

## SPECIFICATIONS OF MATERIALS INDEX

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## 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 it 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 number 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 as per IS 4082-1996 and 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 way 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 change 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 I.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 add cement shall be properly ground to have a uniform colour and shade. The pigments shall have such properties to provide for durability underexposure 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 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
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
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 ram 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 aggregate 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 somewhat 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 the 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 Carborudum.
- 20.4. The high tensile wire shall be obtained from manufacturers. in coils having diameter not less then 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 of 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. Manglore 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 have camber so that it assumes correct shape after deposition of the concrete 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 - Premoulded 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 premoulded 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 far as possible. Any effort like painting 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 fro 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 saw 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 style 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 scud 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 he free from flaws joints broken strands laminations and other harmful surface defects. Expanded metal steel sheet shall confirm 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 charge 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 weighing 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 plate 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 thickness, it shall be extremely resistant to sunlight weather and low temperatures. It shall not show 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 be of best quality free from any defects. The particle boards shall be made with phenolaldehyde adhesive The particle boards shall conform to IS 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 styrofoam 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 IS 3144-1965 shall be followed

**42.3.** Insulation wool blankets 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 40 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 be 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 or 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 except 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. (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 stones shall be dressed to a minimum of 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 dedo, 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 approve by the Engineer-m-charge. The stone slab shall be without my veins, cracks, and flaws The stone slab shall be even sound and durable regular in snaps 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 gram 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 f ice 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 of the extent of maintaining required pattern.
- 51.4.** The slab shall not be thinner than the specified thickness at its thinnest part. A few specimen 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 shad 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 of 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 + 015 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 manufactures 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 spots 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 iron pipes and fittings**

- 56.1.** Galvanised iron pipes shall be of the medium type and of 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 of 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 back 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 white 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. The 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 rubber 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 flat 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 to 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 primers. 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		
			1.5 m long	1.8 m long	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 nahni 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. If 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 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 all 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 fine 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 : Dismantling tiled or stone floors laid in mortar including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift.**

**1.0. Workmanship**

- 1.1. The dismantling tiled of stone floors laid in mortar shall consist of dismantling of one or more parts of the building as specified or shown in the drawings. Dismantling 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 dismantling tiled of stone floors laid in mortar 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 form 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 bee 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. Dismantling implies carefully taking up or down or removing without damage. The articles shall be passed by hand where necessary and lowered and where these are fixed by nail, screws, bolts etc., these shall be taken out with proper tools.

**2.0. Mode of measurements and payment**

- 2.1. Measurements of all work except hidden work shall be taken before dismantling tiled of stone floors laid in mortar and no allowance for increase in bulk shall be allowed. The dismantling tiled of stone floors laid in mortar 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 hereinafter : (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.

- 2.3.** 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 serviceable materials properly and disposing the unserviceable materials with all lead and lift. The rate also includes for temporary shoring for the safety of the portion not required to be pulled down or of adjoining property and providing temporary enclosures or portions where considered necessary.

The rate shall include staking the unserviceable materials as directed with all lead and lift.

- 2.2.** The Rate shall be for a unit of one sq. meter.

**Item No. 2 :    Demolition of brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift (ii) in cement mortar.**

**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 form 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 bee 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-m-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 hereinafter : (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 serviceable materials properly and disposing the unserviceable materials with all lead and lift. The rate also includes for temporary shoring for the safety of the portion not required to be pulled down or of adjoining property and providing temporary enclosures or portions where considered necessary.
- 2.6.** The rate shall be for a unit of one cubic meter.

**Item No. 3 : Dismantling sanitary fittings like wash basin, W.C. pan Indian and European type, flushing tank etc. including stacking the materials with all lead and lift.**

**1.0. Workmanship**

The relevant specifications of **Item No. 1** shall be followed except that the dismantling work of sanitary fittings such as wash basin, W.C. Pan (all type of pans), Flushing tanks etc. shall be carried out.

**2.0. Mode of measurements & 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 hereinafter : (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.
- 2.3.** 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 serviceable materials properly and disposing the unserviceable materials with all lead and lift. The rate also includes for temporary shoring for the safety of the portion not required to be pulled down or of adjoining property and providing temporary enclosures or portions where considered necessary.
- 2.4.** The rate shall be for a unit of one **number**.

**Item No. 4 :-** Providing and laying machine cut, free edges, pre mirror polished granite stone slab 18mm thick for doors & windows cill, jambs and cladding as per design including full moulded round front edge and 1cm nosing on 15 mm thick cement mortar 1:3 (1 cement : 3 coarse sand) jointed with grey cement slurry including rubbing, polishing & finishing etc. complete.

