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**Name Of Work :- Construction of Anganwadi at Manjrol-1v, Kanakuva  
& Padvan Villages Ta.Sankheda Dist. Chhotaudepur under ICDS  
Grant (2026-27) (Pac.11)**

## **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 members .....5 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	NP2
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

## GENERAL TECHNICAL SPECIFICATIONS FOR BUILDING WORKS

### GENERAL:

1. In the specifications "as directed" / "approved" shall be taken to mean "as directed" / "approved by the Engineer-in-Charge".
2. Wherever a reference to any Indian Standard appears in the specifications, it shall be taken to mean as a reference to the latest edition of the same in force on the date of agreement.
3. In "Mode of Measurement" in the specifications wherever a dispute arises in the absence of specific mention of a particular point of aspect the provisions on these particular points, or aspects in the relevant Indian Standards shall be referred to
4. All measurements and computations, unless otherwise specified, shall be carried out nearest to the following limits:
  - (i) Length, width and depth (height) 0.01 meter

(ii) Areas 0.01 Sq.Mt.

(iii) Cubic Contents 0.01 Cu.Mt.

In recording dimensions of work the sequence of length, width and height (depth) or thickness shall be followed.

5. The distance which constitutes lead shall be determined along the shortest practical route and note necessarily the route actually taken The decision of the Engineer-in-charge in this regard shall be taken as final.
6. Where no lead is specific, it shall mean "all leads"
7. Lift shall be measured from plinth level.
8. Up to "floor two level" means actual height of floor (Maxi 4 M) up to 3 Mt. above plinth level.
9. Definite particulars covered in the items of work, though not mentioned or elucidated in its specifications shall be deemed to be included therein.
10. Reference to specifications of materials as made in the detailed specification of the items of works is in the form of a designation containing them under of the specification of the material and prefix 'M' e.g. 'M-5',
11. Approval to the samples of various materials given by the Engineer-in-charge shall not absolve the contractor from the responsibility of replacing defective material brought on site or materials used in the work found defective at a later date. The contractor shall have no claim to any payment or compensation whatsoever on account of any such materials being rejected by the Engineer-in-charge.
12. The contract rate of the item of work shall be for the work completed in all aspects.
13. No collection of materials shall be made before it is got approved from the Engineer-in-charge.
14. Collection of approved materials shall be done at site of work in a systematic manner. Materials shall be stored in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.
15. Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
16. No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage or overloading of the various components of the structure.
17. All works shall be carried out in a workmanlike manner as per the best techniques for the particular item.
18. All tools, templates, machinery and equipment for correct execution of the work as well as for checking lines, levels, alignment of the works during execution shall be kept in sufficient numbers and in good working condition on the site of the work.
19. The mode, procedure and manner of execution shall be such that it does not cause damage or over-loading of the various components of the structure during execution or after completion of the structure.
20. Special modes of construction not adopted in general Engineering practice if proposed to be adopted by the Contractor, shall be considered only if the contractor provides satisfactory

evidence that such special mode of construction is safe, sound and helps in speedy construction and Completion of work to the required strength and quality. Acceptance of the same by the Engineer-in-Charge shall not, however absolve the contractor of the responsibility of any adverse effects and consequences of adopting the same in the course of execution of completion of the work.

21. All installations pertaining to water supply and fixtures there of as well as drainage lines and sanitary fittings shall be deemed to be completed only after giving satisfactory tests by the contractor.
22. The contractor shall be responsible for observing the rules and regulations imposed under the "Minor Minerals Act", and such of the laws and rules prescribed by Government from time to time.
23. All necessary safety measures and precautions {including those laid down in the various relevant Indian Standards) shall be taken to ensure the safety of men. Materials and machinery on the works as also of the work itself.
24. The testing charges of all materials shall be borne by the Contractor.
25. Approval to any of the executed items for the work does not in any relieve the contractor of his responsibility for the correctness, soundness and strength of the structure as per the drawings and specifications.

### **SPECIFICATIONS OF MATERIALS**

#### **M-1 Water**

- 1.1. Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil and injurious alkalis, salts, organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. Container for transport, storage and handling of water shall be clean. Water shall conform to the standard specified in I.S. 456-1978.
- 1.2. If required by the Engineer-in-Charge it shall be tested by comparison with distilled water Comparison shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I.S. 269-1976. Any indication of unsoundness charge in time of setting by 30 minutes or more or decrease of more than 10 per cent in strength, of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3. Water for curing mortar, concrete or masonry should not be too acidic or too alkaline.  
It shall be free of elements which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces
- 1.4. Hard and bitter water shall not be used for curing.
- 1.5. Potable water will generally found suitable for curing mortar or concrete.

#### **M-2. Lime**

- 2.1. Lime shall be hydraulic lime as per I.S. 712-1973 Necessary tests shall be carried out as per I.S. 6932 (Parts I to X) 1973

**2.2.** The following field tests for limes are to be carried out:

- (1) A very rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure white colour, lime in form of porous lumps of dirty white colour indicates quick lime, and solid lumps are the unburnt lime stone.
- (2) Acid tests for determining the carbonate content in lime. Excessive amount of impurities and rough determination of class of lime.

**2.3.** Storage shall comply with J.S. 712-1973. The slaked lime, if stored, shall be kept in a weather proof and damp-proof shed with impervious floor and sides to protect it against rain, moisture, weather and extraneous materials mixing with it. All lime that has been damaged in any way shall be rejected and all rejected materials shall be removed from site of work.

**2.4.** Field testing shall be done according to I.S. 1624-1974 to show the acceptability of materials.

### **M-3. Cement**

**3.1.** Cement shall be ordinary Portland slag cement as per I.S.269-1976 or Portland slag cement as per I.S. 455-1976

### **M-4. White Cement**

**4.1.** The white cement shall conform to I. S. 8042-E-1978.,

### **M-5. Coloured Cement**

**5.1.** Coloured cement shall be with white or grey Portland cement as specified in the item of the work.

**5.2.** The pigments used for coloured cement shall be of approved quality and shall not exceed 10% of cement used in the mix. The mixture of pigment and cement shall be properly ground to have a uniform colour and shade. The pigments shall have such properties to provide for durability under exposure to sunlight and weather.

**5.3.** The pigment shall have the property such that it is neither affected by the cement nor detrimental to it

### **M-6 Sand**

**6.1.** Sand shall be natural sand, clean, well graded, hard, strong, durable and gritty particles free from injurious amounts of dust, clay, kankar nodules, soft or flaky particles, shale, alkali salts, organic matter, loam, mica or other deleterious substances and shall be got approved from the Engineer-in-Charge. The sand shall not contain more than 8 percent of silt as determined by field test, if necessary the sand shall be washed to make it clean.

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

I.S. Sieve Designation	Percentage by Weight Passing sieve	I.S. Sieve Designation	Percentage by Weight Passing Sieve
4.75 mm	100	600 Micron	30 - 100
2.36 mm	90 to 100	300 Micron	5 - 70
1.18 mm	70 - 100	150 Micron	0 - 50

**6.3. Fine Sand :** The fineness modulus shall not exceed 1.0. The sieve analysis of fine sand shall be as under :

I.S. Sieve Designation	Percentage by Weight Passing through	I.S. Sieve Designation	Percentage by Weight Passing through
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4.75 mm	100	600 Micron	40 - 85
2.36 mm	100	300 Micron	5 - 50
1.18 mm	70 - 100	150 Micron	0 - 10

#### **M-7 Stone Dust :**

**7.1.** This shall be obtained from crushing hard black trap or equivalent. It shall not contain more than 8% of silt as determined by field test will measuring cylinder. The method of determining silt contents by fields test is given as under :

**7.2.** A sample of stone dust to be tested shall be placed without drying in 200 mm. measuring cylinder. The quantity of the sample shall be such that it fills the cylinder up to 100 mm. mark. The clean water shall be added up to 150 mm. mark. The mixture shall be stirred vigorously and the content allowed to settle for 3 hours.

**7.3.** The height of silt, visible as settled layer above the stone dust shall be expressed as percentage of the height of the stone dust below. The stone dust containing more than 8% silt shall be washed so as to bring the content within the allowable limit.

**7.4.** The fineness modules of stone dust shall not be less than 1.80.

#### **M-8. Stone Grit**

**8.1.** Grit shall consist of crushed or broken stone and be hard, strong, dense, durable, clean of proper gradation and free from skin or coating likely to prevent proper adhesion of mortar Grit shall generally be cubical in shape and as far as possible flakey elongated pieces shall be avoided. It shall generally comply with the provisions of I.S. 383-1970. Unless special stone of particular quarries is mentioned grit shall be obtained from the best black trap or equivalent hard stone as approved by the Engineer-in-charge. The grit shall have no deleterious with cement.

**8.2.** The Grit shall conform to the following gradation as per sieve analysis :

I.S. Sieve Designation	Percentage Passing through sieve	I.S. Sieve Designation	Percentage by Weight Passing through Sieve
4.75 mm	100	600 Micron	40 - 85
2.36 mm	100	300 Micron	5 - 50
1.18 mm	70 - 100	150 Micron	0 - 10

**8.3** The crushing strength of grit will be such as to allow the concrete in which it is used to built up the specified strength of concrete.

**8.4.** The necessary tests for grit shall be carried out as per the requirements of I.S.2386 (Parts I to VIII) 1963 as per instructions of the Engineer-in-charge. The necessity of test will be decided by the Engineer-in-charge.

#### **M-9. Cinder**

**9.1.** Cinder is will burnt furnace residue which has been fused or sintered into lumps of varying sizes.

**9.2.** Cinder aggregates shall be well burnt furnace residue obtained from furnace using coal fuel only it shall be sound clean and tree from clay dirt, ash or other deleterious matter.

**9.3** The average grading for under aggregates shall be as mentioned below :

I.S. Sieve Designation	Percentage Passing	I.S. Sieve Designation	Percentage Passing
20 mm	100	4.75 mm	70

8			
10 mm	86	2.36 mm	32

#### **M-10 Lime Mortar**

10.1 Lime shall conform to specification M-2. Water shall conform to specification M-1.

Sand shall conform to specification M-6.

#### **10.2. Proportion of Mix:**

10.2.1. mortar shall consist of such proportions of slaked lime and sand as may be specified in item The slaked lime and sand shall be measured by volume

#### **10.3. Preparation of mortar:**

10.3.1. Lime mortar shall be prepared by wet process as per I S 1625-1971 .Power driven mill shall be used for preparation of lime mortar. The slaked lime shall be placed in the mill in an even layer and ground for 180 revolutions with a sufficient water. Water shall be added as required during grinding (care being taken not to add more water) that will bring the mixed material to a consistency of stiff paste. Thoroughly wetted sand shall then be added evenly and the mixture ground for another 180 revolutions.

#### **10.4. Storage:**

10.4.1. Mortar shall always be kept damp, protected from sun and rain till used up, covering it by tarpaulin or open sheds.

#### **10.5. Use:**

10.5.1. All mortar shall be used as soon as possible after grinding. It should be used on the day on which it prepared, But in no case mortar made earlier than 36 hours shall be permitted for use.

#### **M-11. Cement Mortar**

11.1. Water shall conform to specification M-1. Cement shall conform to specifications M-3 and Sand shall conform to M-6

#### **11.2. Proportion of Mix**

11.2.1. Cement and sand shall be mixed to specified proportion, sand being measured by measuring boxes, the proportion of cement will be by volume on the basis of 50 Kg/Bag of cement being equal to 0.0342 cu.m. The mortar may be hand mixed or machine mixed as directed.

#### **11.3. Preparation of Mortar :**

11.3.1. In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed

11.3.2. The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes.

#### **M-12. Stone Coarse Aggregate for Nominal Mix Concrete**

12.1. Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of

mortar.

- 12.2.** The aggregate shall generally be cubical in shape unless special stones of particular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved a ggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement and ordinary reinforced cement concrete shall generally be as per the table given below.

However in case of reinforced cement concrete the maximum limit may be restricted to 6 mm. less than the minimum lateral clear distance between bars or 6- mm. less than the cover whichever is smaller.

**TABLE**

I.S. Sieve Designation	Percentage passing for single sized aggregates of Nominal size			I.S. Sieve Designation	Percentage passing for single sized aggregates of Nominal size		
	40 mm	20 mm	16 mm		40 mm	20 mm	16 mm
80 mm	-	-	-	12.5 mm	-	-	-
63 mm	100	-	-	10 mm	0.5	0.02	0.30
40 mm	85-100	100	-	4.75 mm	-	0.5	0.5
20 mm	0-20	85-100	100	2.35 mm	-	-	-
16 mm	-	-	85-100				

**Note :** This percentage may be varied some what by the Engineer-in-charge when considered necessary for obtaining better density and strength of concrete.

- 12.3.** The grading test shall be taken in the beginning and at the change of source of materials. The necessary tests, indicated in I.S. 383-1970 and 456-197f shall have to be carried out to ensure the acceptability. The aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregates. If she aggregates are covered with dust, they shall be washed with water to make them clean. .

#### **M-13. Black Trap or Equivalent Hard Stone Coarse**

- 13.1. Aggregate For Design Mix Concrete :** Coarse aggregate shall be of machine crushed stone of black trap or equivalent hard stone and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.
- 13.2.** The aggregates shall generally be cubical in shape. Unless special stones of particular quarries are mentioned, aggregates shall be machine crushed, from the best, black trap or equivalent hard stones as approved, Aggregate shall have no deleterious with cement
- 13.3.** The necessary tests indicated in I S. 383-1970 and I.S.456-1978 shall have to be carried out to ensure the acceptability of the material.
- 13.4.** If aggregate is covered with dust it shall be washed with water to make it clean.

#### **M-14. Brick Bats Aggregate**

- 14.1.** Brick bat aggregate shall be broken from well burnt or slightly over burnt and dense bricks. It shall be homogeneous in texture, roughly cubical in shape, clean and free from dirt of any other foreign material. The brick bats shall be of 40 mm - 50 mm. size unless otherwise specified in the item. The under burnt or over burnt brick bats shall not be allowed.
- 14.2** The brick bats shall be measured by suitable boxes or as directed.

#### **M-15. Bricks**

- 15.1.** The bricks shall be hand or machine molded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws and nodules of free lime they shall have smooth rectangular faces with

sharp corners and shall be of uniform colour.

The bricks shall be moulded with a frog of 100 mm. x 40 mm. and 10 mm. to 20 mm. deep on one of its flat sides. The bricks shall not break when thrown on the ground from a height of 600 mm.

**15.2.** The size of modular bricks shall be 190 mm.x 90 mm.x 90 mm.

**15.3.** The size of the conventional bricks shall be as under :

( 9" x 4.3/8" x 2,3/4" ) 225 x 110 x 75 mm.

**15.4.** Only bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work.

Length + 1/8" ( 3.0 mm.) Width  $\pm$  1/16" ( 1.50 mm. ) Height + 1/16" ( 1.50 mm. )

**15.5.** The crushing strength of the bricks shall not be less than 35 Kg/Sq. Cm. The average water absorption shall not be more the 20 percent by weight Necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3495 ( Part-I to IV ) - 1976

#### **M-16. Stone**

- **16.1.** The stone shall be of the specified variety such as Granite/Trap Stone/ Quartzite or any other type of good hard stones. The stones shall be only from the approved quarry and shall be hard sound, durable and free from defects like cavities, cracks, sand holes, flaws injurious veins, patches of loose or soft materials etc. and weathered portions and other structural defects Or imperfections tending to affect their soundness and strength. The stone with round surface shall not be used. The percentage of water absorption shall not be more than 5% of dry weight. When tested in accordance with I.S. 1124-1974. The minimum crushing strength of stone shall be 200 Kg/Sq. Cm. unless otherwise specified.

**16.2.** The samples of the stone to be used shall be got approved before the work is started

**16.3.** The Khanki facing stone shall be dressed by chisel as specified in the item for khanki facing in required shape and size. The face of the stone shall be-so dressed that the bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on face to be plastered it shall not project by more than 19 mm. nor shall it have depressions more than 10 mm. from the average wall surface.

#### **M-17. Laterite Stone**

**17.1.** Laterite stone shall be obtained from the approved quarry it shall be compacted in texture sound, durable and free from soft patch. It shall have minimum crushing strength of 100 Kg/Sq. Cm. in its dry condition. It shall not absorb water more than 20% of its own weight, when immersed for 24 hours in water. After quarrying, the stone shall be allowed to weather for some time before using in work.

**17.2.** The stone shall be dressed into regular rectangular blocks so that all faces are free from waviness and unevenness, and the edges true and square

**17.3.** Those types of stone in which white clay occurs should not be used

**17.4.** Special corner stones shall be provided where so directed.

#### **M-18. Mild Steel Bars**

**18.1.** Mild steel bars reinforcement for R.C C. work shall conform to I.S. 432 (Part -II) 1966 and shall be of tested quality. It shall also comply with relevant part of I.S. 456-1978.

**18.2.** All the reinforcement shall be clean and free from dirt, paint, grease, mill scale or loose or thick rust at the time of placing

**18.3.** For the purpose of payment, the bar shall be measured correct up to 10 mm. length and weight payable worked out at the rate specified below :

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.	40 mm.	9.86 Kg/Rmt.

#### **M-19. High Yield Strength Steel Deformed Bars**

- 19.1.** High yield strength steel deformed bars shall be either cold twisted other rolled and shall conform to I.S. 1786-1966 and I.S. 1139-1966 respectively.
- 19.2.** Other provisions and requirements shall conform to specification No. M-18 for Mild Steel Bars.

#### **M-20. High Tensile Steel Wires**

- 20.1.** The high tensile wires for use in pre stressed concrete work shall conform to I.S.2090-1962.
- 20.2.** The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength the minimum strength shall be taken as per Para 6-1 of the I.S. 1785-1962. Testing shall be done as per I.S. requirements.
- 20.3.** The high tensile steel shall be free from loose mill scale, rust, oil, grease, or any other harmful matter. Cleaning of steel bars may be carried out by immersion in solvent solution, wire brushing or passing through a pressure box containing Carborundum.
- 20.4.** The high tensile wire shall be obtained from manufacturers. in coils having diameter not less than 350 times the diameter of wire itself so that wire springs back straight on being uncoiled .

#### **M-21. Mild Steel Binding Wire**

- 21.1.** The mild steel wire shall be of 1.63 mm. or 1.22 mm. ( 16 to 18 gauge ) diameter and shall conform to I.S. 280-1972.
- 21.2.** The use of black wire will be permitted for binding reinforcement bars. It shall be free from rust oil paint, grease loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

#### **M-22. Structural Steel**

- 22.1.** All structural Steel shall conform to I S. 226-1985: The steel shall be free from the defects mentioned in I.S 226-1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. River bars shall conform to I.S. 1148-1973.
- 22.2.** When the steel is supplied by the Contractor test certificate of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

#### **M-23. Galvanised Iron Sheets**

- 23.1.** The galvanised iron sheets shall be plain or corrugated sheets of gauges as specified in item The G.I. Sheets shall conform to I.S.277-1977. The sheets shall be undamaged in carnage and handling either by rubbing off of zinc coating or otherwise. They shall have clean and bright surface and shall be free from dents, bends, holes, rust or white powdery deposit.
- 23.2.** The length and width of G.I. sheets shall be as directed as per site condition.

#### **M-23.A : G.I. Valleys gutter, ridges**

- 23.A.1.** The G.I. ridges and hips shall be of plain galvanised sheets Class - 3 of the thickness as specified in item. These shall be 600 mm. in width and properly bent up to shape without damage to the sheets in

process of bending.

- 23.A.2.** Valleys gutters and flashings shall also be of galvanised sheet of thickness as specified in item Valleys Shall be 900 mm. wide overall and flashing shall be 380 mm. wide overall They shall be bent to the required shape without damage to the sheet in the process of bending.

**M-24. Asbestos Cement Sheets**

- 24.1.** Asbestos cement sheets plain, corrugated or semi-corrugated shall conform to I.S.459-1970 The thickness of the sheets shall be as specified in the item. The sheets shall be free from all defects such as cracks, holes, deformities chipped edges or otherwise damaged.

**24.2. Ridges & Hips :**

- 24.2.1.** Ridges and hips shall be of same thickness as that of A.C. sheets. The types, of ridges shall be suitable for the type of sheets and location.
- 24.2.2.** Other accessories to be used in roof such as flashing pieces eaves filler pieces, valley gutters, north light, and ventilator curves, barge boards etc, shall be of standard manufacture and shall be suitable for the type of sheets and location.

**M-25. Mangalore Pattern Roof Tiles**

- 25.1.** The mangalore pattern tiles shall conform to I S 654-1972 for Class AA or Class A type as specified in item. Samples of the tiles to be provided shall be got approved from the Engineer-in-charge. Necessary tests shall be carried out as directed.

**M-26. Shuttering**

- 26.1.** The shuttering shall be either of wooden planking of 30 mm. minimum thickness with or without steel lining or of steel plates stiffened by steel angles The shuttering shall be supported on battens and beams and props of vertical bullies properly cross braced together so as to make the centering rigid. In places of bullies props, brick pillar of adequate section built in mud mortar may be used.
- 26.2.** The form work shall be sufficiently strong and shall be able to resist forces caused by vibration of live load of men working over it and other incidental loads associated with it. The shuttering shall have smooth and even surface and its joints shall permit leakage of cement grout.
- 26.3.** If at any stage of work during or after placing concrete in the structure, the form work sags or bulges out beyond the required shape of the structure, the concrete shall be removed and work redone with fresh concrete and adequately rigid form work The complete form work shall be got inspected by and got approved from the Engineer-in charge, before the reinforcement bars are placed in position.
- 26.4.** The props shall consist of bullies having 100 mm .minimum diameter measured at mid length and 80 mm. at thin end shall be placed as per design requirement. These shall rest squarely on wooden sole plates 40 mm. thick and minimum bearing area of 0-10 sq.m laid on sufficiently hard base.
- 26.5.** Double wedges shall further be provided between the sole plate and the wooden props so as to facilitate tightening and easing of shuttering without jerking the concrete
- 26.6.** The timber used in shuttering shall not be so dry as to absorb water from concrete and swell or bulge nor so green or wet as to shrink after erection. The timber shall be properly sawn and planed on the sides and the surface coming in contact with concrete wooden form work with metal sheet lining or steel plates stiffened by steel angles shall be permitted
- 26.7.** As far as practicable, clamps shall be used to hold the forms together and use of nails and spikes avoided.
- 26.8.** The surface of timber shuttering that would come in contact with concrete shall be well wetted and

coated with soap solution before the concreting is done Alternatively coat of raw linseed oil or oil of approved manufacture may be applied in place of soap solution In case of steel shuttering either soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Under no circumstances black or burnt oil shall be permitted.

- 26.9.** The shuttering for beams and slabs shall have camber of 4 mm per meter ( 1 in 250 ) or as directed by the Engineer-in-charge so as to offset the subsequent deflection For cantilevers, the camber at free end shall be 1/50 of the projected length or as directed by the Engineer-in-charge.

**M- 27. Expansion Joints - Permoulded filler**

- 27.1.** The item provides for expansion joints in R.C C. frame structures for internal joints, as well as exposed joints, with the use of promoulded bituminous joint filler.
- 27.2.** Premoulded bituminous joints filler i.e. performed strip of expansion joints filler shall not get deformed, or broken by twisting bending or other handling when exposed to atmospheric condition. Pieces of joints filler that have been damaged shall be rejected
- 27.3.** Thickness of the per-moulded joints filler shall be 25 mm. unless otherwise specified.
- 27.4.** Premoulded bituminous joints filler shall conform to I S 1838-1961

**M-28. Expansion joints-Copper strips & hold .fasts**

- 28.1.** The item provide for expansion joints in R.C.C. frame structure for internal joints, as well as exposed joints, with the use of premoulded bituminous joints filler.
- 28.2.** Copper sheet shall be of 1.25 mm. width and or 1 25 mm. width and the " U " shape in the middle. Copper strip shall have holdfast of 3 mm diameter copper rod fixed to the plate soldered on strip at intervals of about 30 cm or as shown in the drawing or as directed. The width of each flange ( horizontal side ) of the copper plate Jo be embedded in the concrete work shall be 25 mm depth of "U" to be provided in the expansion joint, in the copper plate shall be of 25 mm.

