for bulking. The required quantity of water shall then be added and the mortar mixed to produce

workable consistency before mixing platform shall be thoroughly cleaned before changing from one type of cement to another.

- 2.4. The mixing for base layer shall be done intimately. The operation shall be carried out on clean water tight platform, and cement sand shall be first mixed dry in the required proportion to obtain uniform colour and then the mortar shall be mixed for at least two minutes after addition of water. In case of cement mortar, that has suffered because of evaporation of water the same shall be re-tempered by adding water as frequently as needed to restore the requisite consistency but its re-tempering shall be permitted only within thirty minute from the time of addition to water at the time of initial mixing.
- 2.5. Cement and sand for base layer shall be mixed in proportion as specified in the item, Cement and sand shall be proportioned by volume after making due allowance for bulking. The required quantity of water shall then be added and the mortar mixed to produce workable consistency.
- 2.6. Curing shall be started as soon as the mortar used for finished has hardened sufficiently no to be damaged when watered. It shall be kept wet for a period of at least 7 days. During this period, it shall be suitably protected from all damages;
- 2.7. During hot weather, all finished or partly finished work shall be covered or wetted in such manner as will prevent rapid drying of the flooring work.
- 2.8. Joints of Granite slab flooring shall be through and continuous throughout the building as directed by Engineer in charge.
- 2.9. Joints shall be filled with a stiff mixture of gray cement slurry.
- 2.10. The Granite slab flooring work shall be finished by rubbing and mirror polishing after the work of flooring is set properly.

3.0 MODE OF MEASUREMENT & PAYMENT :

- 3.1. The unit rate Granite stone slab flooring shall include the cost of all materials, tools and plant required for mixing, laying of base layer in true level and slope as required applying & placing stones in position, finishing, curing etc. flooring all over the length of walls and corners and sill of doors etc. and all other incidental expenses for producing flooring work to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work. The rate includes cost of mirror polishing of flooring and dado work.
- 3.2. The rate shall include the cost of all materials and labours involved in all the operations described above. The granite stone slab flooring shall be measured in Square meter correct to 2 places of decimal. Length and breadth shall be measured to correct to a centimeter and between the finished the finished face of the skirting, dado or wall plaster and no deduction shall be made nor extra paid for any opening in floors or areas up to 0.1 square meter.
- 3.3. The rate shall be for a unit of **one Square meter**.

Item No.60 :- Providing and fixing C.P. Brass towel rail complete with C.P. Brass brackets fixed to wooden plugs with c.p. brass screws. (B) 600 mm x 20 mm size.

1.0. Materials

- 1.1.** The C.P. brass towel rail shall be 600 mm x 20 mm. of best quality as approved by the Engineer-in-charge. The brackets shall be of C.P. brass. The rail shall conform to I.S. 1068-1958.

2.0. Workmanship

- 2.1.** The brackets of the towel rail shall be fixed by means of C.P. brass screws to wooden firmly embedded in the wall with C.M. 1:3 (1 cement : 3 coarse sand). The towel rail shall be fixed as and where directed. All necessary testing should be carried out.

3.0. Mode of measurements and payment

- 3.1.** The rate includes cost of all labour and materials, tools and plant etc. required for satisfactory completion of this item.
- 3.2.** The rate shall be for a unit of One number

**Item No. 61 :- Providing and fixing C.P. brass shower rose with 15mm or 20mm inlet.(A)
100mm dia. Each**

1.0. Materials

- 1.1. Providing and fixing C.P. brass shower rose with 15mm or 20mm inlet. 100mm dia**
and of best quality and makes as approved by engineer-in-charge. The inlet of shower rose shall be 15 mm dia. or 20 mm dia. as directed.

2.0. Workmanship

- 2.1.** The C.P. brass shower rose shall be fixed as directed with 15 mm. dia. or 20 mm. dia. G.I. inlet pipe as the case may be.

3.0. Mode of measurements and payment

- 3.1.** The rate includes all labours and materials, tools and plant etc. required for satisfactory completion of this item.
- 3.2.** The rate shall be for a one number.

Item No. 62 :- Providing and fixing 600mm x 450mm beveled edge mirror of superior glass mounted on 6mm thick A.C. sheet or plywood sheet and fixing to wooden pluge with C.P. brass screws and washers.

1.0. Materials

- 1.1.** The 600 mm. x 450 mm. size mirror shall be of superior glass with edge rounded offer beveled as specified. It shall be free from flaws specks, or bubbles and its thickness shall not be less than 6 mm. The glass for the mirror shall be uniformly silver plated at the back and shall be free from silvering defects Silvering shall have a protective uniform covering of red lead paint. The 6 mm thick ply wood shall conform to M-37. The 6 mm. thick A.C. sheets shall conform to M-24. **The 6 mm. thickness of glass shall conform to M-38.**

2.0. Workmanship

- 2.1.** The mirror of 600 mm. x 450 mm. size mounted on A.C. Sheet or plywood sheet 6 mm thick **or PVC framing** with C.P. brass clips shall be fixed as directed, by fixing wooden plugs in wall and C.P. brass screws and washers. The work shall be carried out in best workman like manner.

3.0. Mode of measurements & payment

- 3.1.** The rate includes cost of all labour and materials, tools and plant etc. required for satisfactory completion of this item.
- 3.2.** The rate shall be for a unit of **One number**.

Item No. 63 :- Providing and laying wash down water closet (European type Wall Hung WC pan) Florentine series FLS-WHT 0111B including providing and fixing metropole Flush cock seat cover, jet wash etc complete unit of jaquar Branch (or equivalent) including installing and fitting as per manufacturers standards by skilled trained plumber including testing etc complete quality and brand as approved by Engineer in charge.

1.0. Materials

Wash down water closet (European type Wall hung type W.C. pan) shall conform to M-60. Cement mortar shall conform to M-11. The wash down water closet (European type Wall Hung WC pan) Florentine series FLS-WHT 0111B including providing and fixing metropole Flush cock seat cover, jet wash etc. complete unit of jaquar Branch (or equivalent) including installing and fitting as per manufacturers standards by skilled trained plumber including testing etc. complete as directed by Engineer-in-charge.

2.0. Workmanship

- 2.1.** The closet shall be fixed to the floor by means of 75 mm. long 6.5 mm. diameter counter sunk bolts and nuts embedded in the floor concrete using rubber or before washers so as not to allow any lateral displacement. The joint between the trap of W.C. and soil pipe shall be made with C.M. 1:1 (1 cement : 1 fine sand) including necessary fittings & G.I. inlet connection for flush etc. complete as per manufacturers standards by skilled trained workman etc. as directed.

3.0. Mode of measurements and payment

- 3.1.** The rate shall include the cost of all materials and labour involved in all the operations described under workmanship including testing.
- 3.2.** The rate includes cost of all labour for fixing pans and seat and cover, inlet, connections etc. complete including testing the same. The payment of seat and cover shall be made separately.
- 3.3.** The rate shall be for a unit of **One number**.

Item No. 64 :- Providing laying and jointing in true line and level 160 diameter U.P.V.C. SWR Type B pipe confirmng to IS 13592-1992 with one end plain and other end socketed with rubbering, & fitting conforming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointd with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 160 mm diameter x 210 mm length x 196 mm high at every 2000 mm center to center or shall be concealed in walls as directed including necessary fittings such as bends, shoes etc. including testing of pipes and joints and jointed with adhesive solvent cement including cost of all materials.

The relevant specifications of **Item No. 53** shall be followed accept for the work of **Providing laying and jointing in true line and level 160 diameter U.P.V.C. SWR Type B pipe confirmng to IS 13592-1992 with one end plain and other end socketed with rubbering, & fitting conforming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointd with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 160 mm diameter x 210 mm length x 196 mm high at every 2000 mm center to center or shall be concealed in walls as directed including necessary fittings such as bends, shoes etc. including testing of pipes and joints and jointed with adhesive solvent cement including cost of all materials.**

The rate shall be for a unit of one running meter.

Item No. 65 :- Providing and fixing PVC SWR Nahni trap IS 14735 for drain - 100 mm diameter with jali of the following nominal diameter of self cleansing design with C.I. screwed down or hinged grating including the cost of cutting and making good the walls..

1.0. Materials

- 1.1. The PVC SWR Nahni Trap IS 14735 for drain with S.S. jali shall conform to M-69. The C.I. hinged or screwed down cover shall be of best quality and approved by Engineer in charge.

2.0. Workmanship

- 2.1. The PVC SWR Nahni trap with 100 mm. dia inlet and 75 mm. dia. outlet shall be fixed as per drawing or as directed.
- 2.2. The PVC SWR Nahni Trap shall be jointed with C.I. pipe, 100 mm. dia. with lead joints. The lead joints shall be done in conformation with I.S. 782-1976.