## **General**

This work shall consist of providing and fixing machine cut, free edges, pre mirror polished granite stone slab 18mm thick for doors & windows cill, jambs and cladding as per design of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

### **1.0 MATERIAL**

Water shall confirm to M-1. Cement Mortar shall confirm to M-11. Granite slab shall confirm to M-51. Sand shall conform to M-6.

### **1.0 GRANITE SLAB**

- 1.1. Granite slab shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Only approved coloured shall not be allowed for use. They shall be without any soft veins cracks or flaws Granite slab shall be hard, even, and regular in shape and it should without fault.
- 1.2. The size of the Granite slab to be used as approved by Engineer in charge or Architect. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified. For Doors / Windows cill and jambs cladding the Granite slab shall be in single piece.
- 1.3. Tolerance of minus 30 mm. on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be +3 mm.
- 1.4. The edges of Granite slab shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones shall be true, square and free chipping and surface shall be true and plain.
- 1.5. The Granite slab shall have machine cut free edges with half round pipe moulding mirror polished surface. When brought on site. The stones to be used for flooring dado, skirting, sink, veneering, sills, steps etc.

### **2.0 WORKMANSHIP**

- 2.1 Granite slab shall be of approved quality shall be laid evenly to level and slope as directed by Engineer in charge over a bed of a base layer consisting of cement mortar 1:3 (1 cement: 3 coarse sand by volume) or Lime Mortar 1:1.5 (1 lime : 1.5 lime putty by volume).
- 2.2 Granite slab shall be laid evenly as per detailed drawing or as directed by Engineer in charge. Width, length and shape of stone shall be as per pattern shown in detailed drawing.
- 2.3. Cement and sand for base layer shall be mixed in proportions of 1:3 (1 cement : 3 coarse sand by volume). Cement and sand shall be proportioned by volume after making due allowance for bulking. The required quantity of water shall then be added and the mortar mixed to produce workable consistency before mixing platform shall be thoroughly cleaned before changing from one type of cement to another.
- 2.4. The mixing for base layer shall be done intimately. The operation shall be carried out on clean water tight platform, and cement sand shall be first mixed dry in the required proportion to obtain uniform colour and then the mortar shall be mixed for at least two minutes after addition of water. In case of cement mortar, that has suffered because of

evaporation of water the same shall be re-tempered by adding water as frequently as needed to restore the requisite consistency but its re-tempering shall be permitted only within thirty minute from the time of addition to water at the time of initial mixing.

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

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

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

**Item No. 5 :- Providing and laying Vitrified tiles 8 to 10 mm thick, 24" x 24" in skirting, risers of steps and dedo on 10mm thick cement plaster 1:3 (1 cement : 3 coarse sand) and jointed with 4 mm groove & epoxy filling including labour and cleaning the surface etc. complete.**

**1.0. Materials**

Water shall conform to M-1. Cement mortar shall conform to M-11. Vitrified tiles 8 mm to 10mm thick, 24" x 24" of approved standard quality shall conform to relevant Indian standard. The size & colour of Vitrified tiles shall be approved by Engineer in charge.

**2.0. Workmanship**

**2.1. Preparation of Surface:**

In case of brick masonry wall, the joints shall be raked out to a depth of 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 jointed with 4 mm groove & epoxy filling 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. 6 :- Providing and laying Vitrified tiles 8 mm thick flooring over 20 mm (average) base of cement mortar 1:6 (1 cement : 6 coarse sand) on new surface or fixing on existing flooring by adhesive material including dismantling of existing flooring and jointed with color cement slurry including finished with flush pointing & cleaning the surface etc. complete for antiskit.**

**1.0. Materials**

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

**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. (avg.) thick in cement mortar 1:6 (1 cement : 6 coarse sand) on new surface or fixing on existing flooring by adhesive materials including dismantling of existing flooring and jointed with colour 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 20 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. 7 :-** Providing, laying and jointing in true line and level I.S.I. mark 40mm dia. U.P.V.C (Sch-40) for cold water including fitting as approved by Engineer in charge. Pipe shall be fixed on the wall with held of clamp at every two meter c/c shall be concealed or open as directed including necessary fitting etc. including testing of pipe and joints and fixing the same with adhesive solvent including cost of all materials.

**1.0. Materials**

**1.1.** The pipes shall be standard I.S.I. mark U.P.V.C. pipe (SCH-40) of specified dia.

**1.2.** The fittings, clamps etc. required for specified dia. bore pipes shall be of best quality and makes as approved by the Engineer-in-charge. Necessary accessories with inner/ outer brass thread shall be used as required and instruction by Engineer in charge.

**2.0. Workmanship**

**2.1. Cutting, Laying & Jointing**

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

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

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

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

**2.2. Fixing concealed to wall, ceiling & floors.**

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

required M.S. tube sleeve shall be fixed at a place a pipe is peasant through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.