**M-29. Teak wood**

- 29.1.** The teak wood shall be of good quality as required for the item to be executed. When the kind of wood is not specifically mentioned, good Indian teak wood as approved shall be used.
- 29.2.** Teak wood shall generally be free from large, loose dead or cluster knots, flaws, shakes, warps, twists, bends or any other defects. It shall generally be uniform in substance and of straight fibers as far as possible. It shall be free from rot decay, harmful fungi and other defects of harmful nature which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour shall be uniform as for as possible. Any effort like painig using any adhesive materials made to hide the defects shall render the pieces liable to rejection by the Engineer-in-charge.
- 29.3.** All scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grains and of uniform thickness.
- 29.4.** The tolerances in the dimensions shall be allowed at the rate of 1.5 mm per face to be planed.

**29.5. First class teak wood**

- 29.5.1.** First class teak wood shall have no individual hard and-sound knots, more than 6 sq. cm. in size and the aggregate area of such knots shall not be more than 1% of area of piece, The timber shall be closed grained.

**29.6. Second Class Teak Wood:**

- 29.6.1.** No individual hard and sound knots shall be more than 15 sq. cms. in size and aggregates area of such knots shall be not exceed 2% of the area of piece.

**M-29. A Non-teak wood:**

The non-teak wood shall be chemically treated, seasoned as per I.S. Specifications and of good quality. The type of wood shall be got approved before collecting the same on site. Fabrication of wooden members shall be started only after approval. For this purpose wood of Bio, Kalai, Sires, Saded, Behda, Jamun, Sisoo will be used for door where as only Kalai, Sires, Halda, Kalam etc. will be permitted for shutters after proper seasoning and chemical treatment.

The non-teak wood shall be free from large loose dead of cluster knots, flows, shakes, warps, bends or any other defects, It shall be uniform in substance and of straight fibers as far as possible. It shall be free from rots, decay, harmful fungi and other defects of nature which will effect the strength, durability or its usefulness for the purpose for which it is required. The colour of wood shall be uniform as far as possible. The scantlings planks etc. shall be sawn in straight lines and planes in the direction of grain and of uniform thickness. The department will use the Agency to produce certificate from Forest Department in event of dispute and the decision of the Department shall be final and binding to the contractor. The tolerance in the dimension shall be allowed at 1.5 mm. per face to be planed.

**M-30. Wooden flush door shutters ( solid core )**

- 30.1.** The solid core type flush door shutters shall be of decorative or non-decorative type as specified in the drawing. The size and thickness of the shutter shall be as specified in drawings or as directed. The timber species for core shall be used as per I.S.2202 ( part -I ) 1980. The timber shall be free from decay and insect attack. Knots and knot holes less than half the width of cross-section of the members in which they occur may be permitted. Pitch pockets, pitch streaks and harmless pin holes shall be permissible except in the exposed edges of the core members. The commercial plywood, cross-bands shall conform to I.S. 303-1275.
- 30.2.** The face panel of the shutters shall be formed by gluing by the hot press process on both faces of the core with either plywood or cross-bands and face veneers. The hopping, rebating, opening of glazing, venation etc., shall be provided if specified in the drawing.
- 30.3.** All edges of the door shutters shall be square. The shutters shall be free from twist or warp in its plane. Both faces of the shutters shall be sand papered to smooth even texture.
- 30.4.** The shutters shall be tested for-
  - (1) End immersion test:** The test shall be carried out as per I.S.2202 ( part-1 ) 1980. There shall be no delamination at the end of the test.
  - (2) Knife Test :** The face panel when tested in accordance with I.S 1659-1979 shall pass the test.
  - (3) Glue adhesion test :** The flush door shall be tested for glue adhesive test in accordance with I S 2202 ( part -I ) 1980. The shutters shall be considered to have passed the test, if no delamination occurs in the glue lines in the plywood and if no single determination more than 80 mm in length and more than 3 mm in depth has occurred in the assembly glue lines between the plywood face and the stile and rail. Delamination at the corner shall be measured continuously around the corner. Delamination at the knots, knot hole and other permissible wood defects shall not be considered in assessing the sample.
- 30.5.** The tolerance in size of solid core type flush door shall be as under :  
In Nominal thickness  $\pm 1.2$  mm. In Nominal height  $\pm 3$  mm
- 30.6.** The thickness of the shutter shall be uniform throughout with a permissible variation of not more than 0.8 mm. when measured at any points.

**M-31. Aluminum doors, windows, ventilators**

- 31.1.** Aluminum alloy used in the manufacture of extruded window sections shall conform to I.S. designation

HEAWP of I.S. 733-1975 and also to I S. Designation WVG-WP of I.S 1285-1975 The section shall be as specified in the drawing and design. The fabrication shall be done as directed

- 31.2. The hinges shall be cast or extruded aluminum hinges of same type as in window but of larger size.
- 31.3. The hinges shall normally be of 50 mm. projecting type. Non-projecting type of hinges may also be used if directed. The handles of door shall be of specified design A suitable lock for the door Operable either from outside or inside shall be provided. In double shutter door, the first closing shutter shall have concealed aluminum alloy bolt at top and bottom.

#### **M-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 up to 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 3.5 Meter and above, 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.

#### **M-33. Collapsible Steel Gate**

- 33.1. The collapsible steel gate shall be in one or two leaves and size as per approved drawings or as specified. The gate shall be fabricated from best quality mild steel channels, flats etc. Either steel pulleys or ball-bearings shall be provided in every double channel Unless otherwise specified the particulars of collapsible gate shall be as under.
  - (a) Pickets : These shall be of 20 mm. M.S. channels of heavy sections unless otherwise shown on drawings. The distance centre to centre of pickets shall be 12 cms .with an opening or 10 Cms
  - (b) Pivoted M.S. flats shall be 20 mm x6 mm
  - (c) Top and bottom guides shall be from tee of flat iron of approved size.
  - (d) The fittings like stoppers fixing, locking cleats, brass handles and cast iron rollers shall be of approved design and size

#### **M-34. Welded Steel Wire Fabric**

- 34.1 Welded steel wire fabric for general purpose shall be manufactured form cold drawn steel wire "as drawn" or galvenised steel conforming to I.S. 226-1975 with longitudinal and transverse wire securely

connected at every intersection by a process of electrical resistance welding and conforming to I.S.4948-1974. it shall be fabricated and finished in workmanlike manner and shall be free from injurious defects and shall be rust proof The type of mesh shall be oblong or square as directed The mesh sizes and sizes if wire for square 3b well as oblong welded steel wire fabric shall be as directed The steel wire fabric in panels shall be in one whole piece in each panel as far as stock sizes permit.

**M-35 Expanded Metal Sheets**

- 35.1.** The expanded metal sheets shall be free from flaws joints broken strands laminations and other harmful surface defects. Expanded metal steel sheet shall conform to IS-412-1975. except that blank sheets need not be with guaranteed mechanical properties The size of the diamond mesh of expanded metal and dimensions of strands (width and thickness) shall be as specified. The tolerance on nominal weight of expanded metal sheets shall be of + 10 percent.
- 35.2.** Expanded metal in panels shall be in one whole piece in each panel as far as stock sizes permit. The expanded metal sheets shall be coated with suitable protective coating to prevent corrosion.

**M-36. Mild Steel Wire ( Wire Gauze Jali )**

- 36.1.** Mild steel wire may be galvanized as indicated. All finished steel wire shall be well cleanly drawn to the dimensions and size of wire as specified in item. The wire shall be sound free from splits surface flaws, rough jagged and imperfect edges and other harmful surface defects and shall conform to I.S. 280-1978.

**M-37. Plywood**

- 37.1.** The plywood for general purpose shall conform I.S. 303-17-1975.  
Plywood is made by cementing together than boards or starts of wood into panels. There are always an odd number of layers, 3,5,7,9, ply etc. The piles are placed so that grain of each layer is at right angles to the grain in the adjacent level.
- 37.2.** The chief advantages of plywood a single board of the same thickness is the more uniform strength of the plywood, along the length and width of the plywood and greater resistance to cracking and splitting with change in moisture content.
- 37.3.** Usually synthetic resins are used to gluing, phenolic resins are usually cured in a hot press which compresses and simultaneously heats the plies between hot plates which maintain a temperature of 90 degree C to 140 degree C and a pressure of 11 to 14 Kg/ Sq. Cm on the wood. The time of heating may be anything from 2 to 60 minutes depending upon thickness
- 37.4.** When water glue are used the wood absorbs so much water that the finished plywood must be dried carefully. When synthetic resins are used as adhesive the finished plywood must be exposed to an atmosphere of controlled humidity until the proper amount of moisture has been absorbed.
- 37.5.** According to I.S. 303-1975 the plywood for general purpose shall be of the grades namely BWR, WWR and CWR depending up to the adhesives used for bonding the veneers and it will be further classified into six types namely AA, AB, AC, BB, BC and CC based on the quality of the two faces each face being of three kinds namely A, Band C After pressing, the finished plywood should be reconditioned to a moisture content not less than 8 percent and not more than 16 percent.
- 37.6.** Thickness of plywood Boards

Board	Thickness	Board	Thickness	Board	Thickness	Board	Thickness
3 Ply	3 mm	5 Ply	5 mm	7 Ply	9 mm	9 Ply	16 mm
	4 mm		6 mm		13 mm		19 mm
	5 mm		8 mm		16 mm	11 Ply	19 mm
	6 mm		9 mm	9 Ply	13 mm		25 mm

**M-38. Glass**

**38.1.** All glass shall be of the brief quality, free from specks, bubbles, smokes veins, air holes blisters and other defects. The kind of glass to be used shall be as mentioned in the item or specification or in the special provision or as shown in detailed drawings. Thickness of glass panes shall be uniform. The specifications for different kinds of glass shall be as under.

**38.2. Sheet Glass**

**38.2.1.** In absence of any specified thickness or weight in the item or detailed specifications of the item of work, sheet glass shall be weighing 7.5 Kg/Sq. m for panes up to 600 mm x 600 mm.

**38.2.2.** For panes larger than 600 mm x 600 mm and up to 800 mm x 800 mm the glass weighing not less than 8.75 Kg/Sq m shall be used for bigger panes up to 900 mm x 900 mm. glass weighing not less than 8.75 Kg/Sq. m shall be used. For bigger panes up to 900 mm x 900 mm. glass weighting not less than 11.25 Kg/Sq. m. shall be used

**38.2.3.** Sheet glass shall be patent flattened glass of best quality and for glazing and framing purposes shall conform to I.S. 1761-1960. Sheet glass of the specified colours shall be used, if so shown, on detailed drawings or so specified For important buildings and for panes with any dimension over 900 mm plate glass of specified thickness shall be used

**38.3. Plate Glass:**

**38.3.1.** When plate glass is specified it shall be "polished patent plate glass" of best quality It shall have both the surface ground flat and parallel and polished to obtain clear undisturbed vision and reflection The plate glass shall be of the thickness mentioned in the item or as shown in the detailed drawing or as specified. In absence of any specified thickness, the thickness of plate glass to be supplied shall be 6 mm. and a tolerance of 0.20 mm shall be admissible

**38.4. Obscured Glass:**

**38.4.1.** This type of glass transmits light so that vision is partially or almost completely obscured. Glass shall be plain rolled, figured, ribbed or fluted, or frosted glass as may be specified as required. The thickness and type of glass shall be as per details on drawings or as specified or as directed

**38.5. Wired Glass:**

**38.5.1.** Glass shall be with wire netting embedded in a sheet of planet glass. Electrically welded 13 mm Georgian square mesh shall be used Thickness of glass shall not be less than 6 mm Wired glass shall be of type and thickness as specified

**M-39. Acrylic Sheets**

**39.1.** Acrylic sheets shall be of thickness as specified in the item and of an specified shape and size as the case may be panels may be flat or curved It should be light in weight it shall be colourless or coloured or opaque as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Its light transmission rate shall be about 95% Transparency shall not be affected for the sheets of larger thickens, it shall be extremely resistant to sunlight weather and low temperatures. It shall not sow any significant yellowing or change in physical properties or loss of light transmission over a longer period of use. The sheet shall be impact resistant also Sheets should be of such quality that they can be cut, bent jointed as desired Solution for the joints shall be used as per the requirement of manufacturer.

**M-40. Particle board**

**40.1.** The particle boards used for face panels shall of best quality free from any defects. "I he particle boards shall be made with phenolmaldehyde adhesive The particle boards shall conform I S 3087-1905

"Specification for wood particle board for general purpose" The size and the thickness shall be as indicated.

**M-41. Expanded polystyrene or framed styroper slabs**

41.1. The expanded polystyrene ceiling boards and tiles shall be of approved make and shall be of sizes, thickness, finish and colour as indicated. It shall be of high density and suitable for use as insulating material. The insulating material shall be like slabs of Thermocole etc.

**M-42. Resin bonded fiber glass.**

42.1. The resin bonded fiber glass tiles or rolls shall be of approved make and shall be of sizes. thickness and finish as indicated.

42.2. For test of Mineral wool thermal insulation [Blanket I S 3144-1965 shall be followed

42.3. Insulation wool blanks shall be with the following coverings on one or both sides as indicated

(1) Bituminous Hessian Kraft paper suitable for use in position where moisture has to be excluded.

(2) Hessian cloth or Kraft paper for keeping out dust

(3) G.I wire netting, suitable for surfaces to be plaster over

**M-43. Fixtures and fastenings**

**43.1. General:**

43.1.1. The fixtures and fastenings, that is butt hinges tee and strap hinges sliding door bolts, tower bolts, door latch, bath-room latch, handles door stoppers, casement window fasteners, casement stays and ventilators catch shall be made of the metal as specified in the item or its specification.

43.1.2. They shall be of iron, brass, aluminum chromium plated iron, chromium plated brass, copper oxidised iron, copper oxidised brass or anodised aluminum as specified

43.1.3. The fixtures shall be heavy medium or light type. The fixtures and fastenings shall be smooth finished and shall be such as will ensue ease of operations.

43.1.4. The samples of fixtures and fastenings shall be got approved as regards, quality and shape before providing them in position.

43.1.5. Brass and anodised aluminium fixtures and fastenings shall be bright finished

**43.2. Holdfasts:**

43.2.1. Holdfasts shall be made from mild steel flat 30 cm length and one of the holdfasts shall be bent at right angle and two nos. of 6 mm. diameter holes shall be made in it for fixing it to the frame with screws. At the other end, the holdfast shall be forked and bent at right angles in opposite directions.

**43.3. Butt hinges:**

43.3.1. Railway standard heavy type butt hinges shall be used when so specified

43.3.2. Tee and strap hinges shall be manufactured from M S Sheet

**43.4. Siding door bolts (Aldrops):**

43.4.1. The aldrops as specified in the item shall be used and shall be got approved.

**43.5. Tower bolts (Barrel Type):**

43.5.1. Tower bolts as specified in the item shall be used and shall be got approved

**43.6. Door Latch:**

43.6.1. The size of door latch shall be taken as the length of latch.

**43.7. Bathroom Latch:**

43.7.1. Bathroom latch shall be similar to tower bolt.

**43.8. Handle:**

The size of the handles shall be determined by the inside grip length of the handles. Handles shall have

a base plate of length 50 mm. more than the size" of the handle.

**43.9. Door Catch:**

**43.9.1.** Door stoppers shall be either floor door stopper type or door catch type Floor stopper shall be of overall size as specified and-shall have a rubber cushion.

**43.10. Door Stoppers:**

**43.10.1.** Door catch shall be fixed at a height to about 900 mm from the floor level such that one part of the catch is fitted on the inside of the shutter and the other part is fixed in the wall with necessary wooden plug arrangements for appropriate fixity The catch shall be fixed 20 mm inside the face of the door for easy operation of catch.

**43.11. Wooden Door Stop with hinges:**

**43.11.1.** Wooden door stop of size 100 mm x 50 mm x 40 mm shall be fixed on the door frame with a hinges of 75 mm. size and at a height of 900 mm. from the floor level The wooden door stop shall be provided with 3 coats of approved oil paint

**43.12. Casement Window Fastener:**

**43.12.1.** Casement window fastener for single leaf window shutter shall be left or right handed as directed.

**43.13. Casement stays (Straight Red Stay):**

**43.13.1.** The stays shall be made from a channel section having three holes at appropriate position so that the window can be opened either fully or partially as directed. Size of the stay shall be 250 mm to 300 mm. as directed.

**43.14. Ventilator Catch:**

**43.14.1.** The pattern and shape of the catch shall be as approved

**43.15. Pivot:**

**43.15.1.** The base and socket plate shall be made from minimum 3 mm. thick plate: and projected pivot shall not be less than 12 mm 'diameter and 12 mm. length and shall be firmly riveted to the base plate in case of iron pivot and in single piece plate in the case of brass pivot.

**M-44. Paints:**

**44.1. (A) Oil paints :**

**44.1.1.** Oil paints shall be of the specified colour and as approved. The ready mixed paints shall only be used. However, if ready mixed paint of specified shade or tint is not available white ready mixed paint with approved stainer will be allowed In such a case the contractor shall ensure that the shade of the paint so allowed shall be uniform.

**44.1.2.** All the paints shall meet with the following general requirements.

(i) Paint shall not show excessive setting in a freshly opened full can and shall easily be ready spread with a paddle to a smooth homogeneous state. The paint shall show no curdling, levering caking or colour separation and shall be free from lumps and skins.

(ii) The paint as received shall brush easily, possess good leveling properties and show no running or sagging tendencies.

(iii) The paint shall not skin within 48 hours in a three quarters filled closed container.

(iv) The paint shall dry to a smooth uniform finish free from roughness, grit unevenness and other imperfections.

**44.1.3.** Ready mixed paint shall be used exactly as received from the manufacturers and generally according to their instructions and without any admixtures whatsoever

**44.2. (B) Enamel paints:**

- 44.2.1.** The enamel paint shall satisfy in general requirements in specification of oil paints, Enamel paint shall conform to I.S. 2933-1975.

**M-45. French Polish**

- 45.1.** The French polish of required tint and shade shall be prepared with the below mentioned ingredients and other necessary materials:  
(i) Denatured spirit of approved quality (ii) Chandras (iii) Pigment.
- 45.2.** The French polish so prepared shall conform to I S : 348-1 9C8.

**M-46. Marble chips for marble mosaic terrazzo**

- 46.1.** The marble chips shall be of approved quality and shades. It shall be hard, sound, dense and homogeneous in texture with crystalline and coarse grains It shall be uniform in colour and free from stains cracks, .decay and weathering.
- 46.2.** The size of various colours of marble chips ranging from the smallest up to 20 mm shall be used where the thickness of top wearing layer is 6 mm size The marble chips of approved quality and colours only as per grading as decided by the Engineer-in-charge shall be used for marble mosaic tiles or works.
- 46.3.** The marble chips shall be machine crushed. They shall be free from foreign matter, dust etc. Except as above, the chips shall conform to I S 2114-1962

**M-47. Flooring Tiles****47.1. (A) Plain Cement tiles;**

- 47.1.1.** The plain cement tiles shall be of general purpose type. These are the tiles in the manufacture of which no pigments are used. Cement used in the manufacture of tiles shall be as per Indian Standards.
- 47.1.2.** The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture the tiles shall be subjected to pressure of not less than 140 Kg/Sq. Cm. The proportion of cement to aggregate in the backing of the tiles shall be not less than 1 .3 by weight The wearing face, through the tiles are of plain cement, shall be provided with stone chips of 1 to 2 mm. size. The proportions of cement to aggregate in the wearing layer of the tiles shall be three parts of cement to one parts chips by weight. The minimum thickness of wearing layer shall be 3 mm. The colour and texture of wearing layer shall be uniform throughout its face and thickness. On removal from mould, the tiles shall be kept in moist condition continuously at least for seven days and subsequently, if necessary, for such long period as would ensure their conformity to requirements of I.S.1237-1980 regarding strength resistance to wear and water absorption.
- 47.1.3** The wearing face of the tiles shall he plane, free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right angle and all edges shall be sharp and true.
- 47.1.4.** The size of tiles generally be square shapes 24.85 Cm x24.85 Cm. or 25 Cm x 25 Cm The thickness of tiles shall be 20 mm.
- 47.1.5.** Tolerance of length and breadth shall be plus of minus one millimeter Tolerance on thickness shall be plus 5mm.
- 47.1.6.** The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S 1237-1980.
- 47.2. (B) Plain Coloured Tiles:**
- 47.2.1.** The tiles shall have the same specification as for plain cement tiles as per (A) above expect that they shall have a plain wearing surface wherein pigments are used. They shall conform it I.S. 1237-1980.

**47.2.2.** The pigments used for colouring cement shall not exceed 10 percent by weight of cement used in the mix. The pigments, synthetic or otherwise, used for colouring tiles shall have permanent colour and shall not contain materials detrimental to concrete

**47.2.3** The colour of the tiles shall be specified in the item or as directed

**47.3. (C) Marble mosaic tiles:**

**47.3.1.** These tiles have same specification as per plain cement tiles except the requirements as stated below.

**47.3.2.** The marble mosaic tiles shall conform to I.S 1237-1980. The wearing face of the tiles shall be mechanically ground and filled. The wearing face of tiles shall be free from projections depressions and cracks and shall be reasonably parallel to the back face of the tiles. All angles shall be right angles and all edges shall be sharp and true.

**47.3.3.** Chips used in the tiles be from smallest up to 20 mm. size. The minimum thickness of wearing layer of tiles shall be 6 mm. For pattern of chips to be had on the wearing face; a few samples with or without their full size photographs as directed shall be approved by the Engineer-in-charge, for approval.

**47.3.4.** Any particular samples if found suitable shall be approved by the Engineer-in-charge, or he may ask for a few more samples to be presented The samples shall have to be made by the contractor till a suitable sample is finally approved for use in the work. The Contractor shall ensure that the tiles supplied for, the work shall be in conformity with the approved sample only, in terms of its dimensions, thickness of backing layer and wearing surface, materials, ingredients, colour, shade, chips, distribution etc. required.

**47.3.5.** The tiles shall be prepared from cement conforming to Indian Standards or coloured port land cement generally depending upon the colour of tiles to be used or as directed.

**47.4. (D) Chequered Tiles :**

**47.4.1.** Chequered tiles shall be plain cement tiles or marble mosaic tiles. The former shall have the same specification as per (A) above and the latter as per marble mosaic tiles as per (C) except as mentioned below

**47.4.2.** The tiles shall be of nominal size of 250 mm. x 250 mm. or as specified. The centre to centre distance of chequer shall not be less than 25 mm. and not more than 50 mm. The overall thickness of the tile shall be 22 mm

**47.4.3.** The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3 mm. The chequered tiles shall be plain coloured or mosaic as specified The thickness of the upper layer measured from the top of the chequers shall not be less than 6 mm. The tiles shall be given the first grinding with machine before delivery to site.

**47.4.4.** Tiles shall conform to relevant I.S 1237-1980. 47.5.

**47.5. (E) Chequered Tiles For Stair Cases :**

**47.5.1.** The requirements of these tiles shall be the same as chequered tiles as per (D) above except in following respects :

- (1) The length of a tile including nosing shall be 300 mm
- (2) The minimum thickness shall be 28 mm
- (3) The nosing shall have also the same wearing layer as at the top.
- (4) The nosing edge shall be rounded
- (5) The front portion of the tile for a minimum length of 75 mm. from and including the nosing shall have grooves running parallel to nosing and at centers not exceeding 25 mm Beyond that the tiles shall have normal chequer pattern.