3.0. Mode of measurements and payment

- 3.1. The rate includes cost of all labour, materials, tools and plants etc. required for satisfactory completion of this item including lead, jointing and testing.
- 3.2. The rate shall be for a unit of one number.

Item No. 66 :- Providing and laying (two level or slopes) and jointing with stiff mixture of cement mortar in proportion 1:1 salt glazed stone ware pipes following nominal internal diameter including testing of pipes and joints etc complete. 150 mm dia.

1.0. Materials

(1) Water shall conform to M-1 (2) Cement mortar of proportion 1:1 shall conform to M-11. (3) 150 mm. dia. glazed stoneware pipe shall conform to M-71.

2.0. Workmanship

2.1. The width and depth of the trenches for different diameters of the tubes shall be as under, for 150 mm. dia tube width of trenches shall be 30 cms. and depth of trenches 60 cms,

2.2. All joints, the trench width, shall be widened where necessary. The work of excavation and refilling shall be done true to line, and gradient in accordance with general specifications of earth work in trenches

2.3. The pipes shall be painted with two coats of anti-corrosive bitumastic paint of approved quality. The pipe shall be laid on a layer of 75 mm. sand filled upto 150 mm. above the pipe as so specified. The remaining portion of trench shall be then filled with excavated earth. The surplus shall be disposed off as directed.

2.4. When the excavation is done in rock the bottom shall be cut deep enough to permit the pipe to be laid and cushion of sand 75 mm. in case of bigger diameter of tube where the pressure is very high thrust block of cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 grade stone aggregates of 20 mm nominal size) shall be constructed on all bends to transmit the hydraulic thrust without impairing the ground and spreading it over a sufficient area if so specified.

2.5. Cutting, Laying & Jointing

2.5.1. When the tubes are to be cut or rethreaded, the ends shall be carefully filed out so that no obstruction to bore in offered. The ends of the tubes shall then be threaded conforming to the requirements of I.S. 554-1955 with pipe dies and taps carefully in such a manner that it will not result in slackness of joints when the two pieces are screwed together.

2.5.2. The taps and dies shall be used only for straightening screw threads which have becoming bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the watertight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.

2.5.3. In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all times free from dust, and dirt during fixing. Burrs from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temporarily plugged to prevent access of water, soil, or any other foreign matter.

2.5.4. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.

2.6. Laying :

2.6.1. The pipes shall be laid accurately and perfectly true to line, levels and gradients, Great care shall be taken to prevent sand etc. from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. All junctions and changes in direction and diameter shall be made inside manholes by means of curved tapered channels formed in Cement concrete finished smooth and benched on both sides. The body of the pipe shall rest for its entire length, on a even level bed grips being made or left on the bed to receive the sockets of the pipes.

2.7. Jointing:

2.7.1. Tarred gask in or yarn soaked in neat cement slurry shall first be placed around the spigot to each pipe and the spigot shall then be placed well home into the socket of the pipe previously laid. The pipe shall then be adjusted and fixed in the correct position and gaskin caulked home so as to fill not more than 1/4th of the total depth or (13 mm. in depth) of the socket.

2.7.2. The remainder of the sockets shall be filled with stiff mixture of cement mortar in proportion of one part of cement and one part of sharp sand. When the socket is fillet, a filled shall be formed round the joints with a trowel, forming an angle of 45° with the barrel of the pipe.

2.7.3. The mortar shall be mixed as necessary for immediate use.

2.7.4. After the joint is made, any extraneous materials shall be removed from the inside of the joints with a suitable scraper or "badger". The newly made joints shall be protected, until set, from the sun, dry winds, rain or frost, sacking or other suitable materials which shall be used for the purpose.

2.7.5. The mortar shall be cured for 10 days.

2.8. Testing of Joints:

2.8.1. If any leakage is visible the defective part of the work shall be made good at no extra cost. The pipe line shall be tested as directed.

2.8.2. A slight amount of sweating which is uniform may be overlooked, but excessive sweating from a particular pipe or joints shall be watched for and taken as indicating a defect to be made good.

3.0. Mode of measurements and payment

3.1. Pounding or buttering of the fit trenches bed to the lower part of the pipe and "Grips" dug to take socket, collars etc. are included in the rate of laying the pipes.

3.2. The measurements shall be net without any allowance for cutting, and waste. The length of bends, junctions, and other connections shall be included in the total length of the drain pipes. Nothing extra shall be paid for the same. The rate includes necessary excavation refilling trenches etc. complete,

3.3. The rate shall be for a unit of One running meter.

Item No. 67 :- Constructing brick masonry chamber for under ground C.I. inspection chamber and bends with bricks having crushing strength not less than 35 kg/sq.cm in C.M. 1:5 C.I. cover with frame (light duty) 455 mm x 610 mm internal dimension total weight of cover with frame to be not less than 38 kgs. (weight of cover 23 kg and wt. of frame 15 kg) R.C.C. top slab with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregates 20 mm size) foundation concrete 1:5:10 inside plaster 15 mm thick cement mortar 1:3 finished smooth with a floating coat of neat cement on wall and bed concrete etc. complete. (l) Inside dimensions 455 mm x 610 mm and 450 mm deep for single pipe line.

1.0. Materials : Water shall conform to M-1. Cement shall conform to M-3. Coarse sand shall conform to M-5. Brick shall conform to M-15. Stone aggregate shall conform to M-12. Brick bat shall conform to M-14. M.S. bar shall conform to M-18.

2.0. Workmanship

2.1. C.I. inspection chamber with provision of C.I. bends of specified size with bolts, nuts and felt washers for underground drain shall be enclosed in masonry chamber which shall be constructed as under:

2.2. The excavation shall be done true to dimensions and level shown in one the plans or as directed.

2.3. Bed concrete shall be 15 cms. thick C.C. 1:5:10 (1 cement :5 coarse sand : 10 graded brick bat aggregates. The projection of bed concrete beyond the masonry waifs shall be 7.5 cms.

2.4. Wetting of bricks:

2.4.1. The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water is as indication of through wetting of bricks.

2.5. Laying:

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

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

2.5.3. The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept uniform.

2.5.4. The brick shall be laid with frog up wards. A set of tools comprising of wooden straight edges, man son's spirit level, square half meter rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

2.5.5. Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one meter over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.

- 2.5.6.** All futures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar
- 2.6. Joints:**
- 2.6.1.** Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exposed 12 mm. The face joints shall be raked out as directed by raking tools daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done.
- 2.6.2.** The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.
- 2.7. Curing:**
- 2.7.1.** Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.
- 2.8. Preparation of foundation bed:**
- 2.8.1.** If the foundation is to be laid directly on the excavated bed, the shall be leveled, cleared of all loose materials, cleaned and wetted before stating masonry, If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.
- 2.9.** The walls and the bed concrete of chamber shall be plastered inside with 12 mm. thick cement plaster 1 : 3 (1 cement : 3 coarse sand) finished smooth.
- 2.10.** The gully grating cover shall be hinged to frame to facilitate its opening for cleaning and repairs. The frames of the gully grating g shall be fixed on the top of masonry wall of the chamber in 15 cms. thick C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) laid over the full thickness of walls..
- 2.11.** The chamber shall have connection pipe, the length of which in meter between the road gully chamber and the manhole of the drain shall not be less than 1/40 times the nominal diameter of the pipe in MM. i.e. for 150 mm connection pipe the length shall not be cement plaster on the bed concrete.
- 2.12.** The cover slab of R.C.C. 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm. nominal size) 15 cms. thick reinforced with 10 mm. bars at 15 cms. C/C both ways, surface and edges finished fair. Full bearing equal to the width to the width of wall shall be given to the slab on all sides. The frame of manhole cover shall be embedded firmly in R.C.C. slab so that the top of the frame remains flush with the top of R.C.C. slab.
- 2.13. Testing:**
- 2.13.1** Manhole shall be tested by filling with water to a depth not exceeding 1.2 M. as directed.
- 2.13.2** After completion of work, manhole cover shall be sealed by means of thick grease.
- 3.0. Mode of measurements and payment**
- 3.1.** The earth work in excavation, providing and laying C.I. inspection chamber and bends shall be measured and paid for separately.
- 3.2. The rate shall be for a unit of One number.**

Item No.68 :- Constructing Manhole with R.C.C. top slab in 1:2:4 mix (1-cement :2-coarse sand : 4-graded stone aggregate 20mm nominal size) foundation concrete 1:3:6 mix (1-cement : 3- coarse sand :6-Brick bats 40 + 50mm size) inside plastering 15mm thick with Cement Mortar 1:5 (1-Cement : 5-coarse sand) finished with a floating coat of neat cement and making channels in cement concrete 1:2:4 mix (1-Cement :2-Coarse sand :4-stone aggregate 20mm nominal size) finished smooth complete including curing and festing (i) Inside size 900mm x 1200mm and 1.5M. deep including C.I. cover with frame size 560mm diameter total weight of cover and frame to be not less than 128 kgs. (Wt. of cover 64 Kg. and Wt. of frame 64 Kg.)(A) With 230mm thick walls of brick masonry using brick having crushing strength not less than 35Kg. / Sq.cm. in Cement Mortar 1:5 (1- Cement: 5-Coarse sand) (1) A type depth 0.90 Metre for 150mm diameter sewer.