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

**2.3. Testing of joints :**

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

**3.0. Mode of measurements and payment**

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

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

**Item No. 8 :-** Providing, laying and jointing in true line and level I.S.I. mark 25mm dia. U.P.V.C (Sch-40) for cold water including fitting as approved by Engineer in charge. Pipe shall be fixed on the wall with held of clamp at every two meter c/c shall be concealed or open as directed including necessary fitting etc. including testing of pipe and joints and fixing the same with adhesive solvent including cost of all materials.

The relevant specifications of **Item No. 7** shall be followed accept for the work of **providing, laying and jointing in true line and level I.S.I. mark 25mm dia. U.P.V.C (Sch-40) for cold water including fitting as approved by Engineer in charge. Pipe shall be fixed on the wall with held of clamp at every two meter c/c shall be concealed or open as directed including necessary fitting etc. including testing of pipe and joints and fixing the same with adhesive solvent including cost of all materials.**

**Measurement shall be taken and paid on Rmt. basis.**

**Item No. 9 :-** Providing, laying and jointing in true line and level I.S.I. mark 15mm dia. U.P.V.C (Sch-40) for cold water including fitting as approved by Engineer in charge. Pipe shall be fixed on the wall with held of clamp at every two meter c/c shall be concealed or open as directed including necessary fitting etc. including testing of pipe and joints and fixing the same with adhesive solvent including cost of all materials.

The relevant specifications of **Item No. 7** shall be followed accept for the work of **providing, laying and jointing in true line and level I.S.I. mark 15mm dia. U.P.V.C (Sch-40) for cold water including fitting as approved by Engineer in charge. Pipe shall be fixed on the wall with held of clamp at every two meter c/c shall be concealed or open as directed including necessary fitting etc. including testing of pipe and joints and fixing the same with adhesive solvent including cost of all materials.**

**Measurement shall be taken and paid on Rmt. basis.**

**Item No. 10 :-** Providing and laying half brick masonry in common burnt clay building conventional type bricks having crushing strength not less than 35 Kg/Sq.cm. in cement mortar 1:4 (1 cement : 4coarse sand) in superstructure above floor two level for Ground floor including the cost of all materials and labour charges etc. complete.

**1.0. Materials**

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

**2.0. Workmanship**

- 2.1.** Relevant specifications of bricks, wetting and laying of bricks, joints, curing etc shall conform to Item No. 9 except that the brick work of half brick shall be carried out.
- 2.2.** Cement mortar used in masonry work shall be in proportion of 1 part of cement and 4 parts of coarse sand by volume.
- 2.3.** All bricks shall be laid stretcher wise, breaking joints with those in the upper and lower courses. The wall shall be taken truly plumb. All courses shall be said truly horizontal and all vertical joints shall be truly vertical. The bricks shall be laid with frogs upwards. A set of masons tools shall be maintained on work as required for frequent checking. After every three course 2 nos. of 6mm mild steel bars shall be embedded in cement mortar.

**3.0. Mode of measurement and payment**

- 3.1.** The half brick masonry work in superstructure above floor two level 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. 9 shall be followed. The length shall be measured nearest to one cm.
- 3.3.** The rate includes the cost of providing 2 nos. of 6mm steel bars after every three course.
- 3.4.** The rate shall be for a unit of one sq. meter.

**Item No. 11 :-** Providing and fixing approved SWR quality, heavy duty I.S.I. mark UPVC pipes - Type B Ring Fit and Self Fit, confirming to IS 13592 and fitting confirming to IS 14735 for waste water or soil waste pipe, with necessary specials, bends, such as "Y" junction, "T" junction (both single and double) including plugs, shoes, cowls, flange compression type fittings, wall clips, in proper line and level with necessary support like brackets/clamps, clips, RCC or brick pedestals or battens, if necessary, to wall, ceiling and floor, open or concealed complete jointing with rubberising and airtight joints with 'T' shaped rubber ring etc. and lubricant or jointing material, including testing, cutting, making good the wall, ceiling and floor etc. testing and installation of pipe lines as per drawing and specification. (a) 110 mm dia. pipe.

**1.0. Materials**

**1.1.** The specified dia. of **UPVC pipes - Type B Ring Fit and Self Fit conforming to IS 13592-1992 (I.S.I.)** shall conform M-68.

**2.0. Workmanship**

**2.1.** Asbestos cement rain water pipes and fittings shall be of the diameter, size and type specified in the item. The pipe shall be full lengths of 2 meter as far as possible. All the pipes shall be fixed on wall face at locations indicated on drawings or as ordered by the Engineer-in-charge. Pipe shall be secured to face of wall below all joints by M.S. clamps with wooden gut ties.