**M-48. Rough Kotah Stone**

**48.1.** The Kotah stones 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.

- 48.2. The size of the stones to be used for flooring shall be of size 600 mm x 600 mm and/or size 600 mm. x 450 mm as directed However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified
- 48.3. The edges 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  $\pm 3$  mm
- 48.4. 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 from chipping and surface shall be true and plain.
- 48.5. 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

**M-49. Polished Kotah Stoics**

- 49.1. Polished kotah stone shall have the same specification as per rough kotah stone except as mentioned below :
- 49.2. 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

**M-50. Dholpur Stone Slab**

- 50.1. Dholpur stone slab shall be of best quality as approved by the Engineer-in-charge. The stone slab shall be without any veins, cracks, and flaws The stone slab shall be even sound and durable regular in shape and of uniform colour
- 50.2. The size of the stone shall be as specified in the item or detailed drawing or as approved by the Engineer-in-charge. The thickness of the stone shall be as specified in the item of work with the permissible tolerance of plus or minus 2 mm. The provision in respect of polishing as for polished kotah stone shall apply to polished Dholpur stone also. All angles and edges of the face of the stone slab shall be fine chiseled or polished as specified in the item of work and all the four edges shall be machine cut All angles and edges of the stone slab shall be true and plane.
- 50.3. The sample of stone shall be got approved by the Engineer-in-charge for a particular work It shall be ensured that the stones to be used in a particular work shall not differ much in shade or tint from the approved sample.

**M-51. Marble Slab**

- 51.1. Marble slab shall be white or of other and of best quality as approved by the Engineer-in-charge
- 51.2. Slabs shall be hard, close, uniform and homogeneous in texture. They shall have even crystalline grain and free from defects and cracks. The surface shall be machine polished to an even and perfect plane surface and edges machine cut true and square. The rear face shall be rough to provide key for the mortar.
- 51.3. Marble slabs with natural veins, if selected shall have to be laid as per the pattern given by the Engineer-in-charge.  
Size of the slab shall be minimum 460 mm x 450 mm and preferably 600 mm x 600 mm. However, smaller sizes will be allowed to be used to the extent of maintaining required pattern.
- 51.4. The slab shall not be thinner than the specified thickness at its thinnest part. A few specimens of finished

slab to be used shall be deposited by the Contractor in the office for reference

**51.5.** Except as above the marble slabs shall conform to I.S. 1130-1969

**M-52. Granite Stone slab**

**52.1.** Granite shall be of approved colour and quality. The stone shall be hard, even sound and regular in shape and generally uniform in colour. It shall be without any soft veins, cracks or flaws.

**52.2.** The thickness of the stone shall be specified in items

**52.3.** All exposed faces shall be double polished to tender truly smooth and even reflecting surface. The exposed edges and corners shall be rounded off as directed. The exposed edges shall be machine cut and shall have uniform thickness.

**M-53. P.V.C. Flooring**

**53.1.** P.V.C. sheets for P.V.C., floor covering shall be of homogenous flexible type conforming to I S 3462-1966. The P.V.C. covering shall neither develop any toxic effect while put to use nor shall give off any disagreeable odour.

**53.2.** Thickness of flexible type covering tiles shall be as specified in the description of the item

**53.3.** The flexible type shall be backed with Hessian or other woven fabric. The following tolerances shall be applicable on the nominal dimensions of the rolls or tiles :

(a) Thickness + 0.15 mm.

(b) Length or Width

(1) 300 mm. Square tiles       $\pm 0.20$  mm.      (3) 900 mm Square tiles       $\pm 0.60$  mm.

(2) 600 mm. Square tiles       $\pm 0.40$  mm.      (4) Sheets and roll       $\pm 0.10$  percent.

**53.4. Adhesive:**

**53.4.1.** The adhesive for PVC flooring shall be of the type and make recommended by the manufacturer of PVC sheets/tiles.

**M-54. Facing Tiles**

**54.1.** The facing tiles (burnt clay facing bricks) shall be free from cracks, and nodules of free lime. They shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharp straight right angled faces. The texture of the finished surface that will be exposed when in place shall conform to an approved sample consisting not less than for stretcher bricks each representing the texture desired. The facing tiles shall have a pleasing appearance, sufficient resistance to penetration by ram and greater durability than common bricks. The tiles shall conform to I.S. 2691-1972.

**54.2.** The standard size of facing brick tiles shall be 19 x 9 x 4 cms. The facing brick tiles shall be provided with frog which shall conform to I.S. 11077-1976.

**54.3.** The permissible tolerance in dimensions specified above shall be as follows:

Size	Tolerance for	
	1st Class Brick	2nd Class Brick
19 cm.	$\pm 6$ mm	$\pm 10$ mm
9 cm.	$\pm 3$ mm	$\pm 7$ mm
4 cm.	$\pm 1.5$ mm	$\pm 3$ mm

**54.4.** The tolerance for distortion or warpage of face or edges of individual brick from a plane surface and from a straight line respectively shall be as follows:

Facing dimensions	Permissible tolerance
Max. below 19 cms.	Max. 2.5 mm
- do - above 19 cm.	Max. 3.0 mm

**54.5.** The average compressive strength obtained as a sample of five tiles when tested in accordance with the procedure laid as per I S 1077-1976 shall be not less than 175 Kg/Sq Cm. The average compressive strength of any individual bricks shall be not less than 160 Kg / Sq.Cm.

**54.6.** The average water absorption for five bricks tiles shall not exceed 12 percent of average weight of brick before testing. The absorption for each individual bricks shall not exceed 25 percent.

**54.7.** The brick tiles when tested in accordance with I.S. 1077-1976, the rate of efflorescence shall not be more than "Slightly effloresced"

**M-55. White glazed tiles**

**55.1.** The tiles 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 sports chipper) edges and corners. The glazing shall be of uniform shade.

**55.2.** The tiles shall be nominal size of 150 mm x 150 mm unless otherwise, specified. The maximum variation the stated sizes other than the thickness of tile shall be plus or minus 1.5 mm. The thickness of tile shall be 6 mm. Except as above the tiles shall conform to I.S. 1977-19/0.

**M-56. Galvanised from pipes and fittings**

**56.1.** Galvanised iron pipes shall be of the medium type and or required diameter and shall comply with I.S. 1239-1979. The specified diameter of the pipes shall refer to the inside diameter of the bore, clamps, screw and all galvanised iron fittings shall be of the standard 'R' or equivalent make.

**M-57. Bib cock and stop cock**

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

**57.2.** They shall be of 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.

**57.3.** 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.

**M-58. Gun metal wheel valve**

**58.1.** The gun metal wheel valve shall be of approved quality. These shall be of gun metal fitted with wheel and shall be of gate valve opening full way and of the size specified. These shall conform to I.S. 778-1971.

**M-59. White glazed porcelain wash basin**

**59.1.** Wash basin shall be of white porcelain first quality best Indian make and it shall conform to I.S. 2556 (Part -IV) -1972 and I.S. 771-1979. The size of the wash basin shall be as specified in item. Wash basin shall be of one piece construction with continued over flow arrangements All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole as specified. Each basin shall have a circular waste hole which is either riveted or beveled internally with 65 mm. diameter at top

and 10 mm. depth to suit the waste fitting. The necessary stud slot to receive the bracket on the under side of the basin shall be provided Basin shall have an internal soap holder which shall fully drain into the bowl.

- 59.2.** White glazed pedestal of the quality and colour as that the basin shall be provided where specified in the item. It shall be completely recessed at the back for reception of supply and wash pipe. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from the floor the floor to top of the rim of basin 750 mm. to 800 mm. as directed.

**M-60. European type water closet/with low flushing**

- 60.1.** The European type water closet shall be white glazed porcelain first quality and shall be of wash down type conforming to I.S. 2556-1973 and I.S. 771-1979.
- 60.2.** 'S' trap shall be provided as required with water seal not than 50 mm. The solid plastic seat and cover shall be of best Indian make conforming to I.S 2548-1980. They shall be made of moulded synthetic materials which shall be tough and hard with high resistance to solvents and shall be free from blisters and surface defects and shall have chromium plated brass hinges and rubber buffer of suitable size.

**M-61. Orrissa type water closet**

- 61.1.** The Specification of Orrissa type white glazed water closet of first quality shall conform to I.S. 2256 (Part-III) -1981 and relevant specification of Indian type water closet except that pan will be with the integral squatting pan of size 580 mm x 400 mm with raised footrest.

**M-62. Indian type water closet**

- 62.1.** The Indian type white glazed water closet of first quality shall be of size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556 – (Part-II) 1981. Each pan shall have integral flushing. It shall also have an inlet at black an or front for connecting flush pipes as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 'S' trap with approximately 50 mm. Water seal and 50 mm. diameter vent horn.

**M-62. A. Foot Rests**

- 62.A.1.** A pair of whit glazed earthen ware rectangular foot to minimum size 250 mm. x 130 mm. x 20 mm shall be provided with the water closet.

**M-63. Glazed Earthen Ware Sink**

- 63.1.** The glazed earthen-ware sink shall be of specified size, colour and quality. They sink shall conform, to I.S. 771 Part – II – 1979. The brackets for sinks shall conform to I.S 775-1970.
- 63.2.** The pipes shall conform to I.S. 1239-part-I 1973 and I.S. 404-1962 for steel and lead pipes respectively. 32 mm. brass waste coupling of standard pattern with brass chain and rubble plug shall be provided with sink.

**M-64. Glazed earthen-ware Lipped type flat back urinal/corner type urinal**

- 64.1.** The lipped type urinal shall be fiat back or corner type as specified in the item and shall conform to I.S 771-1979. It shall be of best Indian make and size as specified and approved by the Engineer-in-charge. The flat back of corner type urinal must be of 1st quality free from any defects, cracks etc.

**M-65. Low level Enamel flushing tank**

- 65.1.** The low level enamel flushing tank shall be of 15 liters capacity. It shall conform of I S 774-1971. The flushing cistern shall be of best quality and free from any defects. The flushing tank shall have outlet 32 mm. diameter. The outlet shall be connected with W.C. pan by lead pipe or P.V.C. pipe as specified. The flushing tank shall be provided with inlet and outlet for fixing G.I. inlet pipes and over-flow pipes.

The flushing cistern shall be provided with chromium plated handle for flushing The flushing tank shall be provided with bracket of cast iron so that it can be fixed on wall at specified height. The brackets shall conform to I.S. 775-1970.

**M-66. Cast iron flushing cistern.**

**66.1.** The cast iron flushing cistern shall be of 15 liters capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality free from any defects. The flushing cistern shall have outlet of 32 mm diameter. The lead pipe shall conform to I.S 404 (Part-I) - 1962; For fixing G.I. inlet pipes and overflow pipe 20 mm. dia. inlet and outlet shall be provided The flushing cistern shall be provided with galvanised iron chain and pull of sufficient length and shall be got approved from the Engineer-in-charge. The cast iron flushing cistern shall be painted with one coat of anticorrosive paint and two coats of paints The flushing cistern shall be fixed on two C I brackets The C I brackets shall conform to I S 775-1970.

**M-67. Flush cock**

**67.1.** Half turn flush cock (Heavy weight) shall be of gun metal chromium plated of diameter as specified in the description of the item. The flush cock shall conform to relevant Indian Standard.

**M-68. Cast iron pipes and fittings.**

**68.1.** All soil water, vent and anti syphonage pipes and fitting shall conform to I S.1729-1964. The pipes shall have spigot and socket ends with head on spigot end. The pipes and fitting shall be true to shape smooth, cylindrical, their inner and outer surfaces being as nearly as practicable concentric. They shall be sound and nicely cast and shall be free from cracks, laps, pinholes or there imperfection and shall be neatly dressed and carefully fettled.

**68.2.** The end of pipes and fittings shall be reasonable square to their axis.

**68.3.** The sand of cast iron pipes shall be of the diameter as specified in the description and shall be in lengths of 1.5 M., 1.8 M. including socket ends of the pipe unless shorter lengths are either specified or required at junctions etc. The pipes and fittings shall be supplied without ears unless specified or directed otherwise.

**68.4. Tolerances :**

**68.4.1.** The Standard weights and thickness of pipes shall be as shown in the following table A tolerance up to minus 10 per cent may however be -allowed against these standard weights

Sr. No.	Nominal dia. of Bore	Thickness	Overall	Weight of Pipe	
			1.5 m long	1.8 m long	excluding ears 2 m. long
1.	75 mm	5.0 mm	12.83 Kg.	16.52 Kg.	18.37 Kg.
2.	100 mm	5.0 mm	18.14 Kg.	21.67 Kg.	24.15 Kg.

**68.4.2.** A tolerance up to minus 15 percent in thickness and 20 mm. length will be allowed For fittings tolerance in lengths shall be plus 25 mm. and minus 10 mm.

**68.4.3.** The thickness of fittings and their socket and spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes. The tolerance in weights and thickness shall be the same as for straight pipes.

**M-69. Nahni Trap**

**69.1.** Nahni trap shall be of cast iron and shall be sound and free from porosity or other defects which affect serviceability The thickness of the base metal shall not be less than 6.5 mm The surface shall be smooth and free .form craze, chips and other flaws or any other kind of defects which affect

serviceability The size of nahn trap shall be specified and shall be of self cleaning design.

**69.2.** The Nahni trap shall be of-quality approved by the Engineer-in-charge and shall generally conform to the relevant Indian Standards.

**69.3.** The Nahni trap provide shall be with deep seal, minimum 50 mm. except at places where trap with deep seal cannot be accommodated. The cover shall be cast iron perforated cover shall be provided on the trap of appropriate size.

**M-70. Gully Trap**

**70.1.** Gully trap shall conform to I.S. 651-1980. It shall be some, free from defects such as fire-cracks or hair cracks. The glaze of the traps shall be free from crazing. They shall give a sharp clear note when struck with light hammer. There shall be no broken blisters.

**70.2.** The size of the gully trap shall be as specified in the item.

**70.3.** Each gully trap shall have one C.I. grating of square size corresponding to the dimensions, of inlet of gully trap. It will also have a water tight C.I. cover with frame inside dimensions 300 mm. x 300 mm. the cover with frame inside dimensions 300 mm. x 300 mm. the cover and weighing not less than 4.53 Kg. and the frame not less than 2.72 Kg. The grating cover and frame shall be of sound and good casting and shall have truly square machined seating faces.

**M 71. Glazed Stone Ware pipe And Fittings**

**71.1.** The pipes and fittings shall be of best quality as approved, by the Engineer-in-charge. The pipe shall be of best quality manufactured from stone- ware of fire clay, salt glazed thoroughly burnt through the whole thickness, of a close, even texture, free from air blows, fire blisters, cracks and other imperfections, which affect the serviceability. The inner and outer surfaces shall be smooth and perfectly glazed. The pipe shall be capable to withstand pressures or 1.5 M lead without showing sign of leakage. The thickness of the wall shall not be less than 1/12th of the internal dia. The depth of socket shall not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm. around the pipe.

**71.2.** The pipes shall generally conform to relevant I S 651-1980.

**M-72. Wall Peg Rail**

**72.1.** The aluminum wall peg rail shall have three aluminum pegs approved quality and size. It shall be fixed on teakwood plank of size 450 mm x 75 mm x 20 mm. The teakwood shall be French polished or oil painted as specified.

**M-73. G.I. Water Spot**

**73.1.** The G.I. pipes of 40 mm dia shall be of medium quality and specials shall be of 'R' brand or equivalent brand of best approved quality

**73.2.** The pipe shall have length as required for the thickness of wall in which it is fixed and at outside end tee bend cut at half the length shall be provided and at other end coupling shall be provided to have better fixing. The water spout shall be provided as per detailed drawing or as directed.

**M-74. Asbestos Cement pipe (A.C. pipe)**

**74.1.** The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. 1626-1980. Special like bends, shoes, cowls, etc. shall conform to relevant Indian Standards. The interior of pipe shall have is smooth finish, regular surface and regular internal diameter. The tolerance in all dimensions shall be as I.S. 1626-part-I-1980.

**M-75. Crydon Ball valve**

**75.1.** Ball valve of screwed type including polythene float and necessary level etc shall be of the size as

mentioned in the description of item and shall conform to I.S 1703-1977

**M-76. Bitumen Felt For Water proofing And Damp Proofing**

- 76.1.** Bitumen felt shall be on the fiber bases and shall be of type 2, self finished felt grade-2 and shall conform to I.S. 1322-1970

**M-77. Selected Earth**

- 77.1.** The selected earth shall be that obtained from excavated material or shall have to be brought from outside as indicated in the items. If item does not indicate anything the selected earth shall have to be brought from outside.
- 77.2.** The selected earth shall be good yellow soil and shall be got approved from the Engineer-in-charge. In no case black cotton soil or similar expansive and shrinkable soil shall be used. It shall be clean and free from all rubbish and perishable materials, stones or brick bats. The clods shall be broken to a size of 50 mm or less. Contractor shall make his own arrangement at his own cost for land for borrowing selected earth. The stacking of material shall be done as directed by the Engineer-in-charge in such a way not to interfere with any construction activities and in proper stacks.
- 77.3.** When excavated material is to be used only selected stuff got approved from the Engineer-in-charge shall be used. It shall be stacked separately and shall, comply with all the requirements of selected earth mentioned above.

**M-78. Barbed Wire**

- 78.1.** The barbed wire shall be of galvanized steel and it shall generally conform to I.S. 278-1978. The barbed wire shall be of types-I whose nominal diameter for line wire shall be 2.5 mm. and point wire 2.24 mm. The nominal distance between two barbs shall be 75 mm unless otherwise specified in the item. The barbed wire shall be formed by twisting together two line wires. One containing the barbs. The size of the line and point wires and barb spacing shall be as specified above. The permissible deviation from the nominal diameter of the line wire and point wire shall not exceed  $\pm 0.08$  mm
- 78.2.** The barbs shall carry four points and shall be formed by twisting two point wires, each two turns tightly round one line wire making altogether four complete turns. The barbs shall have a length of not less than 13 mm and not more than 18 mm. The point shall be sharp and cut at an angle not greater than 35 degree of the axis of the wire forming the barbs.
- 78.3.** The line and point wires shall be circular in section, free from scale and other defects and shall be uniformly galvanized. The line wire shall be in continuous length and shall not contain any welds other than those in the rod before it is drawn. The distance between two successive splices shall not be less than 15 meters.
- 78.4.** The lengths per 100 Kg. of barbed wire I.S. type I shall be as under:
- |                    |                   |                     |
|--------------------|-------------------|---------------------|
| Nominal 1000 meter | Minimum 934 meter | Maximum 1066 Meter. |
|--------------------|-------------------|---------------------|

## **ITEM NO.1**

**Excavation for foundation up to 1.5 M Depth including sorting out and stacking of useful materials and disposing of the excavated stuff up to 50 meter lead (B) Dense or hard soil**

### **1.0 GENERAL**

**1.1** Any soil which generally yields to the application of pickaxes and shovels phawarh as takes or any such ordinary excavating implement or organic soil gravel silt sand turf loan clay peat etc fall under this category

**1.2.** Excavation for structures shall consist of the removal of material for the construction of Buildings, in accordance with the requirements, of these specifications and the lines and dimensions shown on the drawings or as indicated by the Engineer-in-charge. The work shall be include all necessary sheeting, shoring, bracing, draining and pumping and the removal of all logs, stumps, shrubs and other deleterious matter and obstruction necessary for the foundations, trimming bottoms of excavations; back filling and clearing up the site and the disposal of all surplus material.

**1.3.** The depth to which the excavation is to be carried out shall be is shown on the drawings, unless the type of materia1s. encountered is such as to required changes, in which case the depth shall be as ordered by the Engineer-in-charge.

**1.4.** Excavation shall be taken to the with of the lowest step of the footing. The contractor at his own expense shall put up necessary shoring, strutting and planking or cut slopes to a safer angle or both with due regard to the safety of personal and works and to the satisfaction of the Engineer-in-charge.

**1.5.** 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, 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 approval of the Engineer-in-charge. Approval of the Engineer-in-charge shall, however not relieve the contractor of the responsibility for *the* adequacy of dewatering, and production arrangements and for the quality and safety of the works.

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

**1.7.** The bottom of the foundation shall be leveled both longitudinally and transversely or stepped as directed by the Engineer-in-charge. Before foundation concrete 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-in-charge, the extra depth shall be made up with concrete or masonry of the foundation grade, at the cost of the contractor. Ordinary filling shall not be used for the purpose to bring the foundation to level if there are any slips or blows is the excavation, these shall be removed by the contractor at his own cost.

**1.8.** Near towns, villages and all frequented places, trenches and foundation pits shall be securely fenced, provided with proper caution sings 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

**1.9.** Back filling shall be done with approved materials 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, making due allowance for settlement in 250mm loose layers, which shall be watered and compacted.

**1.10.** All the excavated materials shall be the property of the Government. Where the excavated material is to be used in the filling of plinth, it shall be directly deposited at the required location, within 100 meters lead.

**1.11.** All useful materials not intended for use in the filling, shall be stacked neatly on Government land as directed by the Engineer-in-charge within 100 meters lead. Unsuitable and surplus materials not intended for use shall be disposed off as directed by the Engineer-in-charge

## **2.0 CLEANING SITE**

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

## **3.0 WORKMAN SHIP**

**3.1.** After the site has been cleared the limits of excavation shall be set out true to lines, curves, slopes, grades and sections as shown on the drawings or as directed by the Engineer-in-charge. 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 mark, centre line stones and other marks and stakes as long as in the opinion of the Engineer-in-charge, they are required for the work.

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

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

## **4.0. SETTING OUT**

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

## **5.0. DISPOSAL OF THE EXCAVATED STUFF**

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

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

## **6.0 MODE OF MEASUREMENT & PAYMENT :**

**6.1.** Excavation for structures shall be measured in cubic meters for each class of materials encountered, limited to the dimensions shown on the drawing or as directed by the Engineer-in-charge. Excavation over increased width cutting of slopes, shoring, shuttering and planking shall be deemed as convenience for the contractor in executing the work and shall not be measured and paid for separately.

The contract under rate for the items of excavation for structures shall be paid in full for carrying out the required operations including:

1. Setting out and fixing bench marks and centre lines stones.
2. Construction of necessary shoring and bracing and their subsequent removal.
3. Removal of all logs, stumps, grubs and other deleterious matter and obstructions for placing the foundations including trimming of bottoms of excavations;
4. Foundation sealing, dewatering including pumping;
5. Back filling ,clearing up the site and disposal of all surplus material within all lifts and lead up to 100 meters;
6. All labour, materials, tools equipment, safeguards and incidentals necessary to complete the work to the specification.

**6.2.** Excavation shall be for soil such as vegetation or organic soil, turf, sand, silt, loam, clay, mud, black cotton soil, soft shale or soft murrum, a mixture of these and similar material which yields to the ordinary application of pick and shovel, or other ordinary digging equipment Removal of gravel or any other nodular material having diameter in anyone direction not exceeding 75mm. occurring in such strata shall be deemed to be covered under this category. The classification of excavation shall be decided by the Engineer-in-charge and his decision shall be final and binding on the contractor.

**6.2.** The excavation work shall be measured for its length breadth and depth, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one cubic meter.