- | | | | |
|------|--------------|----------------|---------------|
| i. | A type depth | 0.90 meter for | 150 mm. sewer |
| ii. | B type depth | 1.50 meter for | 150 mm. sewer |
| iii. | C type depth | 2.25 meter for | 150 mm. sewer |
| iv. | D type depth | 3.15 meter for | 150 mm. sewer |

1.0. Materials: Water shall conform to M-1. Cement shall conform to M-6. Burnt bricks shall conform to M-15.

Brick bats of 40 to 50 mm. size shall conform to M-14. Stone coarse aggregate of 20 mm. nominal size shall conform to M-12.

Grit shall conform to M-8. Cement mortar of specified proportion shall conform to M-11.

The cast iron manhole cover of 560 mm. dia. with frame shall conform to I.S. 1726-1966.

2.0. Workmanship

2.1. The manholes of different types and sizes as specified shall be constructed in sewer line at such places and to such levels and dimension as shown in drawings of as directed.

2.2. The manholes shall be built on a bed of cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 brick bats) (40 to 50 mm. nominal size) to the thickness of the bed concrete shall be 15 cms. for manhole up to 1.0 M. depth and 20 cms. for manholes over meter and up to over meter and up to 2 meters, depth and 30 cms. for manholes greater depth.

2.2.2. Projection of bed concrete beyond the masonry wall shall be 15 cms.

2.3. Walls

2.3.1. The walls of manhole shall be carried out with burnt bricks using having bricks crushing strength not less than 35 Kg/Cms in C.M. 2 in C.M. 1:5 (1 cement : 5 coarse sand). The thickness of brick masonry wall shall be 230 mm. The jointing face of such .brick shall be well buttered with cement mortar before laying so as to ensure a full joints.

2.4. Plaster

2.4.1. The inside of walls shall be plastered 15 mm. thick with C.M. 1:5 (1 cement : 5 coarse sand) and finished with floating coat of neat cement. All angles shall be rounded to 7.50 cms. radius and all rendered internal surfaces shall have hard impervious finish obtained by using a steel trowel. The external joints of masonry shall be finished smooth.

2.5. Channels & Benching:

2.5.1. Channels shall be semicircular in the bottom half and of diameter equal to the sewer. Above the horizontal diameter, the sides shall be extended vertically to the same level as the crown of the out going pipe and the top edge shall be suitably rounded off. The branch channels shall also be similarly constructed with respect to the benching but at their junction with the main channel an appropriate fall suitably rounded off in the direction of flow the main channel shall be given.

2.5.2. The channel and benching shall be done in C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) rising at a slope in line from edges of channel. The channels of the bottom of the chamber shall be plastered with C.M. 1:2 (1 cement : 2 coarse sand) and steel troweled smooth.

2.6. Cover slab:

2.6.1. The cover slab of R.C.C. 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm. nominal size) 15 cms. thick reinforced with 10 mm. bars at 15 cms. C/C both ways, surface and edges finished fair. Full bearing equal to the width to the width of wall shall be given to the slab on all sides. The frame of manhole cover shall be embedded firmly in R.C.C. slab so that the top of the frame remains flush with the top of R.C.C. slab.

2.7. Testing:

2.7.1. Manhole shall be tested by filling with water to a depth not exceeding 1.2 M. as directed.

2.7.2. After completion of work, manhole cover shall be sealed by means of thick grease.

3.0. Mode of measurements and payment

3.1. The depth of manholes shall be distance between the top of the manhole cover and the invert level of the main drain. The rate includes all labours, materials, tools, and plant etc. required for satisfactory completion of this item as directed above.

3.2. The rate shall be for a unit of the **One number**.

Item No. 69 :- Providing erecting and fixing double coated Syntex or equivalent PVC. (ISI) mark water tank of reqd capacity each with all necessary fittings & connection etc. comp on terrace.

General

This work shall consist of furnishing and placing providing and fixing PVC Water tank with necessary G.I. fittings of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

1.0 MATERIAL

1.1 PVC WATER TANK

PVC Water tank of specified capacity and of I.S.I. mark of approved in liters of approved make and quality equivalent to syntax product.

Net capacity shall be net volume of water stored between the lowest level of overflow and lowest specified level.

1.2 NIPPLE

Galvanize pipe nipple shall be of approved make and of best quality. Relevant specification given in Booklet of Building specification shall be applied for the execution of this item.

1.3 BALL VALVE

Ball valve shall be of approved make and of best quality. Relevant specification given in Booklet of Building specification shall be applied for the execution of this item.

1.4 CONNECTIONS

Connection shall be of approved make and of best quality. Relevant specification given in Booklet of Building specification shall be applied for the execution of this item.

2.0 WORKMANSHIP

2.1 Tank shall be approved quality and as per IS standard make. Material used in manufacturing tank shall be confirmed to relevant IS code. The material of tank and lead and fittings which may come in contact of water should be such that it does not impart any taste, colour or odour. It does not have any toxic effect and it does not contaminate the water. Thereby making it un potable.

- 2.2 The tank shall be fixed properly in a level position and making all required necessary correction like inlet outlet flushing overflow and air vent. Tank shall be satisfying the standards of public health.

3.0 **MODE OF MEASUREMENT AND PAYMENT**

- 3.1 The unit rate of **PVC Water tank** shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing and fixing in position, all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing **PVC water tank** work of specified diameter to complete the structure or its components as shown on the drawings and according to these specifications, they shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of PVC Water tank shall include the cost of all labour, materials, tools and plant scaffolding and all incidental expenses as described herein above.

- 3.2 The **PVC water tank** work shall be measured for its number limiting to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one Number.
- 3.3 The payment will be made on litre basis of the finished work.

Item No. 70 :- Providing and fixing ball cock of approved quality as directed. (A)
Copper metal (i) 25 mm dia.

1.0. Materials :

The ball cock of 25 mm diameter of approved quality shall conform to M-75.

2.0. Workmanship

The ball cock of 25 mm diameter shall be fixed as directed. The ball cock shall be fixed in position by means of Jam nut and socket. The ball cock shall be fixed near the inlet of the water meter or as directed. The joints shall be done with white zinc and spun yarn. The joint shall be tested for leak proofing.

3.0. Mode of measurement & payment

3.1. The rate includes cost of all materials and labour involved for carrying out satisfactory work.

3.2. The rate shall be for a unit of One number.

Item No. 71:- Providing and laying sandwich type kitchen platform of size 2.10 x 0.76 x 0.76 m and respected length with dhar polish or moulding having base 4" and support & base with marble or Kota as per site requirement also loft and base finish with glaze tile and top with selected shed of marble or granite with gas pipe provision and sink including all fittings ,material and labour as per directed by engineer incharge.

General

The work shall consist of construction of **Providing and laying sandwich type kitchen platform of size 2.10 x 0.76 x 0.76 m and respected length with dhar polish or moulding having base 4" and support & base with marble or Kota as per site requirement also loft and base finish with glaze tile and top with selected shed of marble or granite with gas pipe provision and sink including all fittings ,material and labour as per directed by engineer in charge** in accordance with the details shown on the drawings as approved by the engineer in charge having granite top and stainless steel sink. Only trained personnel shall be employed for construction work & supervision.

1.0 MATERIAL

Polish kota Stone, Black Granite Stone, Water shall confirm to M-1, Cement shall confirm to M-3 and Sand shall confirm to M-6

2.0 MACHINE POLISHED BLUE KOTAH STONE

- 2.1.** Kota stone shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown coloured shall not be allowed for use. They shall be without any soft veins cracks or flaws
- 2.2.** The size of the stone to be used for flooring shall be of size 600 mm x 450 mm x 150mm as directed. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified.
- 2.3.** Tolerance of minus 30 mm. on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be +3 mm.
- 2.4.** The edges of stones shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones shall be true, square and free chipping and surface shall be true and plain.
- 2.5.** When machine cut edges are specified the exposed and the edges at joints shall be machine cut the thickness of the exposed machine cut edges shall be uniform.
- 2.6.** The stones shall have machine polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. The stones to be used for dado, partitions skirting, sink, veneering, sills, steps, etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished.