**2.2.** The spigot of the upper pipe shall be properly fitted into the socket of the lower pipe such that there is uniform annular space for fitting with the jointing materials. One third depth of annular space between the item. The pipe shall be full lengths of 2 meter as far as possible. All the pipes shall be fixed on wall face at locations indicated on drawings or as ordered by the Engineer-in-charge. Pipe shall be secured to face of wall below all joints by M.S. clamps with wooden gut ties.

**2.2.** The spigot of the upper pipe shall be properly fitted into the socket of the lower pipe such that there is uniform annular space for fitting with the jointing materials. One third depth of annular space between the socket and the spigot shall be filled with spun-yarn soaked in bitumatic jointing compound and shall be pressed home by means of caulking tool. The remaining 2/3 depth of the joints shall be filled in with stiff cement mortar 1:2 and shall be pressed with caulking tool and finished smooth at top at an angle of 45 sloping up.

**2.3** The joints shall be filled with cement mortar 1:2 (1 cement : 2 sand) span spun yarn. The joints shall be filled with cement mortar 1.2 (1 cement : 2 sand) and spurn yarn. The pipes without care shall be fixed to wall with M.S. clamps The pipes will earns shall be secured with 40 mm before steel or iron barrel distance pieces or boils and stout galvanised iron nails 10 cms long into hand wool plug fixed in walls. Access doors to fittings shall be provided with 3 mm. rubber insertion packing and secured without screws to made air and water tight

**2.4.** All soil pipes shall be earned up above the roof and shall have a wire ball on guarded or a cowl.

**2.5.** The ventilating pipe or shaft shall be carried out to a height of at least one meter above the outer covering of the roof of the building or in the case of windows in a gable wall or a dormer windows, it shall carried up to a ridge of the roof or at least tow meters above the top of the windows. In case of flat roof to which access for use is provided, it shall be carried out up to a height of at least on meter above the parapet or two meters measured vertically from the top of any windows or opening which any exist up to a horizontal distance of five meters from the vent pipe into such building and in no case shall be carried out to a height less then three meters.

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

**Item No. 12 :-** Providing and fixing PVC SWR Nahni trap IS-14735 for drain - 100 mm diameter with jali of the following nominal diameter of self cleaning design with screwed down or hinged grating including the cost of cutting and making good the walls.

**1.0. Materials**

- 1.1.** The PVC SWR Nahni Trap IS 14735 for drain with 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 RCC slab hole, 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. 13 :- Providing and fixing 6 mm thick decorative mirror including machine polishing glass all over and fixed with S.S. studs etc. complete with all required fittings & fixtures.**

**1.0. Materials**

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

**2.0. Workmanship**

**2.1.** The decorative mirror of mounted on A.C. Sheet or plywood 6 mm thick with S.S. studs shall be fixed as directed, by fixing wooden plugs in wall and C.P. brass screws and washers. The work shall be carried out in best workman like manner.

**3.0. Mode of measurements & payment**

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

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

**Item No. 14 :-** Providing and fixing white vitreous china Anglo Indian water closet (European type) of standard size of approved shape (standard quality) including providing and fixing white vitreous china cistern with flush fitting including UF soft close slim seat cover, hinges, hand shower (health faucet) with 1 Meter long easy flex tube in chrome finish & wall hook, fixing accessories, accessories set and cistern fittings, with specials of standard make and mosquito proof coupling of approved design complete, cutting and making good the floors wherever required including jet spray as directed by EIC.

**1.0. Materials**

White vitreous china Anglo Indian water closet (European type) of standard size of approved shape (standard quality) shall conform to M-60. Cement mortar shall conform to M-11.

**2.0. Workmanship**

- 2.1.** The closet shall be fixed to the floor by means of 75 mm. long 6.5 mm. diameter counter sunk bolts and nuts embedded in the floor concrete using rubber or before washers so as not to allow any lateral displacement. The white vitreous china cistern with flush fitting including UF soft close slim seat cover, hinges, hand shower (health faucet) with 1 Meter long easy flex tube in chrome finish & wall hook, fixing accessories, accessories set and cistern fittings, with specials of standard make and mosquito proof coupling of approved design complete, cutting and making good the floors wherever required including jet spray as directed by Engineer in charge.

**3.0. Mode of measurements and payment**

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

**Item No. 15 :-** Providing and fixing white vitreous china Wall Hung water closet (European type) of standard size of approved shape (standard quality) including providing and fixing white vitreous china cistern with flush fitting including UF soft close slim seat cover, hinges, Hand shower (health faucet) with 1 meter long easy flex tube in chrome finish & wall hook, fixing accessories, accessories set and cistern fittings, with specials of standard make and mosquito proof coupling of approved design complete, cutting and making good the floors wherever required including jet spray as directed by EIC.