**6.3.** The payment will be made on Cubic Meter basis of the finished work.

## **ITEM NO.2**

**Providing and laying cement concrete 1:3:6 (1 Cement : 3 coarse sand :6 crushed stone aggregates 40 mm nominal size) and curing complete excluding cost of form work in(A) Foundation and plinth**

### **Materials**

#### **Water**

1.1 Water shall not be salty brackish and shall be clean reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R C C container for transport storage and huddling of water shall be clean, Water shall confirm to the standard specified in I S 455 -1978

1.2 If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness change in time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

1.3 Water for curing mortar concrete or masonry should not be too acidic or too alkaline

1.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

1.5 Hard and bitter water shall not be used for curing

1.6 Potable water will generally found suitable for curing mortar or concrete

### **2.0 Cement**

2.1 Cement shall be ordinary Portland slag cement as per IS 1624 -1974 or Portland slag cement as per IS 455-1976

2.2 Cement shall be stored above the ground level in perfectly dry and water tight sheds. Wherever bulk storage containers are used, their capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock-piles sufficiently away from the each other to prevent intermixing the materials.

### **3.0 Sand**

Sand shall be natural sand, clean well graded, hard strong durable and gritty particular free from immures amounts of dust, clay, kankar modules, soft: or flaky particles shall alkali salts, organic matter, learn mica or other deleterious substance and shall be got approved from the Engineer-in-charge. The sand shall not contain more than 8 percent of slit as determined by field test. if necessary the sand.

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

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
4.75 mm	100
2.3 6mm	. 100
1.18 mm	75 to 100
600 MC	40 to 85
300 MC	05 to 50
150 MC	00 to 10

#### 4.0 Stone Coarse aggregate for Nominal mix concrete:

Coarse aggregate shall be machine crushed stone of black trap and hard, strong, dense, durable, clean and free from disintegrated pieces, organic and other deleterious matter. .

The aggregate shall be generally be cubical in shape unless special stones of particular quarries are mentioned. Aggregate shall be machine crushed from the best black trap. Aggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement concrete and ordinary reinforced cement shall generally as per the table given below

IS Sieve designation	% passing for single sized aggregate of nominal size		
80mm			
63 mm	100	-	-
40mm	85-100	100	0
20mm	0-20	85-100.	100
16mm	-	-	85-100

IS Sieve designation	% passing for single sized aggregate of nominal size		
12.5 mm			
10mm	0.5	0.20	0.30
4.75 mm	-	0.5	0.5
2.35 mm	-	-	-

**Note:** This percentage may be varied some what by the Engineer-in-charge when considered necessary containing better and strength of concrete.

The grading test shall be taken in the beginning and at the change of source of material as indicated in I.S. 383-1970 and I.S. 456-1978. Aggregate shall be stored separately and handled in such a manner so as to prevent the intermixing diff aggregate if the aggregate are covered with dust, they shall be washed with water to make them clean.

1.6 All materials shall be stored as to prevent their deterioration of their quality and fitness for the work. Any material which has deteriorated or has been damaged or is otherwise considered defective by the Engineer-in-charge shall not be used in the work.

## Workmanship

Before starting concreting, the road of foundation trenches shall be cleared of all loose materials, leveled, watered & rammed as directed

**Mixing:** The concrete shall be mixed in a mechanical mixes. If Quantity of cement concrete is very small, after taking prior permission of Engineer in charge. Mixing shall be done on a smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water, Mixing platform shall be so arranged so that no foreign material shall get mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform, Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour. Enough water shall then be added gradually and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 per cent above that specified.

**11. For mass concrete work. :** The concrete shall be mixed in a mechanical mixer. The method of transporting and placing concrete shall be approved by the Engineer-in charge. Concrete shall be so transported and placed so that no contamination, segregations or loss of its constituent material takes place. All form work and reinforcement contained in its' 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.

12. Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding 2 meters. When chutes are used they shall be kept clean 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, kept 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 13mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the 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 the coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150mm. in thickness, and shall be well rammed against old work particular attention being given to corners and Close spots.

**Form work if required:** Form work shall include all temporary or permanent forms required for forming the concrete. Together with all temporary construction required for their support. Forms for concrete shall be constructed of metal or timber suitably lined and be of substantial and rigid construction true to shape and dimensions shown on the drawings. Where metal forms are used, all bolts and rivets shall be countersunk and well ground to provide a smooth plane surface. Where timber is used it shall be well season.

14. The Engineer-in-charge shall be informed in advance by the contractor of his intention of

strike any formwork. While fixing the time for removal of formwork, 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. Vertical forms of beams, columns and walls may be removed after 2 days. All form work shall be removed without causing any damage to the concrete.

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

16. The payment will be made on Cubic Meter basis of the finished work.

## **2.1. General**

Before casting concrete the bed of foundation trenches shall be cleared of all loose materials leveled watered and rammed as directed.

### **Proportion of Mix**

The proportion of cement sand and coarse aggregate shall be one part of cement. 5 (five) parts of sand and 10 (Ten) parts of stone aggregates and shall be measured by volume.

#### **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.

Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to be the Engineer in-charge, the first batch of concrete from the mixer 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. .

### **Transporting & Placing the Concrete:**

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.

The concrete shall be laid in layers of 15 cms to 20 cms.

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.

#### **Curing :**

After the final set, the concrete shall be kept continuously wet if required by pounding for a period of not less than 7 days from the date of placement. Hard and bitter water shall not be used for curing

**Mode of Measurement & Payment :**

The concrete shall be measured for its **length breadth** and **depth**, limiting dimensions to those specified on plan or as directed.

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

**Item No 03 :- Filling in foundation and plinth with murrum or selected soil in layers of 20cm. thickness including watering, ramming and consolidating etc. completed.**

**1.0 MATERIALS**

- 1.1. Murrum 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 clarions origin. The size of murrum shall not be more than 20 cm.

**2.0 WORKMANSHIP**

- 2.1 The murrum to be used for filling shall be free from salts, organic or other foreign matter all colds of murrum 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 in layers not exceeding 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 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 and carting murrum / or selected earth of approved quality with all lead and labour required for filling in trenches and plinth.
- 3.3 The rate shall be for a unit of one Cum. meter.

**Item No. 04 :-**

**Filling in foundation and 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**

The relevant specifications of **Item No. 3** shall be followed except that sand shall be filled in under floors, including watering, ramming, consolidating and dressing etc. complete.

**3.0. Mode of Measurements & Payment**

- 3.1.** The relevant specifications of **Item No. 3** shall be followed.
- 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 5 :-**

**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**

### **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 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, 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 raked 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 06 :- Half brick masonry in common brunt clay building bricks having crushing strength not less than 35 Kg/Sq.Cm. in Cement mortar 1:3 ( 1-Cement : 3-coarse sand ) with 2 Nos of 6mm Mild steel round bars after every three course embedded in Cement Mortar in foundation and plinth.(B) Conventional**

**.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. 5** 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 round bars shall be embedded in cement mortar.

**3.0. Mode of measurement and payment**

- 3.1. The half brick masonry work in [superstructure](#) 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. 5** shall be followed. The length shall be measured nearest to one cm.
- 3.3. The rate includes the cost of providing 2 nos. of 7mm dia. mild steel round bars after every 4th course.
- 3.4. The rate shall be for a unit of one sq. meter.

**Item No 07 :- Providing and laying controlled cement concrete M.200 work with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in for BEAMS**

**AND**

**Item No 08:- Providing and laying controlled cement concrete M.250 and curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in for COLUMNS**

**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 150 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 weight 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.	
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<b>M 150</b>	200	150
<b>M 200</b>	260	200
<b>M 250</b>	320	250
<b>M 300</b>	380	300
<b>M 350</b>	440	350
<b>M 400</b>	500	400

**Preliminary test Min.**

**Work Test Min.**

In all cases, the 28 days compressive strength specified in above be 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<sup>3</sup> in plain concrete and not less than 250 kg/m<sup>3</sup> 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 conceding 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 with stand 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 from 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, falters, 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 contract 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 form the form work of the main beam at the inter section point. No deduction shall be made form 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 includes the cost of form work.
- 10.5.** The rate shall be for a unit of **one cubic meter**.

**Item No. 9 :- Providing and laying ordinary cement concrete 1:2:4 (1 Cement : 2 coarse sand : 4 graded stone aggregates 20mm nominal size) for reinforced concrete chajjas not exceeding 10 cm thickness upto floor level including finishing the exposed surface with cement mortar 1:3 to give smooth and even surface centering and formwork and curing complete excluding cost of reinforcement.**

## **MATERIALS**

### **1.0 WATER**

**1.1** Water shall not be salty brackish and shall be clean reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R C C container for transport storage and huddling of water shall be clean, Water shall confirm to the standard specified in I S 455 -1978

**1.2** If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness change in time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

**1.3** Water for curing mortar concrete or masonry should not be too acidic or too alkaline

**1.4** It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

**1.5** Hard and bitter water shall not be used for curing

**1.6** Potable water will generally found suitable for curing mortar or concrete

### **2.0 CEMENT**

**2.1** Cement shall be ordinary Portland slag cement as per IS 1624 -1974 or Portland slag cement as per IS 455-1976

**2.2** Cement shall be stored above the ground level in perfectly dry and water tight sheds. Wherever bulk storage containers are used, their capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock-piles sufficiently away from the each other to prevent intermixing the materials.

### **3.0 SAND**

**3.1** Sand shall be natural sand, clean well graded, hard strong durable and gritty particular free from immures amounts of dust, clay, kankar modules, soft: or flaky particles shall alkali salts, organic matter, learn mica or other deleterious substance and shall be got approved from the Engineer-in-charge. The sand shall not contain more than 8 percent of slit as determined by field test. if necessary the sand.

**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:

<b>I. S. Sieve Designation</b>	<b>% by wt. passing</b>
4.75 mm	100
2.36mm	90 to 100
1.18 mm	70 to 100

600 MC	47 30 to 100
300 MC	85 to 70
150 MC	00 to 50

**3.2 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
4.75 mm	100
2.3 6mm	. 100
1.18 mm	75 to 100
600 MC	40 to 85
300 MC	05 to 50
150 MC	00 to 10

## 5.0 STONE COARSE AGGREGATE FOR NOMINAL MIX CONCRETE:

**4.1** Coarse aggregate shall be machine crushed stone of black trap and hard, strong, dense, durable, clean and free from disintegrated pieces, organic and other deleterious matter.

**4.2** The aggregate shall be generally be cubical in shape unless special stones of particular quarries are mentioned. Aggregate shall be machine crushed from the best black trap. Aggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement concrete and ordinary reinforced cement shall generally as per the table given below

IS Sieve designation	% passing for single sized aggregate of nominal size		
80mm			
63 mm	100	-	-
40mm	85-100	100	0
20mm	0-20	85-100.	100
16mm	-	-	85-100

IS Sieve designation	% passing for single sized aggregate of nominal size		
12.5 mm			
10mm	0.5	0.20	0.30
4.75 mm	-	0.5	0.5
2.35 mm	-	-	-

**Note:** This percentage may be varied some what by the Engineer-in-charge when considered necessary containing better and strength of concrete.

**4.3** The grading test shall be taken in the beginning and at the change of source of material as indicated in I.S. 383-1970 and I.S. 456-1978. Aggregate shall be stored separately and handled in such a manner so as to prevent the intermixing diff aggregate if the aggregate are covered with dust, they shall be washed with water to make them clean.

**4.4** All materials shall be stored as to prevent their deterioration of their quality and fitness for the work. Any material which has deteriorated or has been damaged or is otherwise considered defective by the Engineer-in-charge shall not be used in the work. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock-piles sufficiently away from the each other to prevent intermixing the materials.

## 5.0 WORKMANSHIP

### General

**5.1** Before stating concrete the bed of foundation trenches shall be cleared of all loose materials leveled watered and rammed as directed.

**5.2** The ordinary concrete mix shall generally be specified by volume. For cement which normally comes in bags and is used by weight, volume shall be worked out taking 50 kg of cement as 0.035 cubic meter in volume. While measuring aggregate by volume, shaking, ramming or hammering shall not be done. Proportioning of sand shall be as per its dry volume. In case it is dump, allowance for "bulking" shall be made as per IS: 2386 (Part-III).

### 6.0 PROPORTION OF MIX

**6.1** The proportion of cement sand and coarse aggregate shall be one part of cement. 3 parts of sand and 6 parts of stone aggregates and shall be measured by volume

**Note:** The proportions of the aggregates shall be adjusted from higher limit to lower limit progressively as the grading of the fine aggregates becomes finer and the maximum size of coarse aggregate becomes larger

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

**6.2** For any other item of construction not covered by items! (I) to (v) as specified on the drawing Or as directed by the Engineer in-charge in case It is not specified on drawing. For heavily reinforced concrete members as in the case of ribs of main beams nominal maximum size of aggregate shall usually be restricted to SqM. less than the minimum lateral clear distance between the main bars or. Less than the minimum cover to the reinforcement, whichever is the smaller only black trap type of coarse aggregate should be used. Fine aggregate shall be clean, hard, coarse sand. Shall be free dust and such other substances. The sand be got approved by the Engineer-in-charge. All materials shall be stored as to prevent their deterioration or intrusion of their quality and fineness for the work. Any material which has deteriorated or has been damaged or is otherwise considered defective by the Engineer-in-charge shall not be used in the work.

### 7.0 MIXING:

#### FOR MASS CONCRETE WORK. :

**7.1** Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour.

**7.2** Enough water shall then be added gradually and the mass turned over till a mix of required consistency is obtained. In case of hand mixing quantity of cement shall be increased by 10 per cent above that specified. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the purpose

**7.3** 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. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to be the Engineer in-charge, the first batch of concrete from the mixer 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. .

**7.4** The method of transporting and placing concrete shall be approved by the Engineer-in-charge. Concrete shall be so transported and placed so that no contamination, segregations or loss of its constituent material takes place. All form work and reinforcement contained in it shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

**7.5** Mixing shall be done on a smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water, Mixing platform shall be so arranged so that no foreign material shall get mixed with concrete nor does the mixing water flow out.

**7.6** Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform,

**7.7** Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding 2 meters. When chutes are used they shall be kept clean 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, kept 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 the 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.

**7.8** If concreting is not started within 24 hours of the approval being given, it shall have to be obtained again from the Engineer-in-charge. Concreting being given, it shall proceed continuously over the Area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer unless carried in properly design agitators, operating continuously, when this time shall be within 2 hours of the addition of cement to the mix and within 30 minutes of its discharge from the agitator. Except where otherwise agreed to be the Engineer-in-charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.4-metre when internal vibrators are used and not exceeding 0.30 meter in all other cases

## **8.0 FORM WORK IF REQUIRED:**

**8.1** Formwork shall include all temporary or permanent forms required for forming the concrete, together with all temporary construction required for their support.

Formwork shall however be divided into following two distinct categories.

**(1)** Shuttering i.e. formwork required for forming the concrete.

**(2)** Scaffolding i.e. formwork required for supporting shuttering.

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

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

**8.4** The inside surface of shuttering shall, except in the case of permanent formwork or where otherwise agreed to by the Engineer-in-charge, be coated with an approved material to prevent adhesion of concrete to the formwork. Release agents shall be applied strictly in accordance with the manufacture's instructions and shall not be allowed to come into contact with any reinforcement or pre-stressing tendons and anchorages. Different release agents shall not be used in formwork for concrete which will be visible in the finished works.

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

**8.6** The Engineer-in-charge shall be informed in advance by the contractor of his intention to strike any formwork. While fixing the time for removal of formwork, 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. Where field operations are controlled by strength tests of concrete, the removal of the load-supporting or suffix forms may commence when concrete has attained strength equal to at least twice the stress to which the concrete will be subjected at the time of striking props including the effect of any further addition of loads. When field operations are not controlled by strength tests of concrete the vertical forms of beams, columns and walls may be removed after 2 days. The

props of slabs and beams may be removed after 14 and 21 days respectively. All formwork shall be removed without causing any damage to the concrete. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take 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 25mm cover to the finished concrete surface. Where it is intended to reuse the formwork, it be cleaned and made good to the satisfaction of the Engineer-in-charge.

**8.7** Immediately after the removal of forms, all exposed bars or bolts 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 ties and all other holes and depressions, honeycomb spots, broken edges or corn and other defects, shall be thoroughly cleaned & saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is being finished and of as dry as consistency as is possible to use, Considerable pressure shall be applied in filling and pointing to ensure thorough. Filling in all Surfaces which have been pointed shall be kept moist for a period of four hours. If rock honeycombs, in the opinion of the Engineer-in-charge are of such an character as to affect the strength of the structure materially or to endanger: the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected. In the case of reinforced concrete work workability shall be such that the concrete and properly grips all reinforcement. The degree of consistency which shall depend upon the nature of work and methods of vibration of concrete shall be determined by regular slump, tests. Following slump shall be adopted for different types of works.

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

**8.9** The average strength of the group of cubes cast for each day shall not be less than the specified works cube-strength. 20 per cent of the cubes cast for each day may have values less than the specified strength, provided the lowest value is not less than 85 per cent of the specifies strength.

**8.10** R.C.C. work shall have exposed concrete surface. Centering design and its erection shall approved by the Engineer in charge. One carpenter with helper will invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited over reinforcement laid in position. For access to different parts, suitable mobile platforms shall provided so that steel reinforcement in positions no disturbed. For ensuring proper cover, motor blocks of suitable size shall be cast and tied to the reinforcement. Timber kapchi of metal pieces shall not be used for this purpose. Concreting of important structural members shall always be done in the presence and inductee supervision of departmental. person-not below the rank of Assistant Engineer/ Additional

Assistant Engineer , Work Assistant or as instructed by the Engineer in charge .After removal of form work checks that concrete produced is of good quality .Plastering shall no be allowed to the expressed faces of concrete.

## **9.0 Segregation.**

**9.1** 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 shall be freshly mixed and placed immediately before placing of' new concrete. Where concrete has not fully hardened, allegiance shall be removed by scrubbing the well 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, with neat cement grout. The first layer of concrete to be placed on the ls surface shall not exceed 150mm.in thickness, and shall be well rammed against old work particular attention being given to corners and close spots.

## **10.0 Transporting & Placing the Concrete:**

**10.1** 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.

**10.2** The concrete shall be laid in layers of 15 cms to 20 cms.

**10.3** 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 can not be used. sufficient vibrators in serviceable condition shall be. kept at site so that spare equipment is always available in the event of break downs.

## **11.0 Curing :**

**11.1** 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. Masonry work over- the foundation concrete may be started after 48 hours of its laying but the curing of concrete shall be continued for a minimum period of 14 days.

**11.2** 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

## **12.0 Mode of Measurement & Payment :**

**12.1** The payment will be made on Cubic Meter basis of the finished work.

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

**12.3** All necessary labour, materials Equipment, etc for sampling, preparing test cubes, curing etc. shall be provided by the Contractor. Testing of the materials and concrete may be arranged by the Engineer in charge in an approved laboratory at the cost of the contractor

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

**12.5** The concrete shall be measured for its **length breadth** and **depth**, limiting dimensions to those specified on plan or as directed.

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

**Item No 10:-** Providing and laying controlled cement concrete M-200 work with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in for Grade Slab.

**AND**

**Item No 11:-** Providing and laying controlled cement concrete M-200 work with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in for Slab for All floor.

The work of **Providing and laying controlled cement concrete M-200 work with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C. work in for Slab for All floor.** shall be executed as per relevant specifications of Item No. 07 of this contract and as per approved drawing.

## **Item No. 12 :-**

**Providing TMT bar FE 500D reinforcement for R.C.C. work including, bending, Binding and placing in position complete up to floor two level (up to 10 ton)**

### **1.0. GENERAL**

This work shall consist of furnishing and placing **TMT Fe-500D Conforming to IS 1786 2008** 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. TMT Bars**

Reinforcements shall be **TMT Fe-500D** steel bars. They may be uncoated or coated with epoxy or with approved protective coatings.

2.2. TMT bars reinforcement for RCC work shall conform to IS 1786 FE-415 and shall be of tested quality. It shall also comply with relevant part of IS 456-1966

2.3. All reinforcement shall be clean and free from dirt, paint, grease or oil, oil 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 280-1972

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 an 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 TMT 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 from 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.

10.7. 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 shear nor 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 joined 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 standard threads. Steel for coupling shall conform to IS 226.

10.8. When permitted or specified on the drawings joints of reinforcement bars shall be butt-welded so as to transmit their full stresses. Welded joints shall preferably be located at points where steel 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 arc welding using a process which excludes air from 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, 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 to IS 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number 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.	40 mm	9.86 Kg./Rmt.

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

11.2. Reinforcement shall be measured in length excluding overlaps. No steel shall be given for lap but work may be carried out as per detailed drawings. Where welding or coupling is resorted to, in place lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in

tones on the same basis of as per table given above even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

11.3. The rate for reinforcement includes cost of steel binding wires, but excluding Lap Length its carting with all leads and lifts, cutting, bending, placing in position, binding and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars.

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

## **ITEM NO.13:**

**Providing 15 mm thick cement plaster in single coat on brick/concrete wall for interior plastering up to floor two level finished even and smooth in (I) cement mortar 1 : 6 (1 cement : 6 sand)**

### **General**

This work shall consist of Providing **Providing 15 mm thick cement plaster in single coat** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

### **Material**

#### **1.0 CEMENT**

**1.1.** Cement to be used in the works shall be any of the following types with the prior approval of the Engineer:

- a)** Ordinary Portland Cement, 33 Grade, conforming. to *IS:269*.
- b)** Rapid Hardening Portland Cement, conforming to *IS:8041*.
- c)** Ordinary Portland Cement, 43 Grade, conforming to *IS:8112*.
- d)** Ordinary Portland Cement, 53 Grade, conforming to *IS:12269*.
- e)** Soleplate Resistant Portland Cement, conforming to *IS:12330*.

**1.2.** Cement conforming to *IS:269* shall be used only after ensuring that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**1.3.** Cement conforming to *IS:8112* and *IS:12269* may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be achieved by finer grinding and higher constituent ratio of  $C_3S/C_2S$ , where  $C_3S$  is Tri-calcium Silicate and  $C_2S$  is Dicalcium Silicate. In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

**1.4.** Cement conforming to *IS: 12330* shall be used when sodium soleplate and magnesium soleplate are present in large enough concentration to be aggressive to concrete. The recommended threshold values as per *IS:456* are soleplate concentration in excess of 0.2 per cent in soil substrata or 300 ppm (0.03 percent) in ground water. Tests to confirm actual values of soleplate concentration are essential when the structure is located near the sea coast, chemical factories, agricultural land using chemical fertilizers and sites where there are effluent discharges or where soluble soleplate bearing ground water level is high. Cement conforming to *IS:12330* shall be carefully selected from strength considerations to ensure that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**1.5.** Cement conforming to *IS 8041* shall be used only for pre cast concrete products after specific approval of the Engineer in charge

**1.6.** Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement also total sulfur content calculated as sulfuric anhydride ( $SO_3$ ) shall in no case exceed 2.5 per cent and 3.0 percent when tri-calcium aluminate per cent by mass in up to 5 or greater than 5 respectively

#### **1.7. Storage**

Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination, Cement shall be stored above ground level in perfectly dry and water

tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should be sufficient to cover to the requirement at site and should be cleaned at least once every 3 to 4 months

**1.8.** Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered in any way, during storage shall not be used in the works and shall be removed from the site by the contractor without charge to the employer

The contractor shall prepare and maintain proper records on site in respect of delivery handling storage and use of cement and these records shall be available for inspection by the engineer in charge at all times

**1.9.** The contractor shall make a monthly return to the engineer in charge on the date corresponding to the interim certificate date showing the quantities of cement received and issued during the month in stock at the end of the month.