3.0 Granite Stone Slab

- 3.1.** Granite Stone Slab shall be hard even sound, and regular in shape and thickness generally having uniform approved colour and design. The colour of the stone shall generally be as approved by the engineer in charge. They shall be without any soft veins cracks or flaws

- 3.2. The size of the Granite Stone to be used for top of platform shall be as per details shown on the drawings and as directed by the Engineer in charge. However smaller sizes will not be allowed, Granite Stone shall be in a single piece only.
- 3.3. Tolerance of minus 30 mm. on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be +3 mm.
- 3.4. The edges of Granite Stone Slab shall be truly machine cut and machine polished. All angles and edges shall be true, square and free chipping and surface shall be true and plain.
- 3.5. When machine cut edges are specified the exposed and the edges at joints shall be machine cut and machine polished the thickness of the exposed machine cut machine polished edges shall be uniform.
- 3.6. The stones shall have mirror polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones to be used for top slab shall be double polished.

4.0. Proportion

- 4.1. The proportion of the cement mortar shall be 1:4 (1 part of cement by volume and 4 parts of sand by volume)

5.0. Mixing of Mortar

- 5.1. The mixing of mortar shall be done intimately, the operation shall be carried out on clean water tight platform, and cement sand shall be first mixed dry in the required proportion turned over and over backwards and forwards several times till the mixture is of uniform colour. Thereafter, minimum quantity of water shall be added to bring the mortar to the consistency of stiff paste and then the mortar shall be mixed for at least two minutes after addition of water.
- 5.2. Mortar shall be mixed only in such quantity as required for immediate use. The mix s\which has developed initial set shall not be used. Initial set of mortar with ordinary Portland cement shall normally be considered to have taken place in 30 minutes after mixing.
- 5.3. In case mortar has stiffened during initial setting time because of evaporation of water the same can be re tempered by adding water as frequently as needed to restore the requisite consistency, nut this re-tempering shall not be permitted after 30 minutes. Mortar unused for more than 30 minutes shall be rejected and removed from site.
- 5.4. In case of cement mortar, that has suffered because of evaporation of water the same shall be re-tempered by adding water as frequently as needed to restore the requisite consistency but its re-tempering shall be permitted only within thirty minute from the time of addition to water at the time of initial mixing.
- 5.5. The mixing shall preferably be done in a mechanical mixer operated manually or by power. Hand mixing can be resorted to as long as uniform density of mix and its strength are assured subject to prior approval of Engineer in charge. Where permitted, specific permission is to be given by the Engineer in charge.
- 5.6. Cement and sand shall be mixed in specified proportions given in the drawing. Cement shall be proportioned by weight, taking the unit weight of cement as 1.44 tone per cubic meter, Sand shall be proportioned by volume taking into account due allowance for bulking. All mortar shall be

mixed with a minimum quantity of water to produce desired workability consistence with maximum density of mortar. The mix shall be clean and free from injurious type of soil/acid/alkali/organic matter or deleterious substances.

6.0 Proportion of Mix

- 6.1.** Cement and sand shall be mixed in proportions of 1:4 (1 cement : 4 coarse sand) Cement and sand shall be proportioned by volume after making due allowance for bulking. The require quantity of water shall then be added and the mortar mixed to produce workable consistency. Before mixing platform shall be thoroughly cleaned before changing from one type of cement to another.
- 6.2.** It shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency.

7.0 Curing :

- 7.1.** During hot weather, all finished or partly finished work shall be covered or wetted in such manner as will prevent rapid drying of the brick work.
- 7.2.** Green cement work shall be protected form rain suitable work shall be kept moist on all the faces for a period of seven days The Top of masonry work shall be kept well wetted at the close of the day
- 7.3** Immediately after compaction, concrete shall. be protected against harmful effects of weather, including rain, running water, shocks, vibration, traffic, rapid temperature charges, frost and driving out process shall be covered with wet jute bags or the similar absorbent material approved by the Engineer-in-charge 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 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.
- 7.4** After the final set, the concrete shall be kept continuously wet if required by pounding for a period of not less then 7 days form the date of placement. Hard and bitter water shall not be used for curing

8.0 Scaffolding

- 8.1** Scaffolding shall be sound strong and safe to withstand all loads lilely to come upon it The holes which provide resting space for horizontal members shall be left in masonry under one meter in width or immediately near the skew backs of arches. The holes left in the masonry work for supporting the scaffolding shall be filled and made good Scaffolding shall be got approved by the Engineer in charge However the contractor shall be responsible for its safety.

9.0. Finishing of Surface

- 9.1** All work shall be finished in a workmanlike manner with the thickness of joints manner striking or tooling as described in these above specifications
- 9.2** Kota stone of approved quality shall be laid evenly to level and slope as directed by Engineer in charge over a bed of a base layer consisting of cement mortar 1:6 (1 cement : 6 coarse sand by volume) or Lime Mortar 1:1.5 (1 lime : 1.5 lime putty by volume)

- 9.3** Curing shall be started as soon as the mortar used for finished has hardened sufficiently so as to be damaged when watered. It shall be kept wet for a period of at least 7 days. During this period, it shall be suitably protected from all damages.
- 9.4** During hot weather, all finished or partly finished work shall be covered or wetted in such manner as will prevent rapid drying of the flooring work.
- 10.0 Mode of Measurement & Payment:**
- 10.1.** The unit rate **sandwich type platform** shall include the cost of all materials required to produce the item of sandwich type platform including granite top and stainless steel sink, tools and plant required for mixing, placing in position, finishing as per direction of the Engineer-in-charge, curing and finishing all other incidental expenses for producing sandwich type platform of specified design to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.
- 10.2.** The **sandwich type platform** work shall be measured for its length and limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one running meter.
- 10.3.** The payment will be made on **square meter** basis of the finished work.

Item No. 72 :- Providing & Fixing Co2 type portable ABC Dry Powder Type ABS Fire Extinguisher Capacity 4.5 Kg. Discharge Range 3mt. Timing 60 to 180 Sec. standard approved IS code No. 2878:2004

General

This work shall consist of supplying and installing of **ABC Type - 4.5 Kg. capacity Fire extinguisher** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by Engineer in charge.

1.0 Material

1.0 of **ABC Type - 4.5 Kg. capacity Fire extinguisher**

1.1 of **ABC Type - 4.5 Kg. capacity Fire extinguisher** nominal bore shall conform to I.S. 2171. The of **ABC Type - 4.5 Kg. capacity Fire extinguisher** shall be best Indian make and quality.

1.2 of **ABC Type - 4.5 Kg. capacity Fire extinguisher** shall be chromium polished of best quality and shall be ISI marked.

1.3 It shall be as per standard specification of Fire Safety work.

2.0 Mode of Measurement & Payment

2.1 The unit rate of of **ABC Type - 4.5 Kg. capacity Fire extinguisher** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings and as directed by Engineer in charge finishing structure etc. and all other incidental expenses for producing of **ABC Type - 4.5 Kg. capacity Fire extinguisher** work to complete the structure or its components as shown on the drawings and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of of **ABC Type - 4.5 Kg. capacity Fire extinguisher** shall include the cost of all labour, materials, G.I. fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

4.2 The of **ABC Type - 4.5 Kg. capacity Fire extinguisher** shall be measured for its Number, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one **Number**.

4.3 The payment shall be made on **Number** basis of the finished work.

Item No. 73 :- (B) Providing sock pit of 5.00 Cu.M. Volume including excavating and filling brickbats with dry masonry work at top for 45cm. height including covering the top with stone including providing vatas in C.M. 1:3 with finishing curing etc. complete as directed.

1.0. Materials : Water shall conform to M-1. Cement mortar con form to M-11. Burnt Bricks shall conform to M-15. Rough stone slab 40 x 50 mm. thick shall conform to M-48. Brick bat shall conform to M-14.

2.0. Workmanship

2.1. The excavation for soak pit shall be carried out as. per relevant specifications of **item no. 1** except that the size of soak pit such that the cleat volume Shall remain 5 cum. The diameter and depth shall be as directed.

2.2. The periphery of the sock pit shall be provided with dry masonry wall with burnt bricks in 23 cms. thick. The masonry wall shall be done with best workman like manner in true line and plumb.

2.3. The soak pit shall be filled in with brick bats of burn brick 40 mm. nominal size in 45 cms. height. The work of filling brick-bats shall be done in such a way that no dry masonry shall be damaged during filling of brick bats.

2.4. The top of the soak pit shall be covered with rough kotah stone slab 40 to 50 mm. thickness. The length of the stone shall be in single piece in length.

2.5. The cement mortar 1:3 shall be used to fill up the joints and preparing vata as directed.

2.6. The cement work shall be cured for 4 days.

3.0. Mode of measurements and payment

3.1. The rate includes costs of all labour and material required for satisfactory completion of this item as described above.

3.2. The rate shall be for a unit of One number.

Item No. 74:- Providing and fixing pre-cast Rubber Dye / steel Dye inter locking concrete block 60mm thick with grade of concrete M300 pneumatic compressed / vibrated mechanically and as per approved design Confirming to IS 15658: 2006 including 35 mm Sand layer for leveling and filling the joint with sand in proper line and level as per guidelines of IRC: SP 63-2018 etc. Complete.