**1.0. Materials**

White vitreous china Wall hung water closet (European type) of standard size of approved shape (standard quality) shall conform to M-60. Cement mortar shall conform to M-11.

**2.0. Workmanship**

- 2.1.** The closet shall be fixed to the floor by means of 75 mm. long 6.5 mm. diameter counter sunk bolts and nuts embedded in the floor concrete using rubber or before washers so as not to allow any lateral displacement. The white vitreous china with dual flush fitting of flushing capacity 3 liter / 6 liter, including UF soft close slim seat cover, hinges, hand shower (Health Faucet) with 1 meter long easy flex tube in chrome finish & wall hook, fixing accessories, accessories set and cistern fittings, with specials of standard make and mosquito proof coupling of approved design complete, cutting and making good the floors wherever required including jet spray as directed by Engineer in charge.

**3.0. Mode of measurements and payment**

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

**Item No. 16 :-** Providing and fixing of first quality white vitreous china Table Top Basin, type Wash basin as per product detail including filling gap between counter and wash basin with approved sanitary grade material, cutting and making good the walls where required to the complete satisfaction of the Engineer in charge including Oval wash basin; Rag bolts for Wash basins, Bottle trap, Waste Coupling, Prismatic Pillar cock.

**1.0. Materials**

**1.1.** The white vitreous china Table Top basin shall be first quality and make as approved by the Engineer-in-charge. The wash basin shall conform to M-59.

**2.0. Workmanship**

**2.1.** The first quality white vitreous china Table Top basin 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 Bottle trap and union shall be connected to suitable 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. Bottle trap and union may not be provided where the surface drain or a floor trap is placed directly under the 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 prismatic pillar cocks, bottle trap waste pipe, 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 measurements & payment**

**3.1.** The rate shall be for a unit of one number.

**Item No. 17 :- Providing and fixing screw down bib taps of following size.(B) Brass chromium plated screws down bib tap. (ii) 20mm dia. as directed by Engineer in charge.**

### **General**

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

#### **1.0 MATERIAL**

##### **1.0 Bib Cock**

**1.1.** Bib cock of specified 20 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 brass chromium plated screw down 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 screw down 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. 18 :-** Providing and fixing water closet squatting pan (Indian type W.C. Pan) size 580mm (Earthwork, bed concrete, foot rest and trap to be measured and paid for separately) (A) Vitreous china. (I) Long pattern = white colour and providing and fixing 100mm size P or S trap for water closet squatting pan including jointing the trap with the pan and soil pipe in cement mortar 1:1 (1 cement : 1 fine sand) (A) Vitreous China including chromium plated brass half turn flush cock of approved quality including fixing in pipe line etc. complete. (ii) 25mm dia.

**1.0. Materials**

**1.1.** Wash down water closet squatting pan (Indian type W.C. pan) shall conform to M-62. The 100 mm. size 'P' or 'S' trap for water closet shall confirm to M-62. Cement mortar shall conform to M-11.

**2.0. Workmanship**

**2.1.** The pan shall be sunk into the floor and embedded in a cushion of average 15 cm. cement concrete 1:5:10 (1 cement : 5 coarse sand : 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 so that the waste water is drained into the pan. The 'P' or 'S' trap shall be fixed with pan cast iron pipe with C.M. 1.1. The pan shall be provided with 100 mm. 'P' or 'S' trap as specified in the item with an 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) & providing and fixing G.I. inlet connection for flush valve with W.C. pan vitreous china including chromium plated brass half turn flush cock of approved quality including fixing in pipe line etc. complete. (ii) 25mm dia. as approved by Engineer in charge.

**3.0. Mode of measurements and payment**

**3.1.** The rate shall include the cost of all materials and labours involved in the operations described under workmanship including testing.

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

**Item No. 19 :- Providing and fixing standard extruded of alluminium section of size 63mm x 38.10mm x 1.2mm @ Wt. 0.643 Kg/mt with colour anodized alluminium frame for ventilation with 5 mm thick frosted glass as details etc. complete and fixing Mosquito net on outer side for Ventilation.**

## **1.0 MATERIALS**

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

1.1.1. The work includes standard extruded of alluminium section of size 63mm x 38.10mm x 1.2 mm (@ wt. 0.643 kg/Rmt.) with colour anodized alluminium frame for ventilation with 5mm thick frosted glass as details etc. complete and fixing mosquito net on outer side for Ventilation as directed by Engineer in charge.

**1.2 Glass :** The frosted glass of louvers fixed to alluminium strip blade 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 tinted silicon gasket.