## 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 conform 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 pieces 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
2.36mm	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. WATER

**3.1** Water shall not be salty brackish and shall be clean reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R C C container for transport storage and huddling of water shall be clean, Water shall confirm to the standard specified in I S 455 -1978

**3.2.** If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness charge in time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

**3.3** Water for curing mortar concrete or masonry should not be too acidic or too alkaline

**3.4** It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

**3.5** Hard and bitter water and sea water shall not be permitted for curing

**3.6** Potable water will generally found suitable for curing mortar or concrete

**3.7.** Storage Water shall be stored in containers/ tanks covered at top and cleaned at regular intervals in order to prevent intrusion by foreign matter or growth of organic matter Water from shallow muddy or marshy surface shall not be permitted The intake pipe shall be enclosed to exclude silt, mud grass and other solid materials and there shall be a minimum depth of 0.60 m on water below the intake at all times

**3.8.** As a guide following concentrations represent the maximum permissible values

(a) to neutralize 200 ml sample of water using phenolphthalein as indicator, it should not require more than 2 ml of 0.1 normal NaOH

(b) To neutralize 200 ml of water using methyl orange as an indicator, it should not required more than 10 ml of 0.1 normal HCl

(c) the permissible limits for solids shall be as follows when tested in accordance with IS 3025

	Permissible limits (Max)
Organic	200 mg/lit
Inorganic	3000 mg/lit
Sulphates (SO <sub>4</sub> )	500 mg/lit
Chlorides (Cl)	500 mg/lit
Suspended matter	2000 mg/lit

In case of structures of length 30 m and below, the permissible limit of chlorides may be increased up to 1000 mg/lit

All samples of water (including potable water shall be tested and suitable measures taken where necessary to ensure conformity of the water to the requirements stated herein.

(d) The pH value shall not be less than 6

#### **4.0 WORKMANSHIP**

**4.1** Sand shall be screened and shall be free from all impurities like dust and loose particles pieces of stone or kankar or gravel, and all type of organic materials

**4.2.** Cement and sand shall be mixed in proportions of 1:6 ( 1 cement ; 6 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.

**4.3.** The mixing 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.

**4.4.** For a surface which is to be subsequently plastered the joints shall be squarely racked out to a depth of 15mm. With the mortar is till green. The racked joints shall be well brushed to remove dust and loose particles and the surface hall be throughway washed with water, and wetted

**4.5.** Cement and sand 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.

**4.6.** The mixing shall be done intimately. by hand infixing,. The operation shall be carried out on a clean watertight platform, and cement and sand shall be first mixed dry in the required proportion to obtain mortar that has stiffened because of evaporation of water, the same shall be re-tempered by adding water as frequently as needed to restore the requisite consistent but this re-tempering shall be permitted only within thirty minutes from the time of addition of initial mixing.

**4.7.** Plastering shall be started from top and worked down. All long holes shall be properly filled in advance of the plastering as the scaffolding is being taken down. Wooden screeds 75mm. wide and of the thickness of the plaster shall be fixed vertically 2.5- meters to 4 meters apart to act as gauges and guides in applying the plaster. The mortar shall be laid on the wall between the screeds using the plaster float and pressing the mortar to the racked joints are properly filled.

**4.8.** The plaster shall then be finished off with a wooden straight edge reaching across the screeds. The straight edge shall be worked on ).e screeds with a small upward and side way motion 50mm or 75mmri at a time. Finally, the surface shall be finished off with a plaster's wooden float. Metal floats shall not be used.

**4.9.** When recommencing plastering beyond the work suspended earlier the edge of the old plaster shall be scrapped, cleaned and wetted before plaster is applied to the adjacent areas. No portion of the surface shall be left out initially or be patched by later on. The plaster shall be finished to a true and plumb thickness of plaster shall not be less than the thickness specified in the item with tolerance of 3mm th which appear in the surface and all portions, which sound hollow as directed by the Engineer- in charge

**4.10.** 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;

**4.11.** Stage scaffolding shall be provided for the work. This shall be independent of the structure.

**4.12.** Green work shall be protected from rain by suitable covering. Plaster work is cement of composite mortar shall be kept constantly moist on all faces for a minimum period of seven days. The

top of the masonry work shall be left flooded with water at the close of the day.

**4.13.** 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.

**4.14.** The scaffolding shall be sound and strong to withstand all loads to come upon it. The holes which provide resting space for horizontal members shall not be left in masonry under one meter in width or immediately near the skew backs or arches. The holes left in the masonry work for supporting the unfolding shall be filled and made good.

## **5.0 PROPORTION OF MIX**

**5.1.** The proportion of cement and sand shall be one part of cement. 6 (Six) parts of sand and shall be measured by volume.

## **6.0 MODE OF MEASUREMENT & PAYMENT :**

**6.1.** The unit rate Plaster shall include the cost of all materials, tools and plant required for mixing, applying & placing in position, compacting, finishing as per direction of the Engineer-in-charge, curing and all other incidental expenses for producing plaster work of specified thickness 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 plastering shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.

**6.2.** The plaster work 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.

**6.3.** The payment will be made on square Meter basis of the finished work.

**ITEM NO.14:**

**Providing 10 mm thick cement plaster in single coat on brick/concrete wall for interior plastering up to floor two level finished even and smooth in (I) cement mortar 1 : 6 (1 cement :6 sand)finished with floating coat of neat cement slurry**

**General**

This work shall consist of providing **10mm the cement plaster in single coat in ceiling** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge

**Material****1.0 CEMENT**

**1.1.** Cement to be used in the works shall be any of the following types with the prior approval of the Engineer:

- a)** Ordinary Portland Cement, 33 Grade, conforming. to *IS:269*.
- b)** Rapid Hardening Portland Cement, conforming to *IS:8041*.
- c)** Ordinary Portland Cement, 43 Grade, conforming to *IS:8112*.
- d)** Ordinary Portland Cement, 53 Grade, conforming to *IS:12269*.
- e)** Soleplate Resistant Portland Cement, conforming to *IS:12330*.

**1.2.** Cement conforming to *IS:269* shall be used only after ensuring that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**1.3.** Cement conforming to *IS:8112* and *IS:12269* may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be achieved by finer grinding and higher constituent ratio of  $C_3S/C_2S$ , where  $C_3S$  is Tri-calcium Silicate and  $C_2S$  is Dicalcium Silicate. In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

**1.4.** Cement conforming to *IS: 12330* shall be used when sodium soleplate and magnesium soleplate are present in large enough concentration to be aggressive to concrete. The recommended threshold values as per *IS:456* are soleplate concentration in excess of 0.2 per cent in soil substrata or 300 ppm (0.03 percent) in ground water. Tests to confirm actual values of soleplate concentration are essential when the structure is located near the sea coast, chemical factories, agricultural land using chemical fertilizers and sites where there are effluent discharges or where soluble soleplate bearing ground water level is high. Cement conforming to *IS:12330* shall be carefully selected from strength considerations to ensure that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**1.5.** Cement confirming to *IS 8041* shall be used only for pre cast concrete products after specific approval of the Engineer in charge

**1.6.** Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement also total sulfur content calculated as sulfuric anhydride ( $SO_3$ ) shall in no case exceed 2.5 per cent and 3.0 percent when tri-calcium aluminates per cent by mass in up to 5

or grater than 5 respectively

### 1.7. Storage

Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination, Cement shall be stored above ground level in perfectly dry and water tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should sufficient to cover to the requirement at site and should be cleaned at least once every 3 to 4 months

**1.8.** Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered in any way, during storage shall not be used in the works and shall be removed from the site by the contractor without charge to the employer

The contractor shall prepare and maintain proper records on site in respect of delivery handling storage and use of cement and these records shall be available for inspection by the engineer in charge at all times

**1.9.** The contractor shall make a monthly return to the engineer in charge on the date corresponding to the interim certificate date showing the quantities of cement received and issued during the month in stock at the end of the month.

## 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:

<b>I. S. Sieve Designation</b>	<b>% by wt. passing</b>
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. WATER**

**3.1** Water shall not be salty brackish and shall be clean reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R C C container for transport storage and huddling of water shall be clean, Water shall confirm to the standard specified in I S 455 -1978

**3.2.** If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness change in time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

**3.3** Water for curing mortar concrete or masonry should not be too acidic or too alkaline

**3.4** It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

**3.5** Hard and bitter water and sea water shall not be permitted for curing

**3.6** Potable water will generally found suitable for curing mortar or concrete

**3.7.** Storage Water shall be stored in containers/ tanks covered at top and cleaned at regular intervals in order to prevent intrusion by foreign matter or growth of organic matter Water from shallow muddy or marshy surface shall not be permitted The intake pipe shall be enclosed to exclude silt, mud grass and other solid materials and there shall be a minimum depth of 0.60 m on water below the intake at all times

**3.8.** As a guide following concentrations represent the maximum permissible values

(a) to neutralize 200 ml sample of water using phenolphthalein as indicator, it should not require more than 2 ml of 0.1 normal NaOH

(b) To neutralize 200 ml of water using methyl orange as an indicator, it should not required more than 10 ml of 0.1 normal HCl

(c) the permissible limits for solids shall be as follows when tested in accordance with IS 3025

	Permissible limits (Max)
Organic	200 mg/lit
Inorganic	3000 mg/lit

Soleplates (SO <sub>4</sub> )	500 mg/lit <sup>67</sup>
Chlorides (Cl)	500 mg/lit
Suspended matter	2000 mg/lit

In case of structures of length 30 m and below, the permissible limit of chlorides may be increased up to 1000 mg/lit

All samples of water (including potable water) shall be tested and suitable measures taken where necessary to ensure conformity of the water to the requirements stated herein.

(d) The pH value shall not be less than 6

## **4.0 WORKMANSHIP**

**4.1** Sand shall be screened and shall be free from all impurities like dust and loose particles, pieces of stone or kankar or gravel, and all type of organic materials

**4.2.** Cement and sand shall be mixed in proportions of 1:6 ( 1 cement : 6 fine sand) 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.

**4.3.** The mixing 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.

**4.4.** For a surface which is to be subsequently plastered the joints shall be squarely racked out to a depth of 15mm. With the mortar is till green. The racked joints shall be well brushed to remove dust and loose particles and the surface shall be thoroughly washed with water, and wetted

**4.5.** Cement and sand 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.

**4.6.** The mixing shall be done intimately. by hand infixing,. The operation shall be carried out on a clean watertight platform, and cement and sand shall be first mixed dry in the required proportion to obtain mortar that has stiffened because of evaporation of water, the same shall be re-tempered by adding water as frequently as needed to restore the requisite consistent but this re-tempering shall be permitted only within thirty minutes from the time of addition of initial mixing.

**4.7.** Plastering shall be started from top and worked down. All long holes shall be properly filled in advance of the plastering as the scaffolding is being taken down.

Wooden screeds 75mm. wide and of the thickness of the plaster shall be fixed vertically 2.5-meters to 4 meters apart to act as gauges and guides in applying the plaster. The mortar shall be laid on the wall between the screeds using the plaster float and pressing the mortar to the racked joints are properly filled.

**4.8.** The plaster shall then be finished off with a wooden straight edge reaching across the screeds. The straight edge shall be worked on the screeds with a small upward and side way motion 50mm or 75mm at a time. Finally, the surface shall be finished off with a plaster's wooden float. Metal floats shall not be used.

**4.9.** When recommencing plastering beyond the work suspended earlier the edge of the old plaster shall be scrapped, cleaned and wetted before plaster is applied to the adjacent areas. No portion of the surface shall be left out initially or be patched by later on. The plaster shall be finished to a true and plumb thickness of plaster shall not be less than the thickness specified in the item with tolerance of 3mm which appear in the surface and all portions, which sound hollow as directed by the Engineer- in charge

**4.10.** 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;

**4.11.** Stage scaffolding shall be provided for the work. This shall be independent of the structure.

**4.12.** Green work shall be protected from rain by suitable covering. Plaster work is cement or composite mortar shall be kept constantly moist on all faces for a minimum period of seven days. The top of the masonry work shall be left flooded with water at the close of the day.

**4.13.** 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.

**4.14.** The scaffolding shall be sound and strong to withstand all loads to come upon it. The holes which provide resting space for horizontal members shall not be left in masonry under one meter in width or immediately near the skew backs or arches. The holes left in the masonry work for supporting the scaffolding shall be filled and made good.

## **5.0 PROPORTION OF MIX**

**5.1.** The proportion of cement and sand shall be one part of cement. 6 (Six) parts of sand and shall be measured by volume.

## **6.0 MODE OF MEASUREMENT & PAYMENT :**

**6.1.** The unit rate Plaster shall include the cost of all materials, tools and plant required for mixing, applying & placing in position, compacting, finishing as per direction of the Engineer-in-charge, curing and all other incidental expenses for producing plaster work of specified thickness 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 plastering shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.

**6.2.** The plaster work 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.

**6.3.** The payment will be made on square Meter basis of the finished work.

**Item No. 15 :-**

**Providing 20 mm thick cement plaster in single coat on brick/concrete wall for interior plastering up to floor two level finished even and smooth in (I) cement mortar 1 :6 (1 cement : 6sand).**

**1.0. Materials**

1.1. Water shall conform to M-1. The cement mortar of proportion 1:6 shall conform to M-13.

**2.0. Workmanship**

2.1. The work shall be carried out in single coats.

**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 on 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 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. 1:6.

**2.4.7 Curing :**

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

**3.0. Mode of measurements & payment**

- 3.1.** The 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.
- 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 sand sills shall be measured.
- 3.10. The rate shall be for a unit of **One Sq. meter**.

**Item No. 16 :-** Applying two coats of putty & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand papered smooth.

**AND**

**Item No. 17 :-** Distempering (Two coats) with oil bound distemper of approved brand and manufacture and of required shade on wall surfaces to give an even shade, over and including a priming coat with distemper primer of approved brand and manufacture after thoroughly brushing the surface free from mortar dropping and other foreign matter and also including preparing the surface even and sand papered smooth.

**1.0. Materials**

**1.1.** Dry distemper and primer shall be of approved brand and manufacture. The distemper shall be of required colour and shade and the same shall conform to I.S. : 428-1969. The shade shall be approved by Engineer in charge.

**2.0. Workmanship**

The distempering shall be carried out on ceiling/sloping roofs / walls.

**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 paris 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 distemper 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.

- 2.3.3.** Oil bound distemper is not recommended to be applied within six months of the completion of wall plaster.

**2.4. Preparation of oil bound distemper :**

- 2.4.1.** The distemper 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 days work shall be prepared.

**2.5. Application of Distemper coat:**

- 2.5.1.** 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 distemper, taking care not to rub out priming coat. All loose particles shall be dusted off after rubbing. Minimum two coats of distemper 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.
- 2.5.2.** Sufficient quantity of distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room which cannot be completed on the same day.
- 2.5.3.** 15 cm. double bristled distemper brush shall be used. After day's work brushes shall be thoroughly washed in hot water with soap solution and hung down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.
- 2.6. Protective measurements :** The surfaces of doors, windows, floors, articles of furniture etc. and such other parts of the buildings as are not to be distempered shall be protected from being splashed upon. Such surfaces shall be cleaned of distemper splashes if any.

**3.0. Mode of measurements and payment**

- 3.1.** Priming coat of distemper primer, scraping of surface spoiled by struck roots, removal of oil and grease spots, treatment for infestation of effloresces., mould moss, fungi, algae and lichen and patch repairs to plaster shall be included in this item for which nothing extra shall be paid.
- 3.2.** All the work shall be measured net in the decimal system as in place subject to the following limits unless otherwise stated hereinafter:
- (a) Dimensions shall be measured to the nearest 0.01 m.
  - (b) Area in individual items shall be worked out to the nearest 0.01 sq. m. All work 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 not for finish around ends of joints, beams, posts etc.

- 3.3.** Deductions of opening exceeding 0.5 sq.m. but not exceeding 3 sq. m. each shall be made as follows and net addition shall be made for reveals, jambs, soffits etc. of these openings :
- (a) When both the faces of wall are provided with same finish, deductions 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 doors, windows etc. on which width of reveals is less than that of the other side but no deduction shall be made on the other side. Where the width of reveals on the both the faces of wall are equal, deduction of 50% of area of opening on each face shall be made from area of finish.
- (c) When only one face of wall is treated and the other face is not treated, full deductions shall be made if the width of the reveal on treated side is less than that on untreated side but if the width of the reveal is equal or more than that on untreated side neither deductions nor additions to be made for reveals, jambs, soffits, sills etc.
- 3.4.** In case of opening of area exceeding 3 sq. m. each deduction shall be made for openings but jambs, sills and soffits shall be measured.
- 3.5.** No deductions shall be made for attachments such as casings, conduits, pipes, electric wiring and the like.
- 3.6.** Item includes removing nails, making good holes, patches with materials similar in composition of distemper.
- 3.7.** The extra rate shall be paid for carrying out distempering work on ceiling/sloping roofs over and above.
- 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 sq. meter.

## **ITEM NO.18**

**Wall painting Two coats with plastic emulsion paint of approved brand and manufacturer on wall surfaces to give an even shade including thoroughly brushing the surface free from mortar & other foreign matter and sand papered smooth**

### **General**

This work shall consist of painting the walls with **plastic emulsion paint on surface of ceiling and soffit**, of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

### **MATIRIALS**

#### **1.0 Plastic Emulsion Paint**

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

1. plastic emulsion paint shall not show excessive setting in freshly opened full can and shall easily be redispersed with a paddle to a smooth homogeneous state The plastic emulsion paint shall show no curding, livering cracking or colour separation and shall be free from lumps and skins
2. The plastic emulsion paint as received shall brush easily possess good leveling properties and show no running or sagging tendencies
3. The plastic emulsion paint shall not skin within 48 hours in a three quarters filled closed container
4. The plastic emulsion paint shall dry to a smooth uniform finish free from roughness grit unevenness and other imperfections
5. Ready mix plastic 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 Primer**

Primer shall be of specified colour as approved by Engineer in Charge plastic emulsion paint shall meet with the following general requirements

1. Primer shall not show excessive setting in freshly opened full can and shall easily be redispersed with a paddle to a smooth homogeneous state The paint shall show no curding, livering cracking or colour separation and shall be free from lumps and skins
2. The Primer as received shall brush easily possess good leveling properties and show no running or sagging tendencies
3. The Primer shall not skin within 48 hours in a three quarters filled closed container The paint shall dry to a smooth uniform finish free from roughness grit unevenness and other imperfections

## **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 distemping. Where ladders are used, pieces of old gunny bags

### **2.2 Priming coat**

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 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 Application of distemper coat:**

The plastic emulsion paint is not recommended to be applied within six months of the completion of wall plaster.

The plastic emulsion paint 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 The plastic 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 plastic 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 plastic emulsion paint shall be mixed to finish one room at a time. The application

### **3.0 MODE OF MEASUREMENT & PAYMENT :**

**3.1.** The unit rate Wall painting with plastic emulsion paint shall include the cost of all materials, tools and plant required for mixing, clearing 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 plastic 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 plastic 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 running - meter.

**3.4.** The payment will be made on **square Meter** basis of the finished work

## **ITEM NO.19**

**Finishing wall with water proofing cement paint on wall surface (two coats) to give an approved brand and manufactureres and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials etc. complete**

This work shall consist of **Finishing wall with water proofing Acrylic emulsion paint** of approved brand and manufacture and of approved shade, of the shape and dimensions shown on the drawings and confirming to these specifications or as approved by the Engineer in Charge.

### **1.0 MATERIALS**

1.1 The water shall conform to M-1. Cement water proofing paint shall conform to I.S. 5410-1969.

#### **Paint**

The Acrylic emulsion paint shall be of approved brand and manufacturer and of approved shade as directed by the Engineer-in-Charge.

### **2.0 WORKMANSHIP**

#### **2.1 Scaffolding :**

The relevant specifications of Item No.18.11 shall be followed.

#### **2.2 Preparation of Surface :**

The relevant specifications of item 18.11 shall be followed except that the word white wash colour wash shall be substituted with Epoxi paint of approved brand and manufacturer and of approved shade. The surface shall be thoroughly wetted with clean water before Epoxi paint is applied.

#### **2.3 Preparation of Paint :**

Portland Acrylic emulsion paint shall be prepared as per instruction of manufacturer water as recommended by the manufacturer and stirring to obtain a thick paste, which shall then be diluted to a brushable consistency. Generally, equal volumes of paint powder and water make a satisfactory paint. In all cases, the manufactures instructions shall be followed. The paint shall be mixed in such quantities as can used up within an hour of mixing as otherwise the mixture will set and thickness, affecting flowing and finish. The lids of cement paint drums shall be kept tightly when not in use. Epoxi paint shall be equivalent to Asian paint quality.

#### **2.4 Application of Paint :**

2.4.1 No painting shall be done when the paint is likely to be exposed to at temperature below 70 C within 48 hours after application.

2.4.2 When weather conditions are such as to cause be carried out in the shadow as far as possible. This helps the proper hardening of the paint film by keeping the surface moist for 24 hours or a longer period as instructed by the Engineer-in-Chare.

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

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

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

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

2.4.7 Epoxi paint shall not be applied on surface already treated with white wash, colour wash, distemper dry or oil bound varnishes, paint etc. It shall not be applied on gypsum, wood and metal surfaces.

## **2.2 Curing :**

Painted surface shall be sprinkled with water two or three times a day. This shall be done between coats and for at least two days following the final coat. The curing shall be started as soon as the paint has hardened so as not to be damaged by the sprinkling of water say about 12 hours after the application. 2.6 Protection measures shall be taken as per item.

## **3.0 MODE OF MEASUREMENT & PAYMENT :**

3.1 The unit rate painting shall include the cost of all materials, tools and plant required for mixing, applying and placing in position, compacting, finishing as per direction of the Engineer-in-charge, curing and all other incidental expenses for producing plaster work of specified thickness 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 painting shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.

3.2 The chipping work shall be measured for its **length** and **height**, or **breath** limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one squire meter.

The payment will be made on square meter basis of the finished work

**Item No. 20 :-** Providing and laying Granite stone (15 to 18 mm. thick) slab single piece laid in sill and jambs of doors & windows frame laid on 10 mm. thick cement mortar 1:3 (1 cement : 3 coarse sand) and jointed with grey cement slurry including removing plaster and making good same and rubbing and polishing etc. complete.

## **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. Marble stone shall conform to M-49,
- 1.1. Granite 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 Granite stone slab shall be hard, even, and regular in shape and it should be without fault.
- 1.2. The size of the Granite stone slab to be used for flooring shall be of size 600 mm x 600 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 Granite 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 Granite 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 Granite 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. If 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 Granite 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 **sq. meter**.

**Item No 21 :-**

**Providing and fixing 25 mm thick shutters for Doors, windows and clerestory windows including Indian teak wood frames 10 cm x 7 cm. size including black enamelled iron oxidized fixtures and fastenings including primer coat of approved quality and two coats of oil painting etc, complete.(with water proof ply sheet & decorative formika)**

**1.0. Materials.**

- 1.1. Wood for shutter shall conform to M-29. 2. Glass shall conform to M-38. 3. Anodised aluminum butt hinges shall conform to M-43.

**2.0. Workmanship**

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

**2.2. Shutters:**

- 2.2.1. Paneled shutters shall be constructed in the form of timber frame work of styles and rails with panel inserted of type as specified in the detailed drawings. Panel shall be fixed by providing grooves in the style and rails. The styles and rails shall be joined to each other by mortise and tenon joints at right angles.

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

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

**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 anodised butt hinges including fixing with iron screws. The size and number of hinges shall be as per table given in annexure-1.

**3.0. Mode of measurement and 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 shall be for a unit of one sq. meter.

**Item No 22 :-**

Providing and fixing window having extruded aluminium colour anodized section frame main outer size 63.50 x 38.10 x 1.95mm ( of Jindal section no 4605, @ wt.1.094 kg/rmt) horizontea Two track member size 60.85 mm x 31.75 mm x 1.20mm (of jindal section no: 8637 @wt. of 0.695 Kg/mt ) vertical member of size 61.85mm x 31.75 mm x 1.30 mm (of jindal section no : 8785 @ wt. of 0.659 kg/mt ) with sliding shutters of horizontal member size 40 mm x 18 mm x 1.29 mm ( of jindal section no: 8949 @ wt of 0.459 kg/mt ) veriuca member of size 40 mm x 18 mm x 1.29 mm (of jindal section no: 8947 @ wt. of 0.459 kg/mt /section 8948, @ wt. 0.457 kg/mt ) with 5 mm thick transparent bronze colour tinted float galss with powder coated aluminium fittings and fixturrees and transparent silcon sealant falss fixing to frame as per details etc.complete for window.