General

This work shall consist of providing and laying **60 mm thick Rubber Dye interlocking concrete block specification & samples** over a base layer of **75 mm thick layer** of sand of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

1.0 MATERIAL

Water shall conform to M-1. Cement shall conform to M-3.

1.0 Rubber Dye interlocking concrete block

Rubber dye interlocking concrete block shall be of approved size brand and make as approved by Engineer in charge.

- 1.1** The size shape and design of **rubber dye interlocking concrete block** shall generally be as per manufacturers product or as directed by the Engineer in charge and Architect.
- 1.2** The **rubber dye interlocking concrete block** shall satisfy the tests as regards compress strength transverse strength resistance to wear and water absorption.
- 1.3** The colour size shape and design of the **rubber Dyed interlocking concrete block** shall be directed by Engineer or Architect.
- 1.4** The **rubber dye interlocking concrete block** shall be of best quality as approved by the Engineer In charge. They shall be flat and true to shape. They shall be free from cracks, crazing spots, chipped edges and corners. The glazing shall be of uniform shade.

2.0 SAND

- 2.1** Sand shall be natural sand, clean well graded, hard strong durable and gritty particular free from immures amounts of dust, clay, kankar modules.
- 2.2.** For masonry works sand shall confirm to the requirements of IS: 2116.
- 2.3.** For plain and reinforced cement concrete (PCC and RCC) or pre stressed concrete (PSC) works fine aggregates shall consist of clean, hard strong and durable prices of crushed stone, crushed gravel or suitable combination of natural sand crushed stone or gravel, They shall not contain dust lumps soft or flaky materials mica or other deleterious materials in such quantities as to reduce the strength and durability of concrete, or to attack the embedded steel. Motorized sand washing machines should be used to remove impurities from sand. Fine aggregate having positive alkali-silica reaction shall not be used. All fine aggregates shall conform to IS L 383 and tests for conformity shall be carried out as per IS : 2386 (Part I to VIII) The contractor shall submit to the Engineer in charge the entire information indicated in Appendix A of IS : 383. The fineness modulus of fine aggregate shall neither be less than 2.00 nor greater than 3.5.
- 2.4.** Sand fine aggregates for structural concrete shall conform to the following grading requirements as shown in the table below.
- 2.5 Fine Sand:** The fineness module shall not exceed 1.0 the sieve analysis of fine sand be as under:

IS. Sieve Designation	% by wt. passing		
	Zone I	Zone II	Zone III
10 mm	100	100	100
4.75 mm	90-100	90-100	90-100
2.3 6mm	60-95	75-100	85-100

1.18 mm	30-70	55-90	75-100
600 MC	15-34	35-59	60-79
300 MC	5-20	8-30	12-40
150 MC	0-10	0-10	0-10

- **Coarse Sand:** The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under:

I. S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36mm	90 to 100
1.18 mm	70 to 100
600 MC	30 to 100
300 MC	85 to 70
150 MC	00 to 50

3.0 WORKMANSHIP

- 3.1** The **rubber dyed interlocking concrete block** shall be **60 mm thick** for cement concrete **M-200** and laid on a layer of **7.5 cm thick** layer of coarse sand. The slope in the floors shall be provided in the sub grade. The base layer shall be properly watered, rammed and consolidated. Before laying the pavers blocks, it shall be moisture. Plinth masonry offset shall be depressed so as to allow the sub grade concrete to rest on it.
- 3.2** **Rubber dyed interlocking concrete block** of approved quality shape and design and shall be laid evenly to level and slope as directed by Engineer in charge over a bed of a base layer consisting of **75mm thick sand layer**.
- 3.3** **Laying:** The **rubber dyed interlocking concrete block** shall be laid in plain, diagonal or other pattern as directed. The cement concrete blocks shall be laid properly and set home by gentle taping.
- 3.4** **End portion of pavement shall be finished with C.M. 1:3 as per detailed drawing etc. complete.**

4.0 MODE OF MEASUREMENT AND PAYMENT

- 4.1** The unit rate **rubber dyed interlocking concrete block** flooring shall include the cost of all materials, tools and plant required for supplying and laying material like brick bats sand pavers blocks, laying of base layer in true level and slope as required applying & placing pavers blocks in position, compacting, finishing, curing.
- 4.2** The length and breadth shall be measured correct to a Square meter correct to 2 places of decimal. Length and breadth shall be measured to correct to a centimeter and between the finished the finished face of the skirting, dedo or wall plaster and no deduction shall be made nor extra paid for any opening in floors or areas up to 0.1 square meter.
- 4.3** The rate shall be for a unit of **one Square meter**.

Item No.75 :- Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30cm length, 30cm height and 15cm thick of M250 grade concrete as per approved design and including excavation for fixing in proper line and level, filling the joint with C:M 1:3 (1 cement : 3 fine sand) etc complete.

The item shall be carried out for precast concrete kerb stone of grey cement based concrete block 30 cm length, 30 cm height and 15 cm thick of M-250 grade concrete as per approved design and as per the direction of Engineer in charge.

The relevant specification of following Item Nos. :

<u>Excavation</u>	:	Item No. 1 of this Work
<u>Cement Concrete M-250</u>	:	Item No. 4 of this Work
<u>Cement Concrete M-100</u>	:	Item No. 3 of this Work
<u>Emulsion Paint</u>	:	Paint : M-44
<u>Filter Material</u>	:	Kapachi : M-13 Sand : M-6

The item shall be carried out as per the direction of Engineer in charge.

MODE OF MEASUREMENT & PAYMENT

The Rate and Mode of measurement shall be as per completed item including all labour & materials involved to execute this item as per **Rmt.** basis.

Contract rate shall be for a unit of one **Rmt.** basis.

Item No. 76:- Providing and fixing eco-friendly light weight calcium silicate false ceiling tiles having Tegular edge & 15 mm Thick Densified edges on the Tile Periphery for Extra Strength The Light weight calcium silicate ceiling tiles shall have, light reflection 85% non-combustible as per B.S. 476 part IV, 100% humidity resistance and also having thermal conductivity 0.043° w/m KC. for the best thermal Insulation . The Light weight calcium Silicate tile shall be of approved texture Fine fissured/ Spintone/Cosmos having NRC value of 0.5 & Globe having NRC value of 0.75 NRC or equivalent of size 595 X 595 mm to be laid on true horizontal level suspended inter locking metal grid of hot dipped galvanized steel sections (galvanizing @120 grams per sqm including both side) consisting of main 'T' runner suitably spaced at joints to get required length and size of 24X38mm made from 0.30 mm thick (minimum sheet, 1200mm centre to centre, and cross 'T' of size 24X28mm made out of 0.33mm (Minimum) sheet spaced 1200mm along spaced between main 'T' at 600mm centre to centre to form a grid of 1200X600mm and secondary cross 'T' of length 600mm and size 24x28mm made of 0.30 mm thick (Minimum) sheet to be interlocked at middle of the 1200X600mm panel to form grid of size 600X600mm resting on periphery walls/partitions on a perimeter wall angle pre-coated steel of size (24X24X3000mm made of 0.40mm thick (minimum) sheet with the help of rawl plugs at 450mm centre to centre with 25mm long dry wall screws @ 230mm interval and laying 15mm thick Densified edges.

Providing and fixing eco-friendly light weight Calcium Silicate False Ceiling of approved make, design and texture with **Tegular edge and 15 mm thick densified edges on tile periphery** for additional strength, conforming to R&B specifications and as directed by the Engineer-in-Charge.

The ceiling tiles shall be **light weight calcium silicate tiles** having following minimum performance properties:

- Light reflection : **Minimum 85%**
- Non-combustible : As per **B.S. 476 Part-IV**
- Humidity resistance : **100% RH**
- Thermal conductivity : **0.043 W/m°K** or better
- Sound absorption (NRC) :
 - **0.50** for Fine Fissured / Spintone / Cosmos texture
 - **0.75** for Globe texture or equivalent

The tiles shall be of approved texture and pattern and of size **595 mm × 595 mm**, factory finished and free from cracks, deformation or surface defects.

Suspension Grid System

The tiles shall be laid in **true horizontal level** on exposed suspended **interlocking metal grid system** made from **hot dipped galvanized steel sections** having galvanization coating of **minimum 120 grams per sq.m (both sides)** consisting of:

1. **Main 'T' Runner**
 - Size : **24 mm × 38 mm**
 - Thickness : **0.30 mm (minimum)**
 - Spacing : **1200 mm centre to centre**
 - Properly joined to obtain required length.
2. **Cross 'T' Section (1200 mm length)**

- Size : **24 mm × 28 mm**
- Thickness : **0.33 mm (minimum)**
- Fixed between main runners at **600 mm centre to centre**
- Forming grid of **1200 mm × 600 mm**.