1.2.1 The glass shall be of the brief quality, free from specks, bubbles, smoken veins, air holes distress and other defects. The kind of glass to be used shall be as mentioned in the item or as shown in detailed drawing or as directed by Engineer-in-charge.

1.3. **Glazing clips:** Glazing clips shall be colour marble jambs all around the ventilator shall be free from any scratches or holes or any damage of on surface all section shall have finished luster surface on all sides.

1.4 **Rubber Gasket :** Rubber gasket shall be approved make shall be free from any scratches or holes or any damage on surface and shall have finished luster surface on all sides.

## **1.5. Fixtures**

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

## **WORKMANSHIP**

The work of standard extruded of Aluminium section for ventilation shall be done with extreme finishing. The inclined blades shall be fixed as directed by Engineer-in-charge. 5 mm thick frosted glass shall be fixed on blades.

## **MODE OF MEASUREMENT & PAYMENT**

The unit rate of standard extruded of Aluminium section for ventilation shall include the cost of all labours, materials, anodizing charges, tools, plants, cost of necessary fixtures & fastenings.

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

**Item No. 20 :- Providing and fixing door having side hung single shutter / double leaf having premium quality of factory made 35 mm. thick solid core flush door finished with 1 mm laminated sheet on other side with 6 lever Mortice lock, SS Aldrop, SS handle size 15 cm Long, Tower bolt size 20 cm etc. as per detail colour & pattern approved by this office including necessary anodized alluminum fixtures and fastenings.**

**1.0. Materials**

Wood in frames shall conform to M-29. 2. S.S. hinges shall conform to M-43. 3. 1.00mm thick laminate sheet shall confirm to M-40. 4. Glass shall conform to M-38.

**2.0. Workmanship**

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

The item covers the standard door having side hung single shutter / double leaf having premium quality of factory made 35 mm. thick solid core flush door finished with 1 mm laminated sheet on other side with 6 lever Mortice lock, SS Aldrop, SS handle size 15 cm Long, Tower bolt size 20 cm etc. as per detail colour & pattern approved by this office including necessary anodized alluminum fixtures and fastenings.

**2.2. Preparation of surfaces :**

**2.2.1.** All wood work shall be dry and free from any foreign matter incidental to building operations. Nails shall be punched well below the surface to provide a film key for stopping. Moldings shall be carefully smoothed with abrasive paper and projecting fibers shall be removed. Flat portions shall be smoothed off with abrasive paper used across the grain prior to painting prior to painting and with the grain prior to staining or if the wood is to be left in its natural colour, wood work which is to be stained may be smoothed by scraping instead of by glass papering if so required.

**2.2.2.** Any knots, resinous, streaks or bluefish sap wood that are not large enough to justify cutting out shall be treated with two coats of pure shellac knotting applied thinly and extended about 35 mm. beyond the actual area requiring treatment.

**2.3. Application of primer :**

**2.3.1.** After the preparation of the surface, the priming coat shall be applied immediately. The brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of the particular primer. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing alternately in opposite directions, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off wall constitute one coat.

**2.3.2.** During painting, every time, after the priming coat has been worked out of the brush bristles or after the brush has been unloaded, the bristles of the brush shall be opened up by striking the brush against portion of the unpainted surface with the end of the bristles, held at right angles to the surface, so that bristles thereafter will collect the correct amount of paint when dipped again in to a paint container The prima/y coat shall be allowed to dry completely before painting is started.

**2.3.3.** No hair marks from the brush or clogging at pain puddles in the corner of panels angles of molding etc. shall be left on the work

**2.3.4.** Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc.

**2.3.5.** The container when not in use shall be kept close and free from air so that paint does not thickness and also shall be kept guarded from dust.

**2.3.6.** In painting doors and windows, the putty, round the glass panes also be painted but care shall be taken to see that no paint, stain etc. are left on the glass. Top of shutters and surfaces in similar hidden locations shall not be left out in painting.

**3.0. Shutters:**

**3.1.1.** 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.

**3.1.2.** 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.

**3.1.3.** 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.

**4.0. Timber paneling:**

**4.0.1.** 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.

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

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

**5.5. Fixtures and Fastenings:**

5.5.1. The rate shall include S.S. hinges including fixing with iron screws. The size and number of hinges shall be as per table given in Annexure-1.

**5.2. Frames:**

5.2.1. All members of frames shall be exactly at right angles. The right angle shall be checked from inside surfaces of the-frames of the respective members.

5.2.2. All members of frames shall be straight without any warp of bow and shall have smooth surfaces well planed on the three sides exposed at right angles to each other. The surfaces touching the wall may not be planed unless it is required in order to straighten up the member or to obtain the overall sizes within the tolerances as specified.