**1.0 MATERIAL****1.1 Aluminum standard section****1.1.1 Window having extruded alluminium colour anodized section**

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 work shall be included standard window having extruded alluminium colour anodized section frame main outer size 63.50mm x 38.10mm x 1.95mm (@wt. 1.094 Kg/mt.), horizontal Two track member size 61.85mm x 31.75 mm x 1.20mm (@wt. 0.695 Kg/mt.), vertical member of size 61.86mm x 31.75mm x 1.30mm (@wt. 0.659 Kg/mt.) with sliding shutters of horizontal member size 40mm x 18mm x 1.29mm (@wt. 0.456 Kg/mt.), vertical member of size 40 x 18 mm x 1.29mm (@wt. 0.456 Kg/mt., @wt. 0.458 Kg/mt) 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. 23 :- Providing and fixing M.S. Grills of required pattern to wooden frames of window etc. with M.S. Plate at required spacing & frame around square or round bar with rounded headed bolts and nuts or by screws. (B) Plain 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 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.

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

3.1. No payment shall be made for weight of screws, bolts nuts etc. only weight of grill shall be paid.

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

**Item No. 24 :- Painting two coats including ready mixed priming paint of Red lead over a new Steel and other metal surfaces with synthetic enamel paint, brushing to give an even shade including cleaning the surface of all oil, greases, dirt, dust and other foreign matters.**

### 1.0 Materials

The structural steel surface to be painted shall conform to relevant specifications.

The ready mixed red lead primer shall conform to IS:102 and shall be of approved make and quality.

The thinner, where required, shall conform to IS:75 or shall be of the brand recommended by the paint manufacturer.

The synthetic enamel paint shall conform to IS:133 and shall be of approved make and shade.

### 2.0 Workmanship

The steel and metal surfaces shall be thoroughly cleaned and made free from rust, scales, oil, grease, dirt, dust and other foreign matter before application of paint.

One coat of approved red lead primer shall be applied uniformly over the prepared surface and allowed to dry completely.

Two coats of approved synthetic enamel paint shall then be applied to obtain a smooth, uniform and even finish. Each coat shall be allowed to dry before applying the subsequent coat.

The finished surface shall be free from brush marks, runs, sags, patches and other defects.

### 3.0 Mode of Measurement & Payment

The rate shall include the cost of all materials, labour, surface preparation, primer coat, enamel paint, tools and plant, scaffolding and all incidental expenses required for satisfactory completion of the work.

The work shall be measured in square metres of painted surface.

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

**Item No. 25 :- P & L 24" x 24" Vitrified tiles 8 mm thick tile flooring over 20mm (average) base of cement mortar 1:6 (1 Cement: 6 Coarse Sand) on new surface or fixing on existing flooring by adhesive material including dismantling of existing flooring & jointed with color cement slurry including finished with flush pointing & cleaning the surface etc. complet for light shade**

### **1.0. Materials**

Water shall conform to M-1. Cement mortar shall conform to M-11. **24" x 24" size full body vitrified tiles 8mm thick** shall conform to relevant Indian standard. The size & colour of vitrified tiles shall be approved by Engineer in charge.

### **2.0. Workmanship**

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

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

**2.1.2.** The **vitrified flooring tiles** shall be laid on cement mortar bedding of 20 mm (average) thick base of cement mortar 1:6 (1 cement : 6 coarse sand) and laid over and jointed with white cement slurry. 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 20 mm thickness. The proportion of the cement mortar shall be as specified in the item.

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

**2.2.1.** The tiles before laying shall be soaked in water for at least two hours. Neat 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. The pattern shall be approved by Engineer in charge.

#### **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 sq. meter**.

**Item No. 26 :- Providing and laying white Glazed tiles 6 mm thick in Skirting, risers of Steps & dedo laid on bed of 10mm thick Cement Mortar 1:3 (1 Cement: 3 Coarse Sand) and jointed with white cement slurry (up to 10 ton)**

### **1.0. Materials**

Water shall conform to M-1. Cement mortar shall conform to M-11. **30 cm x 60 cm size glazed tiles 6mm thick** 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 8 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 and dedo 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. 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 sq. meter.

**Item No. 27 :- Providing and laying Ceramic tiles 6mm thick in flooring treads of steps and landing laid on a bed of 12mm thick cement mortar 1:3 (1-cement : 3-coarse sand ) finishing with flush pointing in white cement**

**1.0. Materials**

Water shall conform to M-1. Cement mortar shall conform to M-11. **Ceramic tiles 6mm thick** 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 8 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 and dedo 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. 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 sq. meter.

**Item No. 28 :- Constructing Sandwich platform of 18mm thick polished black granite at top 30mm thick kota stone slab fitting at bottom with cementing materials/ adhesives including making necessary grooves in wall with vertical kota stone 90cm in height, 30mm thick @ every 60cm including rubbing, polishing etc complete as approved by engineer in charge**

General

#### **General**

The work shall consist of construction of sandwich type cooking platform with bricks jointed with bricks together by cement mortar in accordance with the details shown on the drawings for half brick masonry or as approved by the engineer in charge and polish kota stone slab. Only trained personnel shall be employed for construction and half brick masonry work supervision

### **1.0 MATERIAL**

#### **Common burnt clay Bricks**

**1.1** Common burnt clay bricks shall confirm to the requirement of IS:1077, except that the minimum compressive strength when tested flat shall not be less than 35 kg/sqm and that the size may be according to local practice with a tolerance of 5 percent. The water absorption shall not be more than 20 percent by weight Necessary test for crushing strength and water absorption etc shall be carried out as per IS 3495 (Part 1 to IV) - 1976

**1.2** The compression test of bricks shall be taken in the beginning and at the change of source of material as indicated in I.S. 383-1970 and I.S. 456-1978. Bricks shall be stored separately in form of stacks and handled in such a manner so as to prevent braking of bricks and covered by clay and other impurities

**1.3.** The bricks shall be hand or machine molded and made from suitable soils and kiln burnt The shall be free from cracks and flaws and nodules of free lime they shall have smooth rectangular faces with sharp corners and shall be of uniform colour.

**1.4.** The bricks shall be molded with a frog or 100 mm x 40 mm and 10 mm to 20 mm deep on one of its flat sides The bricks shall not break when thrown on the ground from a height of 600 mm

**1.5.** The size of modular bricks shall be 190 x 90 x 90 mm

**1.6.** The size of the conventional bricks shall be as under  
( 9" x 4¾" x 2¾") 225 mm x 110mm x 75 mm

**1.7.** Only bricks of one standard size shall be used on one work The following tolerances shall be permitted in the conventional size adopted in a particular work  
Length + or – 3mm (1/8" ) width 1.50 mm(1/16") height 1.50 mm(1/16")

#### **Kota Stone**

### **2.0 HAND DRESSED MIRROR 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 cranks of flaws

**2.2.** The size of the stone to be used for flooring shall be of size 600 mm x 600 mm and / or

size 600 mm x 450 mm 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.

**4.6.** 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.

### **3.0. WATER**

**3.1** Water shall not be salty brackish and shall be clean reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R C C container for transport storage and huddling of water shall be clean, Water shall conform to the standard specified in I S 455 -1978

**3.2.** If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness change in time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

**3.3** Water for curing mortar concrete or masonry should not be too acidic or too alkaline

**3.4** It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

**3.5** Hard and bitter water and sea water shall not be permitted for curing

**3.6** Potable water will generally found suitable for curing mortar or concrete

**3.7.** Storage Water shall be stored in containers/ tanks covered at top and cleaned at regular intervals in order to prevent intrusion by foreign matter or growth of organic matter Water from shallow muddy or marshy surface shall not be permitted The intake pipe shall be enclosed to exclude silt, mud grass and other solid materials and there shall be a minimum depth of 0.60 m on water below the intake at all times

**3.8.** As a guide following concentrations represent the maximum permissible values

(a) to neutralize 200 ml sample of water using phenolphthalein as indicator, it should not

require more than 2 ml of 0.1 normal NaOH

(b) To neutralize 200 ml of water using methyl orange as an indicator, it should not require more than 10 ml of 0.1 normal HCl

(c) the permissible limits for solids shall be as follows when tested in accordance with IS 3025

	Permissible limits (Max)
Organic	200 mg/lit
Inorganic	3000 mg/lit
Sulphates (SO <sub>4</sub> )	500 mg/lit
Chlorides (Cl)	500 mg/lit
Suspended matter	2000 mg/lit

In case of structures of length 30 m and below, the permissible limit of chlorides may be increased up to 1000 mg/lit

All samples of water (including potable water) shall be tested and suitable measures taken where necessary to ensure conformity of the water to the requirements stated herein.

(d) The pH value shall not be less than 6

## 4.0 CEMENT

**4.1.** Cement to be used in the works shall be any of the following types with the prior approval of the Engineer:

- a)** Ordinary Portland Cement, 33 Grade, conforming to IS:269.
- b)** Rapid Hardening Portland Cement, conforming to IS:8041.
- c)** Ordinary Portland Cement, 43 Grade, conforming to IS:8112.
- d)** Ordinary Portland Cement, 53 Grade, conforming to IS:12269.
- e)** Sulphate Resistant Portland Cement, conforming to IS:12330.

**4.2.** Cement conforming to IS:269 shall be used only after ensuring that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**4.3.** Cement conforming to IS:8112 and IS:12269 may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be achieved by finer grinding and higher constituent ratio of C<sub>3</sub>S/C<sub>2</sub>S, where C<sub>3</sub>S is Tri-calcium Silicate and C<sub>2</sub>S is Dicalcium Silicate. In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

**4.4.** Cement conforming to IS: 12330 shall be used when sodium sulphate and magnesium sulphate are present in large enough concentration to be aggressive to concrete. The recommended threshold values as per IS:456 are sulphate concentration in excess of 0.2 per cent in soil substrata or 300 ppm (0.03 percent) in ground water. Tests to confirm actual values of sulphate concentration are essential when the structure is located near the sea coast, chemical factories, agricultural land using chemical fertilizers and sites where there are effluent discharges or where soluble sulphate bearing ground water level is high. Cement conforming to IS:12330 shall be carefully selected from strength considerations to ensure

that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**4.5.** Cement confirming to IS 8041 shall be used only for pre cast concrete products after specific approval of the Engineer in charge

**4.6.** Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement also total sulfur content calculated as sulfuric anhydride ( $\text{SO}_3$ ) shall in no case exceed 2.5 per cent and 3.0 percent when tri-calcium aluminate per cent by mass in up to 5 or grater than 5 respectively

#### **4.7. Storage**

Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination, Cement shall be stored above ground level in perfectly dry and water tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should sufficient to cover to the requirement at site and should be cleaned at least once every 3 to 4 months

**4.8.** Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered in any way, during storage shall not be used in the works and shall be removed from the site by the contractor without charge to the employer

The contractor shall prepare and maintain proper records on site in respect of delivery handling storage and use of cement and these records shall be available for inspection by the engineer in charge at all times

**4.9.** The contractor shall make a monthly return to the engineer in charge on the date corresponding to the interim certificate date showing the quantities of cement received and issued during the month in stock at the end of the month.

### **5.0 SAND**

**5.1** Sand shall be natural sand, clean well graded, hard strong durable and gritty particular free from immures amounts of dust, clay, kankar modules

**5.2.** For masonry works sand shall confirm to the requirements of IS: 2116

**5.3.** 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.

**5.4.** Sand fine aggregates for structural concrete shall conform to the following grading requirements as shown in the table below

**5.5 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

## 6.0. Proportion

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

## 7.0 Workmanship

### 7.0. Mixing of Mortar

**7.1.** 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.

**7.2** 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.

**7.3** 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.

**7.4.** 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.

**7.5.** 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.

**7.6.** 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.

#### **8.0. Wetting of bricks**

**8.1.** 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 indication of thorough wetting of bricks. Bricks shall be soaked in water for a minimum period of one hour before use. When bricks are soaked they shall be removed from the tanks sufficiently in advance so that at the time of laying they are skin-dry. Such soaked bricks shall be stacked on a clean place when they are not spoilt by dirt, earth etc.

**8.2.** Before laying bricks in foundations, a layer of not less than 12 mm of mortar shall be spread to make the surface on which the work shall be laid even.

**8.3.** All brick work shall be laid in English bond, even and true to line, plumb level and all joints accurately kept. The bricks used on the face shall be selected whole of uniform size and with true rectangular face.

**8.4.** Bricks shall be laid frogs up if any on a full bed of mortar, where laying bricks shall be slightly pressed so that the mortar gets into all the surface pores of bricks to ensure proper adhesion. All joints shall be properly flushed and packed with mortar so that no hollow spaces are left.

**8.5.** Before laying the bricks the bed of foundation trenches shall be cleared of all loose materials leveled watered and rammed as directed.

**8.6.** The brick work shall be built in uniform layer, corners and other advanced work shall be raked back. Bricks work shall be done true up to, plumb or in specified manner. No part of it, during construction, shall use more than one meter above the general construction level to avoid unequal settlement and improper jointing.

**8.7.** Teething may be done where future extension is contemplated but shall be used as an alternative to raking back.

**8.8.** The thickness of joints shall not exceed 12 mm.

**8.9.** When fresh masonry is to be placed against existing surface of structures, these shall be cleaned of all loose material, roughened and wetted as directed by the Engineer-in-charge so as to effect a good bond with the new work.

**8.10.** Green work shall be protected from rain by suitable covering. Masonry work of cement or composite mortar shall be kept constantly moist on all faces for a minimum period of seven days. The top of the masonry work shall be left flooded with water at the close of the day.

#### **9.0 Proportion of Mix**

**9.1.** 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 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.

**9.2.** 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.

### **10.0 Curing :**

**10.1.** 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.

**10.2.** Green cement work shall be protected from rain suitable. 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

**10.3** Immediately after compaction, concrete shall be protected against harmful effects of weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes, 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. Masonry work over- the foundation concrete may be started after 48 hours of its laying but the curing of concrete shall be continued for a minimum period of 14 days.

**10.4** After the final set, the concrete shall be kept continuously wet if required by pounding for a period of not less than 7 days from the date of placement. Hard and bitter water shall not be used for curing

### **11.0. Joints**

**11.1.** Brick 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 racking tools daily during the progress of the work when the mortar is still green so as to provide key for plaster or pointing to be done

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

### **12.0 Scaffolding**

**12.1** Scaffolding shall be sound strong and safe to withstand all loads likely 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.

### **13.0. Finishing of Surface**

**13.1** All brick work shall be finished in a workmanlike manner with the thickness of joints manner striking or tooling as described in these above specifications

**13.1** 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)

**13.2.** 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.

**13.3.** 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.

**13.4.** 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.

**13.5.** 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;

**13.6.** 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.

**13.7.** Joints of flooring shall be through and continuous throughout the building as directed by Engineer in charge

**13.8.** joints shall be filled with a stiff mixture of gray cement surly

**13.9.** The flooring work shall be finished by rubbing and mirror polishing after the the work of flooring is set properly

**13.10.** The rate of flooring is inclusive of 7.5 cm thick skirting using same stone of Jesalmer stone or green kota strips including providing and laying in true line and level including filling the joints with gray cement slurry with rubbing and polishing as directed by Engineer in charge

#### **14.0 Mode of Measurement & Payment :**

**14.1.** The unit rate half brick masonry work shall include the cost of all materials required to produce the item of half brick masonry work including 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 half brick masonry work of specified strength 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.

**14.2.** The half brick masonry work work 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.

**14.3.** The payment will be made on square Meter basis of the finished work.

**Item No. 29 :- Providing erecting and fixing double coated Syntex or equivalent PVC (ISI) mark water tank of required capacity each with all necessary fittings& connection etc. complete on terrace.**

## **General**

This work shall consist of furnishing and placing providing and fixing double coated I.S.I. mark 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 unpotable.
- 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 **volume** to specified capacity to those specified on plan or as directed. The rate shall be for a unit of **one litre basis**.
- 3.3 The payment will be made on **litre** basis of the finished work.

**Item No. 30 :-** Providing and fixing PVC SWR Nahni Trap IS 14735 for drain with jali of the following nominal diameter of self cleansing design with C.I. scread down or hinged grating including the cost of cutting and making good the walls (i) 100 mmr 1:1 ( 1cemtn : 1fine sand)(A)  
Viterous China

**1.0. Materials**

- 1.1. The PVC SWR Nahni Trap IS 14735 for drain with 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 50 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. 31**

**Providing and fixing washbasin with single hole for pillar tape with C.I. or M.S. brackets painted white including cutting holes and making good the same excluding necessary fittings (A) vitreous china : II. Flat back washbasin 550 mm x 400 mm size (I) IN white colour with C.P brass waste for washbasin or sink (32mm dia), pillar tap, capstan head, screw down high pressure with screws, shanks and backnuts (15mm dia) & M.I fisher union for wash basin or sink including rubber plug for washbasin or sink**

**1.0 MATERIAL****1.1. WASH BASIN**

Wash basin squatting pan shall be European type and of best quality as approved by engineer in charge size of the wash basin shall match as per provision in the item of wash basin. type and shape and colour of the wash basin shall be approved by Engineer in charge.

1.1.2 Wash basin shall be of white porcelain first quality best Indian make and it shall conform to IS 2556 (Part – IV) – 1972 and I.S 771 – 1979. The size of the wash basin shall be as specified in the item Wash basin shall be of one piece construction with continued over flow arrangements. All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole or two holes as specified. Each basin shall have a circular waste hole which is either rebated or beveled internally with 65 mm diameter at top and 10 mm depth to suit the waste fitting. The necessary stud slot to receive the bracket on the under side of the basin shall be provided Basin shall have an internal soap holder recess which shall fully drain into the bowl.

**1.2. Chromium plated bottle trap**

P-trap shall be of best quality as approved by engineer in charge

**1.3. Pillar cock**

Pillar cock shall be of best quality and make and chromium plated as approved by engineer in charge

**1.4. Stop cock**

Stop cock shall be of 15 mm dia meter and shall be chromium plated of best quality as approved by engineer in charge

**1.5. C P Brass waste**

C P Brass waste shall be of best quality as approved by engineer in charge having 40 mm dia meter

**2.0. WORKMANSHIP**

**2.1.** The washbasin shall be fixed on the wall as and where directed. The wash basin shall be supported on a pair of M.S. or C.I. brackets fixed in C.M. 1:3 (1 cement : 3

sand). The bracket shall conform to I.S. 775 – 1962. The wall plaster on the rear shall be cut to rest the top edge of the washbasin. After fixing the basing plaster shall be made good and surface finished to match the existing one.

**2.2.** The brackets shall be painted white with ready – mixed paint.

**2.3.** The C.I. brass trap and union shall be connected to 32 mm dia waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to a gully trap or direct in to gully-trap on the ground floor and shall be connected to a waste pipe through a floor trap on the upper floors. C.P. brass trap and union may not be provided where the surface drain or a floor trap is placed directly under basin and the waste is discharged in to vertically.

**2.4.** The height of the front edge to the wash basin from the floor level shall be 80 cms.

**2.5.** The necessary inlet, outlet, connections and fittings such as pillar cocks, CP dress waste trap waste pipe, stop cock, chain wish rubber plug etc. shall be fixed.

**2.6.** The payment of fittings shall be made separately under separate items.

### **3.0 MODE OF MEASUREMENT & PAYMENT :**

**3.1.** The unit rate Wash basin shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & 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 Wash basin work of specified size to complete the structure or its components as shown on the drawings and according to these specifications.

**3.2.** The Wash basin 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 number basis of the finished work.

**Item No. 32**

**Providing and fixing Providing and fixing Kitchen sink with C.I. or M.S. brackets, painted white including cutting holes in walls and making good the same but excluding fittings. (C) Vitreous China Sink.(i) 600mm x 450mm x 150mm size with C.P brass waste for washbasin or sink (32mm dia),pillar tap,capstan head ,screw down high pressure with screws, shanks and backnuts(15mmdia) & M.I fisher union for wash basin or sink including rubber plug for washbasin or sink**

**MATERIAL****1.0 Kitchen sink**

**1.1.** Kitchen sink shall be of iron and shall be sound and free from porosity or any defects which affect serviceability . The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from scratches. chips and other flaws or any other kind of defect which affect serviceability. The size of Kitchen sink shall be specified and shall be of self cleaning design.

**1.2** The Kitchen sink shall be of quality approved by Engineer in charge and shall generally conform to the relevant Indian standard

**1.3** The Kitchen sink provided shall be with fitted on platform by drilling holes of appropriate size using adhesive material of approved quality as approved by Engineer in charge.

**1.2.** The Necessary fittings like, adhesive materials etc, shall be of best quality and makes as approved by the Engineer-in-charge.

**2.0. WORKMANSHIP****Fitting**

**2.1.** When the Kitchen sink are to be Fitted, the surface of Platform shall not be damaged. The Kitchen sink shall be fitted on walls carefully by drilling holes in surface slab surface of wall carefully while fitting of sockets

**3.0 MODE OF MEASUREMENT & PAYMENT :**

**3.1.** The unit rate of Kitchen sink 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 item of Kitchen sink 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 Kitchen sinks shall include the cost of all labour, materials, fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

**3.2.** The Kitchen sink 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. 33 :- Providing and fixing screw down bib taps of following size. (A) Brass screw down bib tap polished bright (ii) 15 mm 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**

**2.0 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 screw down bib tap chromium plated 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 screw down bib tap 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 chromium plated.

**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.

**1.6.** 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 is to be fitted, the ends shall be carefully filed out so that no obstruction to bore is 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 **including testing.**

**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.34:**

**Providing and fixing water closet squatting pan (Indian type W.C. pan) size 580 mm and fixing 100mm size P or S trap including jointing the trap with soil pipe in cement mortar 1 : 1 (1 cement : 1 fine sand) & GI inlet connection For flush pipe (A) Vitreous china - (i) Long pattern-white colour**

**General**

This work shall consist of **Providing and fixing wash down water closet (Indian, W.C. Pan Size 580 mm with 100 mm I 'P' or 'S' trap including jointing the trap with soil pipe** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge

**MATERIAL****1.0. wash down water closet (Indian type)**

**1.1.** The Indian type white glazed water closet of first quality shall be of size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556 – (Part-II) 1981. Each pan shall have integral flushing. It shall also have an inlet at back and front for connecting flush pipes as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 'S' trap with approximately 50 mm. Water seal and 50 mm . diameter vent horn.

**2.0. Foot Rests**

**2.1.** A pair of white glazed earthen ware rectangular foot to minimum size 250 mm x 130 mm. x 20 mm shall be provided with the water closet.

**3.0. 'P' or 'S' trap for water closet squatting pan Vitreous China.**

**3.1.** 'P' or 'S' trap shall be of white porcelain first quality best Indian make and it shall conform to general Indian IS standards The size of the 'P' or 'S' trap shall be as specified in item. 'P' or 'S' trap shall be of one piece All internal angles shall be designed so as to facilitate cleaning.