3. Secondary Cross 'T' Section (600 mm length)

- Size : **24 mm × 28 mm**
- Thickness : **0.30 mm (minimum)**
- Interlocked at centre to form **600 mm × 600 mm grid module**.

Perimeter Support

The grid framework shall rest on **pre-coated steel wall angle** of size **24 mm × 24 mm × 3000 mm length**, made from **0.40 mm thick (minimum) sheet**, fixed along walls/partitions using:

- Rawl plugs at **450 mm centre to centre**, and
- **25 mm long dry wall screws** at **230 mm intervals**.

Suspension Arrangement

The main runners shall be suspended from R.C.C. slab/roof using approved **G.I. wires / M.S. rods with suitable hangers, cleats and fasteners**, fixed at required spacing to maintain proper alignment, rigidity and level of ceiling.

Fixing of Tiles

The **15 mm thick densified edge calcium silicate tiles** shall be carefully laid in grid system ensuring proper seating without gaps. Necessary cutting for light fittings, diffusers, fans, detectors and service lines shall be carried out neatly as directed by Engineer-in-Charge.

Scope Includes

- Providing all ceiling tiles, grid sections and suspension system
- Cutting and finishing around services
- Fixtures, fasteners, anchors and accessories
- Scaffolding, labour, tools and plants
- Complete installation as per manufacturer's specification

The work shall be completed **true to line, level and plane**, as per approved drawings and instructions of Engineer-in-Charge.

Mode of Measurement:

Measured in **square metre** of finished false ceiling area.

Rate Includes:

Supply, transportation, erection, suspension system, fixing, wastage, cutting, fittings and all incidental charges required for complete work.

Item No. 77 :- Painting lines, dashes, arrows, letters etc on roads, Air fields, on walls and like in two coats with road marking paint, brushing including cleaning the surface of all dirt, dust and other foreign matter. (i) Upto 10cm in width.

Materials

The Road marking paint shall be confirm to IS 164-1951.

Workmanship

The painting of lines dashes arrows and letters on roads, air fields and like shall be carried out with road marking paint in two coats up to 10 cm. width.

Mode of Measurement and Payment

Letters figures and similar items etc. stops, commas, hyphens and like shall be deemed to be include in the item the rate per cm. height / width shall hold good irrespective of width of letter, figures or the thickness of lettering.

The Rate shall be for a Unit of one Square meter basis.

Item No. 78: Clearing and grubbing road land including uprooting rank vegetation grass bushes, shrubs, sapling and trees girth up to 300 mm removal of stumps of trees cut earlier and disposal of unserviceable materials (A) By manual means in area of light jungle.

201. CLEARING AND GRUBING

201.1. Scope

This work shall consist of cutting, removing and disposing of all materials such as trees, bushes, shrubs, stumps, roots, grass, weeds, top organic soil etc. to an average depth of 150mm in thickness, which in the opinion of the Engineer are unsuitable for incorporation in the works, from the area of road land containing road embankment, drains, cross-drainage structures and such other areas as may be specified on the drawings or by the Engineer. It shall include necessary excavation, backfilling of pits resulting from uprooting of trees and stumps to required compaction, handling, salvaging, and disposal of cleared materials with all lead and lift. Clearing and grubbing shall be performed in advance of earthwork operations and in accordance with the requirements of these specifications.

201.2. Preservation of Property/Amenities

Roadside trees, shrubs, any other plants, pole lines, fences, signs, monuments, buildings, pipelines, sewers and all highway facilities within or adjacent to the highway which are not to be disturbed shall be protected from injury or damage. The Contractor shall provide and install at his own cost, suitable safeguards approved by the Engineer for this purpose.

During clearing and grubbing, the Contractor shall take all adequate precautions against soil erosion, water pollution, etc., and where required, undertake additional works to that effect vide Clause 306 (as per Page No. 77 in MORTH specification booklet). Before start of operations, the Contractor shall submit to the Engineer for approval, his work plan including the procedure to be followed for disposal of waste materials etc. and the schedules for carrying out temporary and permanent erosion control works as stipulated in Clause 306.3 (as per Page No. 78 in MORTH specification booklet).

201.3. Methods, Tools and Equipments

Only such methods, tools and equipment as are approved by the Engineer and which will not affect any property to be preserved shall be adopted for the work. If the area has thick vegetation/roots/trees, a crawler or pneumatic tyred dozer of adequate capacity may be used for clearance purposes. The dozer shall have ripper attachments for removal of tree stumps. All trees, stumps, etc., failing within excavation and fill lines shall be cut to such

depth below ground level that in no case these fall within 500 mm of the subgrade. Also, all vegetation such as roots, under-growth, grass and other deleterious matter unsuitable for incorporation in the embankment/subgrade shall be removed between fill lines to the satisfaction of the Engineer. All branches of trees extending above the roadway shall be trimmed as directed by the Engineer.

All excavations below the general ground level arising out of the removal of trees, stumps, etc., shall be filled with suitable material and compacted thoroughly so as to make the surface at these points conform to the surrounding area.

Ant-hills both above and below the ground, as are liable to collapse and obstruct free subsoil water flow shall be removed and their workings, which may extend to several metres shall be suitably treated.

201.4. Disposal of Materials

All materials arising from clearing and grubbing operations shall be taken over and shall be disposed of by the Contractor at suitable disposal sites with all lead and lift. The disposal shall be in accordance with local, State and Central regulations.

201.5. Measurements for Payment

Clearing and grubbing for road embankment, drains and cross-drainage structures shall be measured on area basis in terms of [Hectares](#). Cutting of trees upto 300mm in girth and removal of their stumps, including removal of stumps upto 300mm in girth left over after trees have been cut by any other agency and trimming of branches of trees extending above the roadway and back filling to the required compaction shall be considered incidental to the clearing and grubbing operations. Clearing and grubbing of borrow areas shall be deemed to have been included in the rates quoted for the embankment construction item and no separate payment shall be made for the same.

Ground levels shall be taken prior to and after clearing and grubbing. Levels taken prior to clearing and grubbing shall be the base level and will be accordingly used for assessing the depth of clearing and grubbing and computation of quantity of any unsuitable material which is required to be removed. The levels taken subsequent to clearing and grubbing shall be the base level for computation of earthwork for embankment.

Cutting of trees, excluding removal of stumps and roots of trees of girth above 300 mm shall be measured in terms of number according to the girth sizes given below:-

- i) Above 300 mm to 600 mm
- ii) Above 600 mm to 900 mm

iii) Above 900 mm to 1800 mm

iv) Above 1800 mm

Removal of stumps and roots including back filling with suitable material to required compaction shall be a separate item and shall be measured in terms of number according to the sizes given below:-

i) Above 300 mm to 600 mm

ii) Above 600 mm to 900 mm

iii) Above 900 mm to 1800 mm

iv) Above 1800 mm

For this purpose of cutting of trees and removal of roots and stumps, the girth shall be measured at a height of 1 metre above ground or at the top of the stump if the height of the stump is less than one metre from the ground.

201.6. Rates

206.6.1 The Contract unit rates for the various items of clearing and grubbing shall be payment in full for carrying out the required operations including full compensation for all labour, materials, tools, equipment and incidentals necessary to complete the work. These will also include removal of stumps of trees less than 300mm girth excavation and backfilling to required density, where necessary and handling, giving credit towards salvage value disposing of the cleared materials with all lifts and leads. Clearing and grubbing done in excess of 150 mm by the Contractor shall be made good by the Contractor at his own cost as per Clause 301.3.3 to the satisfaction of the Engineer prior to taking up earthwork. Where clearing and grubbing is to be done to a level beyond 150 mm, due to site considerations, as directed by the Engineer, the extra quantity shall be measured and paid separately.

201.6.2 The Contract unit rate for cutting trees of girth above 300 mm shall include handling, giving credit towards salvage value disposing of the cleared materials with all lifts and leads.

201.6.3 The Contract unit rate for removal of stumps and roots of trees girth above 300 mm shall include excavation and backfilling with suitable material to required compaction, handling, giving credit towards salvage value disposing of the cleared materials with all lifts and leads.

201.6.4 The Contract unit rate is deemed to include credit towards value of usable materials, salvage value of unusable material and off-set price of cut trees and stumps belonging to the forest Department. The off-set price of cut trees and stumps belonging to the Forest Department shall be deducted from the amount due to the Contractor and

deposited with the State Forest Department. In case the cut trees and stumps are required to be deposited with the Forest Department the Contractor shall do so and no deduction towards the off-set price shall be effected. The offset price shall be as per guidelines I estimates of the state Forest Department.

201.6.5 Where a Contract does not include separate items of clearing and grubbing, the same shall be considered incidental to the earthwork items and the Contract unit prices for the same shall be considered as including clearing and grubbing operations.