5.2.3. Frame shall have dovetail joints. When clerestory windows are included, it shall be provided by having full length one piece post for door or windows and clerestory window extending the frame on top at the head to the required extent. Horns shall not be provided in the head of the frame. When no sills are provided, the vertical posts of the frame in the ground floor shall be embedded in the sill masonry for 10 cm. on upper floors, the vertical posts shall be fixed in the floor or masonry by forming notches 10 mm. deep. Slight adjustment of spacing as necessary shall be done to have the hold fasts in the joints of masonry; course. The frame shall be erected in position and held plumb with strong support from north sides and built in masonry as it is being built. The transom shall be through tenoned into the mortises of the jamb post to the full width of the jamb post and the thickness of the tenon shall be not less than 35 mm.

**5.3. Tolerance:**

Unless specially mentioned otherwise tolerance of +1.5 mm shall be allowed for each wrought face.

5.4. The tenons shall be closely fitting into the mortises and suitably pinned with wood dowels not less than 10 mm. dia. meter. The depth of rebates for housing the shutter shall be as shown in the detailed drawing or as directed.

5.5. The concrete surface of tenon and mortise shall be treated before putting together with an adhesive of approved make.

5.6. Minimum number of three hold-fasts shall be fixed on each side of door and windows frames, one at the center point and the other two at 30 mm. from the top and bottom of the frames. In case of windows and ventilators frames. The size of each hold-fast shall be 300 x 25 x 6 mm. and of mild-steel with split end. The hold fasts shall be fixed with screws to frames.

5.7. Mild steel hold fasts shall be protected with a coating of coal asphalt tar. The surface of frame abutting the masonry or concrete faces shall be properly treated by applying a coat of approved coating.

**6.0. Mode of Measurements and payment**

6.1. The linear dimensions shall be measured correct upto 1 cm. The quantity shall be worked out correct to places of decimals of cum.

6.2. The new wood and wood based surface shall be measured under this item.

6.3. All the work shall be measured net in the decimal system, as executed subject to the following limits unless otherwise stated hereinafter.

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

(b) Areas shall be worked out to the nearest 0.01 sq. meter.

6.4. No deductions shall be made for openings not exceeding 0.5 sq. mt. each and no addition shall be made for painting to beddings, moldings, edges, jambs, soffits, sills etc. of such opening.

6.5. In case of fabricated structural steel and iron work, priming coat of paint shall be included with fabrication. In case of trusses if measured in sq.m. compound girders, stanchions, lattices, grader and similar work, actual area shall be measured in sq.m and no extra shall be paid for painting on bolts heads, nuts, washers etc. No addition shall be made to the weight calculated for the purpose of measurements of steel and iron works for paint applied on shop or at site.

6.6. The different surfaces shall be grouped into one general item, areas of uneven surfaces being converted into equivalent plain areas in accordance with the table given as per Annexure-II for payment.

6.7. The rate includes all materials, labours, tools, plants, equipments and any other expensive required for satisfactory completion of item as specified with all lead and lift.

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

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

**Item No. 21 :-** Providing and fixing approved SWR quality, heavy duty I.S.I. mark UPVC pipes - Type B Ring Fit and Self Fit, confirming to IS 13592 and fitting confirming to IS 14735 for waste water or soil waste pipe, with necessary specials, bends, such as "Y" junction, "T" junction (both single and double) including plugs, shoes, cowls, flange compression type fittings, wall clips, in proper line and level with necessary support like brackets/clamps, clips, RCC or brick pedestals or battens, if necessary, to wall, ceiling and floor, open or concealed complete jointing with rubberising and airtight joints with 'T' shaped rubber ring etc. and lubricant or jointing material, including testing, cutting, making good the wall, ceiling and floor etc. testing and installation of pipe lines as per drawing and specification. (a) 50 mm dia. pipe.

The work shall be executed as per specification of **Item No. 11** except for the work of **providing and fixing approved SWR quality, heavy duty I.S.I. mark UPVC pipes - Type B Ring Fit and Self Fit, confirming to IS 13592 and fitting confirming to IS 14735 for waste water or soil waste pipe, with necessary specials, bends, such as "Y" junction, "T" junction (both single and double) including plugs, shoes, cowls, flange compression type fittings, wall clips, in proper line and level with necessary support like brackets/clamps, clips, RCC or brick pedestals or battens, if necessary, to wall, ceiling and floor, open or concealed complete jointing with rubberising and airtight joints with 'T' shaped rubber ring etc. and lubricant or jointing material, including testing, cutting, making good the wall, ceiling and floor etc. testing and installation of pipe lines as per drawing and specification. (a) 50 mm dia. pipe.**

**Measurement shall be taken and paid on Rmt. basis.**

**Item No. 22 :- Providing and fixing 25 mm thick PVC shutter inclusive of S.S hinges with necessary screws & alluminium S.S. fixtures & fastenings & fastener sleeve etc. complete.**

**1.0. Materials**

- 1.1.** The 25 mm thick PVC shutter make as approved by the Engineer-in-charge with necessary fixtures and fastenings.