**3.2.** 'P' or 'S' trap shall have single piece as specified.

**3.0. WATER**

**3.1** Water shall not be salty brackish and shall be clean reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R C C container for transport storage and huddling of water shall be clean, Water shall conform to the standard specified in I S 455 -1978

**3.2.** If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness change in time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar

prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

**3.3** Water for curing mortar concrete or masonry should not be too acidic or too alkaline

**3.4** It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

**3.5** Hard and bitter water and sea water shall not be permitted for curing

**3.6** Potable water will generally found suitable for curing mortar or concrete

**3.7.** Storage Water shall be stored in containers/ tanks covered at top and cleaned at regular intervals in order to prevent intrusion by foreign matter or growth of organic matter Water from shallow muddy or marshy surface shall not be permitted The intake pipe shall be enclosed to exclude silt, mud grass and other solid materials and there shall be a minimum depth of 0.60 m on water below the intake at all times

**3.8.** As a guide following concentrations represent the maximum permissible values

(a) to neutralize 200 ml sample of water using phenolphthalein as indicator, it should not require more than 2 ml of 0.1 normal NaOH

(b) To neutralize 200 ml of water using methyl orange as an indicator, it should not required more than 10 ml of 0.1 normal HCl

(c) the permissible limits for solids shall be as follows when tested in accordance with IS 3025

	Permissible limits (Max)
Organic	200 mg/lit
Inorganic	3000 mg/lit
Soleplates (SO <sub>4</sub> )	500 mg/lit
Chlorides (Cl)	500 mg/lit
Suspended matter	2000 mg/lit

In case of structures of length 30 m and below, the permissible limit of chlorides may be increased up to 1000 mg/lit

All samples of water (including potable water shall be tested and suitable measures taken where necessary to ensure conformity of the water to the requirements stated herein.

(d) The pH value shall not be less than 6

## **4.0 CEMENT**

**4.1.** Cement to be used in the works shall be any of the following types with the prior approval of the Engineer:

- a)** Ordinary Portland cement, 33 Grade, conforming. to *IS:269*.
- b)** Rapid Hardening Portland cement, conforming to *IS:8041*.
- c)** Ordinary Portland Cement, 43 Grade, conforming to *IS: 8112*.
- d)** Ordinary Portland Cement, 53 Grade, conforming to *IS: 12269*.
- e)** Soleplate Resistant Portland cement, conforming to *IS: 12330*.

**4.2.** Cement conforming to IS:269 shall be used only after ensuring that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**4.3.** Cement conforming to IS: 8112 and IS: 12269 may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be achieved by finer grinding and higher constituent ratio of  $C_3S/C_2S$ , where  $C_3S$  is Tri-calcium Silicate and  $C_2S$  is D-calcium Silicate. In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

**4.4.** Cement conforming to IS: 12330 shall be used when sodium sulphate and magnesium sulphate are present in large enough concentration to be aggressive to concrete. The recommended threshold values as per IS:456 are sulphate concentration in excess of 0.2 per cent in soil substrata or 300 ppm (0.03 percent) in ground water. Tests to confirm actual values of sulphate concentration are essential when the structure is located near the sea coast, chemical factories, agricultural land using chemical fertilizers and sites where there are effluent discharges or where soluble sulphate bearing ground water level is high. Cement conforming to IS:12330 shall be carefully selected from strength considerations to ensure that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**4.5.** Cement conforming to IS 8041 shall be used only for pre cast concrete products after specific approval of the Engineer in charge

**4.6.** Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement also total sulfur content calculated as sulfuric anhydride ( $SO_3$ ) shall in no case exceed 2.5 per cent and 3.0 percent when tri-calcium aluminates per cent by mass in up to 5 or greater than 5 respectively

#### **4.7. Storage**

Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination, Cement shall be stored above ground level in perfectly dry and water tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should be sufficient to cover the requirement at site and should be cleaned at least once every 3 to 4 months

**4.8.** Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered in any way, during storage shall not be used in the works and shall be removed from the site by the contractor without charge to the employer

The contractor shall prepare and maintain proper records on site in respect of delivery handling storage and use of cement and these records shall be available for inspection by the engineer in charge at all times

**4.9.** The contractor shall make a monthly return to the engineer in charge on the date corresponding to the interim certificate date showing the quantities of cement received and issued during the month in stock at the end of the month.

### **5.0 SAND**

**5.1** Sand shall be natural sand, clean well graded, hard strong durable and gritty particular

free from immures amounts of dust, clay, kankar modules

**5.2.** For masonry works sand shall confirm to the requirements of IS: 2116

**5.3.** 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.

**5.4.** Sand fine aggregates for structural concrete shall conform to the following grading requirements as shown in the table below

**5.5 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

**5.6. 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

## 5.2. Proportion of Mix

**5.2.1.** Cement and sand shall be mixed to specified proportion, sand being measured by measuring boxes, the proportion of cement will be by volume on the basis of 50 Kg/Bag of cement being equal to 0.0342 Cu.m. The mortar may be hand mixed or machine mixed as directed.

## 5.3. Proportion of Mortar :

**5.3.1.** In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water

cement ratio shall be adopted as directed

**5.3.2. The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes**

## **6.0. WORKMANSHIP**

**6.1.** The **(Indian type)** pan shall be sunk into the floor and embedded in a cushion of average 15cm. cement concrete 1:5:10 ( 1 cement : 10 graded stone aggregate or brick aggregate 40 mm. nominal size) or and its bed concrete. The floor should be left 115 mm below the top level of the pan so as to allow for flooring and its bed concrete. The floor should be suitably stopped sp that the waste water is drained into the pan. The shall be provided with 100 mm. 'P' or 'S' trap as specified in the **item No. 23.113** with approximately 50 mm. seal. The joints between the pan and the trap shall be made leak- proof with cement mortar 1:1 ( 1 cement : 1 fine sand).

**6.2.** The 'P' or 'S' trap shall be fixed with pan cast iron pipe with C.M. 1.1. The pan shall be provided with a 100 nun. 'P' or 'S' trap as specified in the item with an approximately 50 mm . seal The joint between the pan and the trap shall be made leak-proof with cement mortar 1:1(1 cement : 1 fine sand).

## **6.0 MODE OF MEASUREMENT & PAYMENT :**

**6.1.** The unit rate Water Closet shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & 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 Water Closet work of specified size to complete the structure or its components as shown on the drawings and according to these specifications.

**6.2.** The rate includes cost of labour for fixing pans and seat cover,inlet outlet connections , including the cost of seat and covers and water jet including testing the same

**6.3.** The Water Closet 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.

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

**Item No. 35 :- Providing and fixing in position PVC cowl vent to pipes (ii) 100mm dia.**

**General**

This work shall consist of providing and fixing in position **PVC cowl vent** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

**Material**

**1.0. PVC Cowl vent**

- 1.1. PVC Cowl vent shall be sound and free from porosity or other defects which affect serviceability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from craze, chips and other flaws or any other kind of defects which affect serviceability. The size of PVC Cowl vent shall be specified.
- 1.2. PVC Cowl vent shall be of quality approved by the Engineer-in-charge and shall generally conform to the relevant Indian Standards.
- 1.3. The cover shall be perforated cover shall be provided on the trap of appropriate size.

**2.0 MODE OF MEASUREMENTS & PAYMENT**

- 2.1. The rate for PVC cowl vent includes cost of vent, its carting from to work site with all leads and lifts placing and fixing in position.
- 2.2. The rate shall be for a unit of One **Number**.

**ITEM NO.36:****Providing and fixing screw down stop 15 mm****1. 0 MATERIAL****3.0 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. 37 :- Providing and fixing gun metal check or non return fullway wheel valve 32mm dia.**

**1.0. Materials :**

The gun metal check or not return full way wheel valve or specified dia. shall conform to I.S. : 778-1964. The non-return valve shall be of tested quality.

**2.0. Workmanship**

**2.1.** The gun metal check or non return 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.

**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. 38 :- Providing and fixing chromium plated brass half turn flush cock of approved quality including fixing in pipe line etc. complete (i) 20 mm Dia**

**1.0. Materials :** Chromium plated brass Metropole type 20mm dia. Half turn flush cock shall conform to M-67.

**2.0. Workmanship**

The chromium plated brass Metropole type Half turn flush cock of specified diameter shall be fixed as directed. The flush cock shall be fixed in G.I. pipe line with necessary fittings. The joints shall be made leak proof by using spun yarn and white Zink.

**2.1** 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 20 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 cement : 3 coarse sand), and properly finished to match the adjacent surface.

**2.2. Testing of joints :**

**2.2.1.** 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 rate includes cost of all materials and labour required for satisfactory completion of this item including fittings.

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

## **ITEM NO.39**

**Providing and fixing C.P. brass towel rail complete with C.P. brass brackets fixed to wooden plugs with C.P. brass screws**

### **1. 0 MATERIAL**

#### **4.0 Towel Rail**

**1.1.** Towel rail shall be of iron and shall be sound and free from porosity or any defects which affect serviceability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from scale, chips and other flaws or any other kind of defect which affect serviceability. The size of Towel rail shall be specified and shall be of self cleaning design.

**1.2** The Towel rail shall be of quality approved by Engineer in charge and shall generally conform to the relevant Indian standard

**1.3** The Towel rail provided shall be with fitted on brackets fitted on wall of glazed tiled surface of wall by drilling holes duly plugged by wooden gummies by appropriate size of screws as approved by Engineer in charge.

**1.2.** The Necessary galvanized fittings like sockets, screws etc, shall be of best quality and make as approved by the Engineer-in-charge.

### **2.0. WORKMANSHIP**

#### **FITTING & FIXING**

**2.1.** When the Towel rail are to be Fitted, the surface of wall or tiles shall not be damaged. The Towel rail shall be fitted on walls carefully by drilling holes in surface of walls or tiled surface of wall carefully while fitting of sockets

**2.2** In fitting of the Towel rail the socket shall be fitted by means of screws

### **3.0 MODE OF MEASUREMENT & PAYMENT :**

**3.1.** The unit rate of Towel rail 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 Towel rail 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 Towel rails 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 Towel rail 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. 40 :- Constructing brick masonry road gully chamber 500mmx450mm x600 mm including 500mm x 450 mm C.I. Vertical grating with frame complete.**

- 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. 41 :- Providing sock pit of 5.0 Cu.mt. volume including excavating and filling brick bats with dry masonry work at top for 45 cm. 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 conform to M-11. Burnt Bricks shall conform to M-15. Rough stone slab 40 x 50 mm. thick shall conform to M-48. Brick bats 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 payment shall be made on number basis.

**Item No. 42 :-** Providing and fixing to wall, ceiling and floor 10.0 kgF/cm<sup>2</sup> working pressure polythelene pipes of the following out side low density, complete with special flange compression type fittings wall clamps etc. including making good the wall, ceiling and floor. 75 mm dia.

### **AND**

**Item No. 43 :-** Providing and fixing to wall, ceiling and floor 10.0 kgF/cm<sup>2</sup> working pressure polythelene pipes of the following out side low density, complete with special flange compression type fittings wall clamps etc. including making good the wall, ceiling and floor. 110 mm dia.

#### **1.0. Materials**

**1.1.** The low density polythene pipe of specified diameter with **10.0 Kg./Sq.cm.** working pressure shall conform to I.S. 3076-1968. The specials and fittings required shall be of best quality.

#### **2.0. Workmanship**

**2.1.** The P.V.C. pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P.V.C. pipes, due allowance shall be made particularly in over ground pipe lines for any change in length of pipe line which may occur during installation or when pipe line which may occur during installation or when pipe line is in service.

**2.2.** Above ground installation of rigid P.V.C. pipe should be under taken after preparations are observed for their protection against direct sun rays and mechanical damage.

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

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

-20 mm. dia 500 mm.                      -25 mm. dia 750.mm.                      -32 mm. dia.900 mm.

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

**2.6.** The guide lines indicated by the manufacturer regarding handling, transportation, storing, laying and jointing pf pipes shall be kept in view during execution.

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

#### **2.8. Jointing the pipes :**

**2.8.1.** The pipes and sockets shall be accurately cut. The ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper, and then solvent cement joint. Since solvent cement is aggressive to P.V.C. care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped of after jointing. Empty solvent cement tins, brushes, rags, or paper impregnated with cement should not be buried in the trenches. They should be gathered not left scattered about, as-they can prove to be a hazard to animals, which may chew them.

**2.8.2.** If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.

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

- 2.9.1. The pipes shall be laid over uniform relatively soft fine trained soil found to be free of presence of hard object such as large flints, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.
- 2.9.2. The pipes laid underground shall not be less than one meter from the ground level. The pipe shall be positioned in the trenches so as to avoid any induced stressed due to deflection. Any deviation required shall be obtained by using proper type of rubber ring joints.
- 3.0. **Mode of measurements & payment**
- 3.1. The 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 P.V.C. pipes 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 unit rate shall be for a unit of One running meter.

**ITEM NO.44**

Providing, laying and jointing in true line and level UPVC pipe (SCH-40) line including fittings make or equivalent as approved by engineer-in-charge. Pipes shall be fixed on the wall with the help of clamp at every two meter 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. 15 mm

**AND****ITEM NO.45**

Providing, laying and jointing in true line and level UPVC pipe (SCH-40) line including fittings make or equivalent as approved by engineer-in-charge. Pipes shall be fixed on the wall with the help of clamp at every two meter 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. 32 mm

**AND****ITEM NO.46**

Providing, laying and jointing in true line and level UPVC pipe (SCH-40) line including fittings make or equivalent as approved by engineer-in-charge. Pipes shall be fixed on the wall with the help of clamp at every two meter 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. 40 mm

In general the work shall be carried out as per the standard specifications of P.W.D. / C.P.W.D., relevant drawings and as per the instructions of Engineer in Charge. Work shall be carried out as per item description.

**1.0. Materials**

- 1.1. The pipes shall be standard I.S.I. mark U.P.V.C. pipe having thermal stability for hot and cold water supply 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 is 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 leaky shall be redone, and all 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 be held to include the consequent waste.
- 3.5.** In case of fitting of unequal bore, the target 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 and carrying out the tests.
- 3.7.** The rate includes [U.P.V.C. pipes having thermal stability for hot and cold water supply](#) with screwed socket joints to gather with all fittings (such as bends, sockets, elbows, tees, 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.47****P & F G.I. Rain water spout of 50 mm dia and 30 cm length*****Rain Water SPOUTS***

Drainage along longitudinal direction shall be ensured by sufficient number of drainage fixtures embedded in the deck slab. The spouts shall be of not less than 50 mm in diameter and shall be of corrosive resistant material such as galvanised steel with suitable cleanout fixtures. The spacing of drainage spouts shall not exceed 10 m. The discharge from drainage spout shall be kept away from the deck structure by means of suitable down pipes upto 500 mm above High Flood Level. In case of viaducts in urban areas, the drainage spouts should be connected with suitably located runners and down pipes to discharge the surface run-off into drains provided at ground level.

***Fabrication***

The drainage assembly shall be fabricated to the dimensions shown on the drawings. All materials shall be corrosion resistant. Steel components shall be of mild steel conforming to IS:226. The drainage assembly shall be seam welded for water tightness and then hot-dip galvanised.

***Placement***

The galvanised assembly shall be given two coats of bituminous paint before placement. The whole assembly shall be placed in true position, lines and levels as shown on the drawings with necessary cutouts in the shuttering for deck slab and held in place firmly. Where the reinforcements of the deck are required to be cut, equivalent reinforcements shall be placed at the corners of the cut out.

***Finishing***

After setting of the deck slab concrete, the shrinkage cracks around the assembly shall be sealed with polysulphide sealant or bituminous sealant as per 18:1834 and the excess sealant trimmed to receive the wearing coat. After the wearing coat is completed, similar sealant shall be provided to cover at least 50 mm on the wearing coat surface all round the drainage assembly.

***MEASUREMENTS FOR PAYMENT***

Drainage / water spouts shall be measured in numbers.

**ITEM NO.48**

**Painting of various types of birds, animals cartoons & educational slogans with oil paint & acrylic paint on pre primed wall labour, materials, colour etc complete as directed**

**General**

This work shall consist of painting the walls with plastic emulsion paint on surface of ceiling and soffit, 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 Plastic Emulsion Paint**

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

1. plastic emulsion paint shall not show excessive setting in freshly opened full can and shall easily be redispersed with a paddle to a smooth homogeneous state The plastic emulsion paint shall show no curding, livering cracking or colour separation and shall be free from lumps and skins
2. The plastic emulsion paint as received shall brush easily possess good leveling properties and show no running or sagging tendencies
3. The plastic emulsion paint shall not skin within 48 hours in a three quarters filled closed container
4. The plastic emulsion paint shall dry to a smooth uniform finish free from roughness grit unevenness and other imperfections
5. Ready mix plastic 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 Primer**

Primer shall be of specified colour as approved by Engineer in Charge plastic emulsion paint shall meet with the following general requirements

1. Primer shall not show excessive setting in freshly opened full can and shall easily be redispersed with a paddle to a smooth homogeneous state The paint shall show no curding, livering cracking or colour separation and shall be free from lumps and skins
2. The Primer as received shall brush easily possess good leveling properties and show no running or sagging tendencies
3. The Primer shall not skin within 48 hours in a three quarters filled closed container The paint shall dry to a smooth uniform finish free from roughness grit unevenness and other imperfections

## 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

### 2.2 Priming coat

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 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 Application of distemper coat:

The plastic emulsion paint is not recommended to be applied within six months of the completion of wall plaster.

The plastic emulsion paint 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 The plastic 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 plastic 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 plastic emulsion paint shall be mixed to finish one room at a time. The application

### 3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate Wall painting with plastic emulsion paint shall include the cost of all materials, tools and plant required for mixing, clearing 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 plastic 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 plastic 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 running - meter.

3.4. The payment will be made on square Meter basis of the finished work

**ITEM NO.49**

**Providing septic tank of inside dimensions 1.00m x 2.00m x 1.00m with brick masonry of CM 1:6 foundation floor with 1:5:10 B.B.C. finished with 15mm C.P. in CM 1:3 root cover of R.C.C. slab inc. connection pipe from inlet and outlet etc.**

- 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.** Sump for storage a drinking water 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 cm. 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 cm. 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 cm. 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 Sump for storage a drinking water and bends shall be measured and paid for separately.
- 3.2.** The rate shall be for a unit of One number.

**ITEM NO.50**

**Contracting A ground level sump for storage a drinking Water with monoblock motor pump set with wooden box cover for motor etc. com.**

- 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.** sump for storage a drinking water 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 cm. 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 cm. 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 cm. 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.

**2.14** Providing & fixing Single phase self priming mono block pump set of ISI mark 0.50 H.P. with outlet & inlet all as per requirement. with wooden cover on the pump to protect from water.

**3.0. Mode of measurements and payment**

**3.1.** The earth work in excavation, providing and laying Sump for storage a drinking water and bends shall be measured and paid for separately.

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

**ITEM NO 51 :**

Providing and laying broken chine 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 MATERIAL - WATER**

- 1.1 Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. container for transport storage and huddling of water shall be clean. Water shall confirm to the Standard Specification in I.S. 455 - 1978.
- 1.2 If required by the Engineer in charge, it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269 - 1976. Any indication of unsoundness charge in time of setting by 50 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3 Water for curing, mortar concrete or masonry should not be too acidic/too alkaline.
- 1.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.5 Hard and bitter water shall not be used for curing.
- 1.6 Potable water will generally found suitable for curing mortar or concrete.

**2.0 CEMENT**

- 2.1 Cement shall be ordinary Portland slag cement as per I.S. 1624 - 1974 or Portland slag cement as per I.S.455-1976.
- 2.2 Cement shall be stored above the ground level in perfectly and dry and water tight sheds. Wherever bulk storage containers are used, there capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock piles sufficiently away from the each other to prevent inter mixing the materials.

**3.0 SAND**

- 3.1 Sand shall be natural sand, clean, well graded, hared, strong, durable and gritty particular free from immures amounts of dust, clay, kankar, modules, soft or flaky

particles shall alkali salts, organic matter, learn mica or other deleterious substance and shall be got approved from the Engineer in charge. The sand shall not contain more than 8 percent of slit as determined by field test if necessary, the sand

**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 :

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

**3.2 FINE SAND** : The fineness modules shall not exceed 1.0 the sieve analysis of fine sand be as under:

<b>I.S. Sieve Designation</b>	<b>% by wt. passing</b>
4.75 mm	100
2.36 mm	100
1.18 mm	70 to 100
600 MC	40 to 85
300 MC	05 to 50
150 MC	00 to 10

**3.3** Materials shall be stored as to prevent their deterioration of their quality and fitness for the work. Any material which has deterioration or has been damaged or is otherwise considered defective by the Engineer in charge shall not be used in the work.

#### **1.4 WATER PROOFING COMPOUND**

Water proofing compound shall be of approved quality and make as approved by Engineer in charge.

#### **1.5 BRICK BATS**

Brick bat aggregates shall be broken from well burnt or slightly over burnt and dense bricks it shall be homogeneous in texture roughly cubical in shape clean and free from dirt or any other foreign material brick bats shall be of 40 to 50 mm nominal size unless otherwise specified in the item the under burnt or over burnt bricks bats shall not be used.

#### **1.6 CHINA MOSAIC TILE PIECES**

China mosaic tiles pieces shall be of 50 mm to 90 mm nominal size, tiles pieces shall be made from hard and good quality of tiles.

#### **1.7 WHITE CEMENT**

White cement shall be of approved make it shall confirm definition of I.S. 8042-E-1978 the sample of white cement shall be approved by Engineer in charge.

### **WORKMANSHIP**

- A** First of all surface of the entire terrace shall be cleaned by thoroughly brooming and then by wire brushes. All the loose material, dust and debris shall be removed thoroughly from the entire surface of the terrace.

All joints and cracks shall be raked off and cut in trench which shall be filled by neat cement slurry admixed with water proofing compound. The joints with parapet shall be raked up to 30 cm height and shall be applied by neat cement slurry admixed with water proofing compound.

Neat cement slurry shall be prepared and a water proofing compound of approved make shall be mixed with the slurry in proportion specified by the manufacturer of the compound and shall be laid through out the surface of the terrace by the use of brushes mala etc. Cement slurry shall be prepared by adding adequate quantity of water so as to spread it uniformly on the surface.

- B** Cement concrete 1:5:10 (Using 50% of cement mortar 1:5, 1 part of cement and 5 part of coarse sand by volume admixed with water proofing compound of approved make in specified proportion). Of specified thickness shall be laid (Specification of C.C. 1:5:10 shall be followed for the execution of this layer) all over the surface of the terrace in true level and required slope including rounding of junctions of walls and slabs.

- C** After two days of proper curing applying a second coat of cement slurry on entire surface of the terrace.

- D** The entire surface shall be finished with 20 mm thick C.M. 1:4 and China mosaic tilling in true level and slope as directed by Engineer in charge and finally finishing the surface with trowel with white cement slurry (Specification of white glazed tiles flooring shall be followed for the execution of this item).

- E** Finishing the surface with 20 mm thick C.M. 1:4 and China mosaic tilling and finally finishing the surface with trowel with white cement slurry.

- F** After two days proper curing the terrace shall be flooded for 15 days.

## **7.0 MODE OF MEASUREMENT AND PAYMENT**

- 7.1** The unit rate of 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 and placing broken pieces of china mosaic tile in position, compacting, finishing, curing, providing treatment of 30 cm high allover the length of parapets and corners and sill of doors etc. and all other incidental expenses for producing flooring work to complete the structure of its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing of all scaffolding and forms required for the work.

The rate of plastering shall include the cost of all labour, materials, tools and plants, scaffolding and all incidental expenses as described herein above.

- 7.2** The plaster work shall be measured for its length and width, limiting dimensions to

those specified on plan or as directed. The rate shall be for a unit of one Square Meter.

7.4 A guarantee bond on appropriately stamped paper shall be given by the contractor to the Department in the manner and form prescribed below.

7.5 The payment will be made on **Square Meter** basis of the finished work.

## FORM OF GUARANTEE BOND

Contractor I / We \_\_\_\_\_) here by guarantee that work will remain unaffected and will not be in anyway damaged by water rain and will not leak from surface for a period for 5 years after completion of the work of water proofing treatment as per the terms and conditions of the contract and damage that might be caused on account of water rain and or other similar type of dampness or leakage from walls or above floor.