Item No. 79 :- Providing and laying controlled cement concrete M -250 and finishing smooth with curing etc complete, including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in (A) Foundations, footings, Base of Columns and Mass concrete.

The relevant specifications of **Item No. 04** shall be followed accept for the work of **Providing and laying controlled cement concrete M -250 and finishing smooth with curing etc. complete, including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in (A) Foundations, footings, Base of Columns and Mass concrete.**

The rate shall be for a unit of one Cubic meter.

Item No. 80:- Providing, fixing and erecting steel shed including M.S. G.I. pipe (class-B), framing of structure with hollow section And painting with two coats of oil paint including priming coat. Rates including with necessary fabrication work including cutting, welding, making holes by drilling machine & fixing in line and level of all structure including cost of all laboures, fixtures, fastening and equipment's etc. complete.

The item of work shall be carried out as described in item. The column pipes shall confirm to standard galvanised mild steel medium grade tube of required dia. and Polycarbonate multi wall roofing sheet. The frame structure shall be of structural steel as specified. The structure shall be painted with primer coat and two coats of oil paint as specified in item of painting to steel work.

Item also includes for drilling holes in gusset plates, fixing & welding pipe to gusset plate including cutting, welding, making holes for nuts and bolts in structural steel & fixing components and fixing in line and level of all structure including cost of all labours, fixtures, fastening necessary equipments etc. complete.

The mode of measurement and payment shall be on **square meter** basis of work executed.

Item No. 81:- Office Table:- 18mm thick three layer pre laminated particle board Work with PVC Edge band 2mm thick wrapped around the top, Decorative aluminium bidding in top and modesty including all necessary elements with necessary features and fastning finish all as per directed by Engineer in Charge. 6FT Office Table (Dimension :- 180 cm x 90cm x 75 cm) with suitable Brand.

Providing and supplying Office Table of size **1800 mm (L) x 900 mm (W) x 750 mm (H)** made from approved quality **18 mm thick three layer pre-laminated particle board** conforming to relevant IS standards, in approved shade and texture. The top, sides, modesty panel, drawers and all exposed edges shall be finished with **2 mm thick PVC edge banding** machine pressed and properly fixed to provide smooth and uniform finish.

The table top shall be provided with decorative **aluminium bidding/beading** as approved by Engineer-in-Charge. The table shall include modesty panel, side supports, drawer unit/storage arrangement, keyboard provision (if required), cable management provision and all necessary accessories complete.

The structure shall be rigid, levelled and properly assembled using approved quality screws, fittings, connecting hardware, brackets, locking arrangements, channels, handles, buffers and fastening materials. All hardware fittings shall be of reputed make such as **Ebco / Hettich / Godrej / Hafele** or equivalent approved brand.

The table shall be manufactured with proper workmanship, free from warping, bending or surface defects and finished neatly in all respects. Necessary support members, stiffeners and levelling PVC/nylon shoes shall be provided wherever required.

The work includes supplying, transporting, loading, unloading, placing in position and fixing complete as directed by the Engineer-in-Charge.

Complete finished item including all materials, labour, fixtures, accessories and incidental charges required for proper completion of work.

Mode of measurement:

Payment shall be made on the number basis.

Item No. 82:- Revolving Chair:- Full-Back Executive Office Chair upholstered in bonded leather and PVC, Padded seat and back for all-day comfort and support, Pneumatic seat-height adjustment; 360-degree swivel; smooth-rolling casters and having overall dimension 73.9D x 66.5W x 115.6H Centimeters with Armrest (Brown) with selected brand.

Providing and supplying **Full Back Executive Revolving Office Chair** of approved make and model, having overall size approximately **739 mm (D) x 665 mm (W) x 1156 mm (H)**, upholstered with superior quality **bonded leather and PVC upholstery** in approved colour/shade (Brown), suitable for office use complete as directed by the Engineer-in-Charge.

The chair shall be provided with ergonomically designed **full back support** and cushioned seat with high density foam padding to provide all-day seating comfort and proper lumbar support. The seat and back shall be properly stitched and finished with durable upholstery material resistant to wear and tear.

The chair shall be equipped with **pneumatic seat height adjustment mechanism**, centre tilt/revolving mechanism with locking arrangement, and **360-degree swivel movement** for smooth operation. The base shall be heavy duty moulded/fabricated base with minimum five legs fitted with twin wheel **smooth rolling castors** suitable for office flooring.

The chair shall have fixed or cushioned **armrests** made from high quality ABS/PU material or equivalent approved material. All components including gas lift, mechanism, base and castors shall be of approved quality and suitable for continuous office usage.

The work shall include supplying, transporting, assembling and placing in position complete with all fittings, fixtures, fasteners and accessories required for proper installation and use.

Complete finished item including all materials, labour, fixtures, accessories and incidental charges required for proper completion of work.

Mode of measurement:

Payment shall be made on the number basis.

Item No. 83:- File Rack:- lack Adjustable 5-Shelf Shelving Unit Storage Rack Utility Rack Garage Shelves Display Rack Steel Boltless Rivet Rack, 60 inches Height 1-Pack ({5 - SECTION } 5'[H] X 2'[L] X 1'[D]) with suitable Brand.

Providing and supplying **Steel File Rack / Adjustable Shelving Storage Rack** of size approximately **5 Feet (Height) x 2 Feet (Length) x 1 Foot (Depth)** (1500 mm x 600 mm x 300 mm) having **5 adjustable shelves/sections**, made from superior quality heavy duty CRCA/M.S. steel sections and sheets complete as directed by the Engineer-in-Charge.

The rack shall be of **boltless rivet type construction** or approved equivalent system, designed for easy assembly, dismantling and adjustment of shelf levels as required. The vertical supports/uprights shall be made from heavy gauge steel angle/channel sections with adequate strength and rigidity. Shelves shall be fabricated from minimum 20/22 gauge steel sheet with edge bending/stiffening for load bearing capacity. Each shelf shall be adjustable in height and capable of storing office files, records and documents uniformly without deformation. The complete rack shall be treated for rust prevention through phosphating/anti-corrosive treatment and finished with superior quality powder coating paint in approved shade.

The rack shall include all necessary brackets, rivets, stiffeners, connectors, fasteners, base supports and accessories required for complete installation. All exposed edges shall be smooth finished free from sharp corners and manufacturing defects.

The work shall include supplying, transporting, assembling and placing in position complete in all respects as directed by the Engineer-in-Charge.

Mode of measurement:

Payment shall be made on the number basis.

Item No. 84:- Steel Stool:- Office Stainless Steel Stool having minimum overall dimension 35.6D x 35.6W x 76.2H Centimeters, made with S.S. leg and rubber pad/bushing with suitable Brand which will select by engineer in charge.

Providing and supplying **Office Stainless Steel Stool** of approved make and model having minimum overall dimensions approximately **356 mm (D) x 356 mm (W) x 762 mm (H)**, suitable for office and utility use complete as directed by the Engineer-in-Charge.

The stool shall be fabricated from superior quality **stainless steel tubular/frame sections** of approved gauge with adequate strength and stability. The seat shall be properly finished with smooth edges and suitable reinforcement to withstand regular office use. The complete frame shall be rigid, well welded, ground smooth and polished to provide durable and aesthetically finished appearance.

The stool legs shall be fitted with approved quality **rubber pads/bushings/shoes** at the bottom to prevent slipping, floor damage and noise during movement. All welding joints shall be properly finished and free from sharp edges, dents or surface defects.

The stainless steel used shall be corrosion resistant and suitable for long service life under normal office conditions. The stool shall be stable, levelled and capable of carrying required load safely.

The work includes supplying, transporting, loading, unloading and placing in position complete with all fittings, fixtures and accessories required for proper completion of work.

Mode of measurement:

Payment shall be made on the number basis.

Item No. 85:- Chair:- S.S. Chair for Office having seat and back with selected cushion, Fabric, Pattern, PU with arm rest and minimum overall dimension 78.7D x 41.9W x 78.7H Centimeters with suitable Brand which will select by engineer in charge.

Providing and supplying **Stainless Steel Office Chair** of approved make and model having minimum overall dimensions approximately **787 mm (D) x 419 mm (W) x 787 mm (H)**, suitable for office use complete as directed by the Engineer-in-Charge.

The chair shall be fabricated from superior quality **stainless steel tubular/frame sections** of approved gauge with adequate strength, rigidity and durability. The seat and back shall be ergonomically designed and provided with approved quality **cushioning upholstered with selected fabric/PU finish/pattern** in approved shade and design as selected by the Engineer-in-Charge.

The chair shall be provided with comfortable **arm rests** made from stainless steel and/or moulded PU material as approved. The cushioning shall consist of high density foam providing proper seating comfort and support. Upholstery shall be neatly stitched, wrinkle free and firmly fixed to the frame.