The guarantee shall remain in force for the period of 5 years from the completion of the work under the contract and it shall remain binding to the contractor for period of 5 years.

The deposit at the rate of 20% of the cost of this item from the running and final bills shall be recovered and remained for the first one year after completion of the work or at least on monsoon season passed which ever is later and 10% shall be retained for the balance of the guarantee period and shall be returned only after completion of the guarantee period.

## MODE OF MEASUREMENT AND PAYMENT

The length and breadth shall be measured correct to cm. as per the dimension of the sanctioned plants. No deduction shall be made nor extra for paid for any opening for pipes etc. upto 0.1 sq.mt. The rate shall include the cost of all labour and materials required for the operation involved. For satisfactory completion.

**Item No. 52 :-** 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 levelling 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 Dyed interlocking concrete block paving tiles 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 Dyed interlocking concrete block paving tiles

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

- 1.1 The size shape and design of rubber Dyed interlocking concrete block paving tiles shall generally be as per manufacturers product or as directed by the Engineer in charge and Architect.
- 1.2 The rubber Dyed interlocking concrete block paving tiles 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 paving tiles shall be directed by Engineer or Architect.
- 1.4 The rubber Dyed interlocking concrete block paving tiles 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
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	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 paving tiles** shall be laid on a layer **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 paving tiles** 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 paving tiles** shall be laid in plain, diagonal or other pattern as directed. The cement concrete blocks shall be laid properly and set home by gentle tapping.
- 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 paving tiles** 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.53**

**Writing letter or figures on any surface with black japan paint (stops,comas, hyphens and the like not to be measured and paid for separately) (ii) Indian (Letters/Figures)**

**Materials**

The paint shall be confirm to IS 164-1951.

**Workmanship**

The painting of lines dashes arrows and letters on Building shall be carried out with paint as as directed by the Engineer-in-charge

**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 per letter per Cm/Ht..

**ITEM NO.54**

**providing & erecting for 42"LED TV complete with necessary suitable cables as per requirement on site as per direction of Engineer - in - charge )**

**1.0 Materials**

The LED TV shall be of approved make, minimum 42 inch screen size and of latest model conforming to relevant Indian Standards.

All power cables, HDMI cables, connectors, wall mounting brackets and accessories shall be of approved quality and make.

**2.0 Workmanship**

The LED TV shall be supplied, installed and fixed securely at the designated location using approved wall mounting brackets.

All necessary power and signal cables shall be provided and properly connected for satisfactory operation of the TV.

The installation shall be completed in a neat manner with proper alignment and concealed/exposed cable routing as directed by the Engineer-in-Charge.

The TV shall be tested after installation and handed over in proper working condition.

**3.0 Mode of Measurement & Payment**

The rate shall include the cost of LED TV, mounting brackets, cables, fittings, labour, testing, commissioning and all incidental expenses required for satisfactory completion of the work.

The rate shall be for a unit of **Number**.

**ITEM NO.55**

**providing & erecting for R.O. Water Purifier complete with necessary Connections as per requirement on site as per direction of Engineer - in - charge )**

**1.0 Materials**

The R.O. Water Purifier shall be of approved make, model and capacity suitable for providing safe drinking water and as approved by the Engineer-in-Charge.

The unit shall be supplied complete with filters, membrane, storage tank, fittings, valves, tubing, electrical cord and all standard accessories required for proper operation.

**2.0 Workmanship**

The R.O. Water Purifier shall be installed at the designated location and securely fixed in position.

Necessary water supply, drain and electrical connections shall be provided and connected for satisfactory operation of the system.

The complete unit shall be tested and commissioned to ensure proper functioning and leak-proof operation.

The installation shall be completed in a neat and workmanlike manner as directed by the Engineer-in-Charge.

**3.0 Mode of Measurement & Payment**

The rate shall include the cost of R.O. Water Purifier, all fittings, accessories, connections, labour, testing, commissioning and all incidental expenses required for satisfactory completion of the work.

The rate shall be for a unit of **Number**.

**ITEM NO.56****SUPPLY AND INSTALLATION OF ABC - 6 Kg. capacity as per IS Make Pro/ Red Bottle FIRE EXTINGUISHER**

Supply & Installation Of ABC - 6 Kg. capacity as per IS Make Pro/ Red Bottle FIRE EXTINGUISHER have approved quality and shall be standard size as directed by the Engineer-in-charge of the work

ABC Types Fire extinguishers are effective for all types of fire like Class A, B and C types of fires as well as Electrical fires and also ABC Powder Type (Stored Pressure) Fire Extinguisher.

ISI, ISO and CE Certified Product and Multipurpose Uses ABC Type fire extinguisher 6 Kg with 5 years Warranty

Multi-purpose application:

Class A: Solids such as Wood, Paper, Textiles and Fabric.

Class B: Flammable Liquids such as petrol, paraffin and oil.

Class C: Flammable Gases such as propane, butane and methane.

Can also be used on electrical equipment.

Measurement shall be per **number** of FIRE EXTINGUISHER Installed.

Unit rate includes cost of all material, Fixing Charges, labour etc. for complete work.



**ITEM NO.57****SUPPLY AND INSTALLATION OF Co2 - 4.5 Kg.capacity as per IS Make Pro/ Red Bottle  
FIRE EXTINGUISHER**

Supply & Installation Of Co2 – 4.5 Kg. capacity as per IS Make Pro/ Red Bottle FIRE EXTINGUISHER have approved quality and shall be standard size as directed by the Engineer-in-charge of the work

ISI, ISO and CE Certified Product and Warranty: 12 Months

CO2 TYPES FIRE EXTINGUISHER 4.5 Kg. Capacity ISI Mark and Co2 Type Fire Extinguisher uses all respect and 'B' and 'C' class fires - inflammable liquids, gaseous fires like L.P.G. and acetylene, and electrical fires

Measurement shall be per **number** of FIRE EXTINGUISHER Installed.

Unit rate includes cost of all material, Fixing Charges, labour etc. for complete work.



**ITEM NO.58**

**Providing and laying in ground 100 mm Diameter, P.V.C. Rain water pipe with necessary fittings connection as per detail drawing or as directed by engineer in charge.**

**1.0 Materials**

The pipe shall be 100 mm diameter PVC Rain Water Pipe of approved make and quality conforming to relevant Indian Standards.

All fittings such as bends, tees, sockets, reducers, couplers, end caps and other accessories required for the work shall be of approved make and matching specifications.

**2.0 Workmanship**

The pipes shall be laid true to line and level in the trenches as shown on the drawings or as directed by the Engineer-in-Charge.

Jointing of pipes and fittings shall be carried out using approved solvent cement or rubber ring joints as recommended by the manufacturer to obtain watertight joints.

The trench bottom shall be properly dressed and the pipes shall be laid carefully to avoid damage. After laying and testing, the trench shall be backfilled and compacted with selected excavated earth.

All fittings, specials and connections required for completing the rain water disposal system shall be provided and fixed properly.

After laying and jointing, the pipeline shall be tested for proper flow and leak-proof performance. Any defective pipe or joint shall be replaced without extra cost.

**3.0 Mode of Measurement & Payment**

The rate shall include the cost of pipes, fittings, jointing materials, excavation, laying, testing, backfilling, making good and all labour, tools, plants and incidental expenses required for satisfactory completion of the work.

The pipe shall be measured along the centre line of the finished pipeline including fittings.

The rate shall be for a unit of **running metre**.

**ITEM NO.59**

**Providing & Constructing filter Chamber of size 2.06 x 1.21 x 1.20 mt. including connecting rain water pipes as per detail drawing or as directed by engineer incharge.**

**1.0 Materials**

The materials shall conform to the relevant specifications of **Item No. 49 (Septic Tank)**, except that approved quality rain water pipes and fittings shall be used for inlet and outlet connections.

**2.0 Workmanship**

The excavation, PCC foundation, brick masonry in CM 1:6, half brick partition wall in CM 1:4, plastering, RCC cover slab with reinforcement, curing and testing shall conform to the relevant specifications of **Item No. 49**.

The filter chamber shall be constructed to the dimensions shown on the drawings and at the location directed by the Engineer-in-Charge.

Rain water inlet and outlet pipes shall be properly fixed and connected to ensure free flow of water through the chamber.

The completed chamber shall be cleaned and tested for satisfactory performance before acceptance.

**3.0 Mode of Measurement and Payment**

The rate shall include excavation, PCC, brick masonry, partition wall, plastering, RCC slab, reinforcement, formwork, rain water pipe connections, labour, materials, tools and plant, curing, testing and all incidental expenses required for satisfactory completion of the work.

The completed filter chamber shall be measured and paid on Number basis.

The rate shall be for a unit of Number.

## **ITEM NO.60**

**Constructing Percolation Sockwell of 2.54 mt internal clear diameter and 5.00 Mt depth including brick masonry in C.M 1:6.,R.C.C. Top slab of 10 cm thick.filling with gravel etc.complete as per detail drawing or as directed by engineer in charge.**

### **1.0 Materials**

Water, cement, sand, bricks, stone aggregates, reinforcement steel and gravel shall conform to the relevant specifications of the tender booklet and approved samples.

The gravel shall be clean, hard, durable and free from dust, clay and organic impurities.

### **2.0 Workmanship**

Excavation, PCC foundation, brick masonry in C.M. 1:6, plastering, reinforcement, RCC work, curing and testing shall conform to the relevant specifications of **Item No. 49** except as modified herein.

The sockwell shall be constructed with an internal clear diameter of 2.54 m and depth of 5.00 m or as shown on the approved drawings.

The circular honeycomb brick masonry shall be constructed in C.M. 1:6 as shown in the drawings to permit percolation of water into the surrounding soil.

The bottom of the sockwell shall be left open and the inside shall be filled with approved graded gravel as specified in the drawings.

A 100 mm thick R.C.C. top slab complete with necessary reinforcement shall be provided at the top. The slab shall be properly supported on the masonry wall and finished smooth.

All inlet rainwater pipes shall be properly connected and sealed to ensure free flow of water into the sockwell.

The completed sockwell shall be cleaned and tested to the satisfaction of the Engineer-in-Charge.

### **3.0 Mode of Measurement and Payment**

The rate shall include excavation, PCC, honeycomb brick masonry, gravel filling, RCC slab, reinforcement, formwork, pipe connections, curing, testing, labour, materials, tools and plant and all incidental works required for satisfactory completion of the item.

The completed sockwell shall be measured and paid on Number basis.

The rate shall be for a unit of Number.

**Item No. 61 Providing & fixing post and pipe railing as per detailed drawing including 3 coats of painting to steel works complete.**

## **1.0 Materials**

1.1 G.I. pipes shall conform to IS 1239 (Part-1) and shall be of approved quality and specified diameter.

1.2 Structural steel sections used for posts shall conform to IS 2062.

1.3 Concrete used for foundations of railing posts shall conform to IS 456 and relevant specifications of concrete work.

1.4 Primer and synthetic enamel paint shall conform to relevant Indian Standards and shall be of approved make and shade as approved by the Engineer-in-Charge.

1.5 All fittings, couplings, bolts, nuts, clamps and fasteners shall be of approved quality.

## **2.0 Workmanship**

2.1 The railing shall consist of structural steel posts of approved size and section fixed in concrete foundations or supporting structure as shown on the drawings and approved by the Engineer-in-Charge.

2.2 The posts shall be truly aligned, plumb and securely anchored in position.

2.3 The railing shall comprise three horizontal rows of G.I. pipes, the top rail being 50 mm diameter and the lower two rails being 40 mm diameter, unless otherwise specified in the drawings.

2.4 Holes of required size shall be provided in the posts and the pipes shall be fixed securely with necessary couplings, fittings and fasteners complete.

2.5 All exposed steel surfaces including posts, pipes and fittings shall be thoroughly cleaned of rust, oil, grease, dirt and other foreign matter and shall be painted with one coat of approved metal primer followed by two coats of synthetic enamel paint of approved shade.

2.6 The posts shall be fixed at 2.0 m to 2.5 m centre-to-centre spacing or as shown on the drawings.

## **3.0 Mode of Measurement and Payment**

3.1 The railing shall be measured in running metres along the centre line of the completed railing.

3.2 The rate shall include the cost of all materials, labour, concrete foundations for posts, fittings, fasteners, cutting, welding, fixing, painting, tools and plant and all incidental works required for satisfactory completion of the item.

3.3 The rate shall be for a unit of running metre.

**Item No. 62 Providing & fixing mosquito mesh for windows & ventilations complete****1.0 Materials**

1.1 The mosquito mesh shall be made of approved quality fiberglass, stainless steel, aluminium or nylon mesh as specified in the item and approved by the Engineer-in-Charge.

1.2 The frame, wherever required, shall be made of approved aluminium/PVC sections complete with necessary corner cleats, rubber gasket, screws and accessories.

**2.0 Workmanship**

2.1 The mosquito mesh shall be fixed to windows and ventilators as shown on the drawings or as directed by the Engineer-in-Charge.

2.2 The mesh shall be stretched properly and fixed firmly to the frame without wrinkles, sagging or damage.

2.3 The frame shall be fixed in position with suitable screws, clips or approved fixing arrangement complete.

2.4 The completed mesh shall be neat in appearance and shall provide effective protection against insects and mosquitoes.

**3.0 Mode of Measurement and Payment**

3.1 The rate shall include the cost of mesh, frame, fixtures, fasteners, labour, tools and plant and all incidental works required for satisfactory completion of the item.

3.2 The mosquito mesh shall be measured in square metres of finished work.

3.3 The rate shall be for a unit of square metre.

**SPECIFICATION OF**  
**ITEM NO.63 to 73**  
**AS PER ATTACHED ELECTRICAL SPECIFICATION**

**Item No. 74 Providing and Fixing SS 304 Foldable Checking bed having size 1.50 X 0.60 X 0.75 mm including using of 25mm dia pipe, SS 2mm thick, matter of 25.4 (1") of 40 density, cover with regine cloth of approved quality etc completed as directed by Engineer incharge.**

### **1.0 Materials**

- 1.1 The checking bed shall be fabricated from SS 304 pipe of 25 mm dia and minimum 2 mm thickness.
- 1.2 Mattress shall be 25.4 mm (1") thick of 40 density foam covered with approved quality rexine cloth.
- 1.3 All fittings, hinges and fasteners shall be of stainless steel.

### **2.0 Workmanship**

- 2.1 The bed shall be fabricated, assembled and fixed complete as per approved design and dimensions of 1.50 m x 0.60 m x 0.75 m.
- 2.2 All welded joints shall be smooth and properly finished.
- 2.3 The bed shall be stable, foldable and free from sharp edges.

### **3.0 Mode of Measurement & Payment**

- 3.1 The rate shall include all materials, labour, fittings and incidental expenses complete.
- 3.2 The rate shall be for a unit of **Number**.

**Item No. 75 Providing and Placing IT wood writing table having size 1.50 X 0.75 X 0.75 mt with one side drawer with using of 19mm thick WP wood, top cover with 1 mm thick wood type Formica including using of all necessary material & labour etc completed as directed by Engineer incharge.**

### **1.0 Materials**

- 1.1 The table shall be made from 19 mm thick waterproof plywood/wood board.
- 1.2 Top surface shall be finished with 1 mm thick wood finish laminate (Formica) of approved shade.
- 1.3 Necessary drawer fittings, handles and hardware shall be of approved quality.

### **2.0 Workmanship**

- 2.1 The table shall be of size 1.50 m x 0.75 m x 0.75 m with one side drawer.
- 2.2 All exposed surfaces shall be finished smooth and properly polished/laminated.

### **3.0 Mode of Measurement & Payment**

- 3.1 The rate shall include all materials, labour, hardware and finishing complete.
- 3.2 The rate shall be for a unit of **Number**.

**Item No. 76 Providing and fixing Fabric cloth Curtain having length 1.8 mtr for covering of checking area including using of alluminum sliding channel etc complete as directed by Engineer incharge.**

### **1.0 Materials**

- 1.1 Curtain cloth shall be of approved quality, colour and pattern.
- 1.2 Aluminium sliding channel and accessories shall be of approved make.

### **2.0 Workmanship**

- 2.1 Curtain shall be fixed complete with sliding channel, rollers, hooks and accessories.
- 2.2 Finished length shall be 1.80 m or as shown in drawings.

### **3.0 Mode of Measurement & Payment**

- 3.1 The rate shall include cloth, channel, fittings, labour and all incidental expenses.
- 3.2 The rate shall be for a unit of **Running Meter**.

**Item No. 77 Providing and Fixing of SS 304 Hanger for bag including using all necessary materials like SS rail, screw etc completed as directed by Engineer Incharge.**

### **1.0 Materials**

- 1.1 Hanger shall be fabricated from SS 304 sections, pipes or plates of approved design.
- 1.2 Screws and fasteners shall be stainless steel.

### **2.0 Workmanship**

- 2.1 The hanger shall be securely fixed to wall at locations directed by the Engineer-in-Charge.
- 2.2 All exposed surfaces shall have smooth finish.

### **3.0 Mode of Measurement & Payment**

- 3.1 The rate shall include all materials, labour and fittings complete.
- 3.2 The rate shall be for a unit of **Number**.

**Item No. 78** Providing and Fixing pin cushion display board having size 1.20 X 0.75 mt including using of alluminum section frame, 18mm thick WB plywood, nevy blue Cushion cloth pin etc completed as directed by Engineer Incharge.

### **1.0 Materials**

- 1.1 Board shall be of size 1.20 m × 0.75 m.
- 1.2 Frame shall be made from approved aluminium sections.
- 1.3 Backing shall consist of 18 mm thick waterproof plywood covered with navy blue cushion cloth.

### **2.0 Workmanship**

- 2.1 The board shall be fixed securely to wall complete with all accessories.
- 2.2 Cloth shall be stretched uniformly without wrinkles.

### **3.0 Mode of Measurement & Payment**

- 3.1 The rate shall include all materials, labour and fittings complete.
- 3.2 The rate shall be for a unit of **Number**.

**Item No. 79** Providing and fixing PVC modular kitchen cabinet consisting of base and wall units, made from high quality rigid PVC boards (minimum 15–18 mm thick), including shutters, shelves, drawers, SS hinges, telescopic channels, handles, magnetic locks, necessary fittings, cutting, fixing, complete as per design and direction of Engineer-in-charge.

### **1.0 Materials**

- 1.1 Cabinet shall be manufactured from rigid PVC boards of minimum 15–18 mm thickness.
- 1.2 Hinges, telescopic channels, handles, magnetic locks and accessories shall be of approved quality.

### **2.0 Workmanship**

- 2.1 The cabinet shall include base units, wall units, shutters, shelves and drawers as per approved design.
- 2.2 All joints shall be neat, rigid and properly finished.

### **3.0 Mode of Measurement & Payment**

- 3.1 The rate shall include all materials, labour, fittings, cutting and fixing complete.
- 3.2 The rate shall be measured in **Square Metre** of front elevation area of cabinet.

**Item No. 80** Providing and fixing of hook of 10mm or 12mm dia including drilling hole, fixing of male- female thrade fastner sealing the same with appoxy compound, finishing the same etc complete as directed by Engineer incharge.

### **1.0 Materials**

- 1.1 Hook shall be of approved stainless steel or M.S. with approved finish.
- 1.2 Male-female threaded fasteners and epoxy compound shall be of approved quality.

### **2.0 Workmanship**

- 2.1 Holes shall be drilled and hooks fixed using threaded fasteners and epoxy compound.
- 2.2 The fixing shall be firm, secure and properly finished.

### **3.0 Mode of Measurement & Payment**

- 3.1 The rate shall include drilling, fixing, materials, labour and finishing complete.
- 3.2 The rate shall be for a unit of **Number**.

**Item No. 81** Providing and fixing medical device & equipment standio meter height measuring scale 2.10mt long including fixing in wall with using of all heavy SS screw, rail etc complete as directed by Engineer incharge.

### **1.0 Materials**

- 1.1 Stadiometer shall be of approved make and quality with measuring range up to 2.10 m.
- 1.2 Fixing screws, rails and accessories shall be stainless steel.

### **2.0 Workmanship**

- 2.1 The scale shall be fixed vertically and accurately on wall.
- 2.2 Necessary calibration and alignment shall be ensured.

### **3.0 Mode of Measurement & Payment**

- 3.1 The rate shall include all materials, labour, fixing and accessories complete.
- 3.2 The rate shall be for a unit of **Number**.

**Item No. 82 Providing and supplying standard PVC (Polyvinyl chloride) Chair with handle of approved design and make as directed by Engineer incharge.**

**1.0 Materials**

1.1 Chair shall be manufactured from high quality moulded PVC/plastic material of approved make and design.

**2.0 Workmanship**

2.1 The chair shall be free from cracks, sharp edges and manufacturing defects.

**3.0 Mode of Measurement & Payment**

3.1 The rate shall include supply, transportation and all incidental expenses complete.

3.2 The rate shall be for a unit of **Number**.

**Item No. 83 Providing and supplying standard PVC (Polyvinyl chloride) Stool having size 0.375 X 0.60 X 0.45 mtr of approved make as directed by Engineer incharge.**

**1.0 Materials**

1.1 Stool shall be manufactured from high quality moulded PVC/plastic material of approved make and design.

**2.0 Workmanship**

2.1 Stool shall be of approved dimensions and free from defects.

**3.0 Mode of Measurement & Payment**

3.1 The rate shall include supply, transportation and all incidental expenses complete.

3.2 The rate shall be for a unit of **Number**.

## **Item No. 84 : Dismantling Existing Building**

### **1.0. Workmanship**

- 1.1. The demolition shall consist of demolition of one or more parts of the building as specified or shown in the drawings. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown in the drawings.
- 1.2. The demolition shall always be planned before hand shall be done in reverse order to the one in which the structure was constructed. This scheme shall be got approved from the Engineer-in-charge before starting the work. This however will not absolve the contractor from the responsibility of proper and safe demolition.
- 1.3. Necessary propping, shoring and under pinning shall be provided for the safety of the adjoining work or property, which is to be left intact, before dismantling and demolishing is taken up and the work shall be carried out in such a way that no damage is caused to the adjoining property.
- 1.4. Wherever required, temporary enclosures or partitions shall also be provided. Necessary precautions shall be taken to keep the dust nuisance down as and where necessary.
- 1.5. Dismantling shall be commenced in a systematic manner. All materials which are likely to be damaged by dropping from a height or demolishing roof, masonry etc. shall be carefully dismantled first. The dismantled articles shall be properly stacked as directed.
- 1.6. All materials obtained from demolition shall be the property of Government unless otherwise specified and shall be kept in safe custody until handed over to the Engineer-in-charge.
- 1.7. Any serviceable materials, obtained during dismantling or demolition shall be separated out and stacked properly as directed with all lead and lift. All unserviceable materials, rubbish etc. shall be stacked as directed' by the Engineer-in-charge.
- 1.8. On completion of work, the site shall be cleared of all debris rubbish and cleaned as directed.

### **2.0. Mode of measurements and payment**

- 2.1. Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed. The demolition of lime concrete shall be measured under this item. Specification for deduction for voids, openings etc. shall be on same basis as that employed for construction of work.
- 2.2. All work shall be measured in decimal system as fixed in its place subject to the

following limits; unless otherwise stated herein after: (a) Dimensions shall be measured to the nearest 0.01 mt. (b) Area shall be worked out to the nearest 0.01 sq. mt.(c) Cubical contents shall be worked out to the nearest 0.01 Cu.m.

**2.4.** The unserviceable materials shall be stacked as directed by Engineer-in-charge with all leads and lifts.

**2.5.** The rate shall include cost of all labour involved and tools used in demolishing and dismantling including scaffolding. The rate shall also include the charges for separating out and stacking the material.



**Executive Engineer  
Panchayat (R & B) Division  
Chhotaudepur**