All stainless steel components shall be properly welded, ground smooth and polished with corrosion resistant finish free from sharp edges, dents and surface defects. The chair legs shall be fitted with suitable rubber/PVC shoes or bushes to prevent floor damage and noise during use.

The work shall include supplying, transporting, loading, unloading and placing in position complete with all fittings, fixtures, fasteners and accessories required for proper completion of work.

Mode of measurement:

Payment shall be made on the number basis.

Item No. 86:- Stainless Steel Office Almira: Supply and installing Portable Modern double Door steel almaria with nearer 30 kg wt having dimension 36 x 18 x 78.5 inch made from ss, Eco friendly and UV resistant in grey color having min 4 partition for file rack and other compartment as per selected and directed by Engineer incharge.

Providing and supplying in position **Portable Modern Double Door Stainless Steel Office Almira** of approved make and model having approximate size **36 inch (W) x 18 inch (D) x 78.5 inch (H)**, weighing not less than **30 kg**, fabricated from superior quality stainless steel sheets and sections, suitable for office storage purpose complete as directed by the Engineer-in-Charge.

The almaria shall be of robust construction with double shutters/doors and provided with minimum **4 adjustable partitions/shelves** suitable for storing office files, records, documents and other office materials. Additional compartments/locker arrangements shall be provided as per approved design and requirements of the Engineer-in-Charge.

The body, shutters, shelves and supporting members shall be fabricated from approved gauge stainless steel sheet with proper reinforcement for rigidity and long service life. The shutters shall be fitted with approved quality hinges, handles, locking arrangement, magnetic catch, tower bolts and all necessary hardware fittings complete.

The almaria shall be finished in approved **grey colour** with smooth surface finish and shall be **eco-friendly and UV resistant**. All edges and corners shall be machine finished, smooth and free from sharp edges, dents or manufacturing defects. Shelves shall be capable of carrying uniform load without bending or deformation.

The unit shall be provided with suitable base supports/levelling arrangement and all necessary fixtures, fasteners and accessories required for complete installation. The work includes supplying, transporting, loading, unloading, assembling and placing in position complete in all respects.

Mode of measurement:

Payment shall be made on the number basis.

Item No. 87:- Providing and fixing Precast RCC Compound Wall made of I shape verticle Pre cast Pre tension post of size 2100 mm height , section 150 mm x 150 x 50 mm center slot and edge chamfer made from concrete grade M-25 (For Vertical Post), 2135 mm x 300mm x 50 mm plank made of pre cast and pretension from concrete grade M-25 with 3 nos of 4mm tension wire and Edge 10 x 10 mm chamfer (For Panel)7 panel in row position having center to center space not more than 2.25 meter and segemnt height made of 2100 mmasper design or as per directed by engineer incharge.

Providing and fixing Precast RCC Compound Wall comprising of factory made precast pre-tensioned RCC vertical posts and RCC panels complete in all respects as per approved design, drawing and direction of Engineer-in-Charge.

The work shall consist of supplying, transporting, loading, unloading, erecting and fixing precast RCC compound wall made out of the following components:

1. Precast RCC Vertical Post

Factory made precast pre-tensioned RCC “I” shaped vertical posts of size 2100 mm height having section size 150 mm x 150 mm with 50 mm central groove/slot including edge chamfer, cast in M-25 grade concrete using approved quality cement, graded aggregate and clean river sand. The post shall be properly vibrated, machine cast, cured and reinforced/pre-tensioned as per approved design to withstand all dead load, wind load and handling stresses. The post shall be embedded in PCC foundation/pedestal to required depth as directed by Engineer-in-Charge.

2. Precast RCC Panels / Planks

Providing factory made precast pre-tensioned RCC wall panels/planks of size 2135 mm x 300 mm x 50 mm cast in M-25 grade concrete with 3 Nos. of 4 mm dia high tensile pre-stressed wires complete with 10 mm x 10 mm chamfer on edges. The panels shall be machine made, properly compacted, cured and finished smooth. The panels shall be inserted in grooves of vertical posts in proper line, level and plumb complete.

3. Wall Configuration

The compound wall shall consist of 7 Nos. panels in one row position between two posts with center to center spacing of posts not exceeding 2.25 metre and overall segment height of 2100 mm or as per approved design and as directed by Engineer-in-Charge.

4. Foundation and Erection

Including excavation for foundation, providing and laying PCC pedestal/foundation block of required size in cement concrete, fixing posts in true line and level, filling and ramming earth around foundation, lifting, placing and erecting precast members, all labour, tools, tackles, scaffolding and machinery required for complete installation.

5. General Requirements

The entire work shall be completed true to alignment, line, level and plumb. All precast members shall be free from honeycombing, cracks, damage or any manufacturing defects. The rate shall include all materials, labour, conveyance, royalty, loading, unloading, transportation, curing, erection and incidental charges complete as directed by Engineer-in-Charge.

Mode of measurement:

Payment shall be made on the running meter basis.

Item No. 88 :- Providing and fixing ms grill entrance gate of predetermine design including all material like hinges, roller, stopper ,rail head , handle etc. having coat of red lead and painting with selected colour guide by engineer in charge.

Providing and fixing M.S. grill entrance gate of approved and predetermined design and size, fabricated from approved quality mild steel sections, square bars, flats, angles, pipes etc. as per approved drawing including cutting, welding, grinding, drilling, finishing and making necessary arrangements for proper fixing in position complete.

The work shall include providing and fixing all necessary fittings and accessories such as heavy duty hinges, rollers, stoppers, rail head, guide channel, locking arrangement, handles, tower bolts, nuts, bolts, washers and all other required hardware complete for smooth operation of gate.

The M.S. members shall be thoroughly cleaned and provided with one coat of approved quality red lead primer before fixing and thereafter finished with two coats of synthetic enamel paint of approved make and selected shade/colour as directed by Engineer-in-Charge.

3.0 MODE OF MEASUREMENT & PAYMENT:

3.1. The unit rate of structure shall include the cost of all materials, tools and plant required for fabrication, fitting the same to specified position as per drawings, finishing, painting with three coats including priming coat, etc, and all other incidental expenses for producing M S structure work to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of M S structure shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.

3.2. The plaster work shall be measured for its weight, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Square meter.

3.3. The payment will be made on **Kg.** basis of the finished work.

Item No. 89 :- Providing and laying controlled cement concrete M.250 and curing complete including the cost of formwork and Excluding the cost fo reinforcement for reinforced concrete work in (D) Columns, Pillars posts and struts, upto floor two level.

The relevant specifications of **Item No. 04** shall be followed accept for the work of **Providing and laying controlled cement concrete M.250 and curing complete including the cost of formwork and Excluding the cost fo reinforcement for reinforced concrete work in (D) Columns, Pillars posts and struts, upto floor two level.**

The rate shall be for a unit of one Cubic meter.

Item No. 90 :- Providing and laying burnt brick masonry for super structure with ordinary portland cement mortar 1:5 proportion including providing scaffolding racking out joints curing etc. complete for all leads and lifts. (Conventional Bricks) upto floor two level.

The relevant specifications of **Item No. 13** shall be followed accept for the work of **Providing and laying burnt brick masonry for super structure with ordinary portland cement mortar 1:5 proportion including providing scaffolding racking out joints curing etc. complete for all leads and lifts. (Conventional Bricks) upto floor two level.**

The rate shall be for a unit of one Cubic meter.

Item No.91:- Providing and laying and fixing 50 mm thick expansion joint by hydro cell semi rigid UV resistance with high performance laminated closed cell polythene foam joint filler in sheet foam as directed, etc. complete.

General

This work shall consist of providing and laying hydro cell semi rigid UV resistance with high performance laminated closed cell polythene foam joint filler in sheet foam in conforming to these specifications or as directed by the Engineer in charge.

1.0 Workmanship and Finish

Joint sealing slots :-

When forming expansion joints with Hydrocell in in-situ concrete, Hydrocell can be supplied pre-cut with a “zip top” to site requirements or joint sealing slots can be readily formed in the following manner. Before installing, simply cut off a strip to the required depth then pin the strip back onto the main filler using small nails. Then install the filler flush with the finished surface. Prior to sealing, the top strip can then be pulled easily from the joint to provide an uncontaminated sealing slot ready for preparation and sealing. As elastomeric sealants will not bond to Hydrocell the additional need for bond breaker strips to is eliminated.

Suspended Slabs :-

When installing Hydrocell in expansion joints between suspended slabs, partly projecting copper nails or daubs of adhesive may be used to help prevent displacement.

2.0 MODE OF MEASUREMENTS & PAYMENT

- 2.1.** The rate includes preparation of surface, treatment and sealing of all joints. equipments and labour.
- 2.2.** The rate shall be for a unit of One **Square meter**.