**2.0. Workmanship**

- 2.1.** The PVC shutter shall be fixed on the wall as and where directed. The 25 mm thick PVC shutter inclusive of S.S hinges with necessary screws & alluminium S.S. fixtures & fastenings & fastener sleeve etc. complete as per direction of engineer in charge.

**3.0. Mode of measurements & payment**

- 3.1.** The unit rate of 25 mm thick PVC shutter shall include the cost of all material, cost of all necessary fixture and fastening. Labour charge for fixing frame, shutter and fixing shutter in window at the place shown drawing and instructed by engineer in charge, all tools and plant required for assembling and fixing in position, finishing as per direction of Engineer in charge. They shall include the cost of fixing and making walls good by plaster colour etc. as directed.
- 3.2** The 25 mm thick PVC shutter shall be measured for its width and height, limiting dimension to those specification on plan or as directed.
- 3.3. The rate shall be for a unit of One Square Meter.**

**Item No. 23 :-** Providing and fixing white vitreous china flat back urinal of approx. size 355 x 320 x 610 mm having water inlet and outlet from back side including fixing to wall with suitable brackets all as per manufacturers specification and direction of Engineer-in-charge.

**1.0. Materials:**

The white vitreous china flat back Urinal of approx. size 355 x 320 x 610 mm of premium quality of standard make shall conform to M-64.

Urinal shall be flat back or angle wall type lipped in front. The vitreous china conforming to IS 2556 (Part VI). Urinal shall have an integral flushing rim and inlet or supply horn for connecting flush pipe. Flushing rim and inlet shall be of the self-draining type. At bottom of basin and outlet horn for connecting outlet shall be provided. The inside surface of the urinal shall be uniform and smooth throughout to ensure efficient flushing.

They shall be of vitreous china conforming to IS:2556 (Part-VI) constructed in one piece with providing slot or alternative fixing arrangement at flat back and where the integral flushing rim is not provided, they shall be provided with ridges inside the bowl to divert towards the front line of the urinal.

**2.0. Workmanship**

- 2.1.** The urinals shall be fixed in position by using wooden plugs and screws and shall be at a height 65 cms. from the floor level to the top of the lip of urinal, unless otherwise directed. The wooden plugs shall be of 50 mm. x 50 mm. at base tapering to 38 mm. x 38 mm. at top 50 mm. in length shall be fixed in wall in steel waste pipe which shall discharge in the channel or floor a tap. The connection between the urinal and flush or C.P. brass waste pipe shall be made by means of putty or white lead mixed with chopped hemp. Flush of approved quality by Engineer in charge should be provided.

**3.0. Mode of measurements and payment**

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

**Item No. 24 :-** Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- graded stone aggregates 20 mm nominal size) and curing complete including cost of formwork in foundation and plinth including mixing of water proofing material in C.C. in mix proportion etc. complete as directed by engineer in charge.

**1.0. Materials**

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

**2.0. Workmanship**

**2.1. General**

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

**2.2. Proportion of Mix:**

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

**2.3. Mixing:**

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

**2.4. Transporting & Placing the Concrete:**

2.4.1. The concrete shall be handed from the place, of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

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

2.5.1. The concrete shall be rammed with heavy iron rammers and rapidly to get the required compaction and to allow all the interstices to be filled with mortar.

**2.6. Curing:**

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

**3.0. Mode of measurement and payment**

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

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

**Item No. 25 :- Providing and fixing machine cut, free edges kota stone slab 40 mm thick for doors & windows lintel as per design including cutting, fitting & finishing 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. 40mm thick machine cut, free edges kota stone slab shall conform to M-49.
- 1.1. Kota stone slab shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown coloured shall not be allowed for use. They shall be without any soft veins cracks or flaws Kota stone slab shall be hard, even, and regular in shape and it should without fault.
- 1.2. The size of the Kota 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 Kota stone slab shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones of 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 machine cut, free edges kota stone slab shall be of cement mortar 1:6 (1 cement : 6 coarse sand) for doors & windows lintel as per design including cutting, fitting & finishing etc. complete. Sub grade shall be cleaned wetted and mopped mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one blue kota stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining, the walls shall enter not less than 10 mm. under the plaster,

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

- 2.3. The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly
- 2.4. Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stones of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone of 220 to 350 grade grit fitted in heavy machine. Water shall be properly used during polishing. The stone shall then be washed clean with water when directed by the Engineer-in-charge, wax polish of approved quality shall be applied on the surface with the help of soft cloth over a clean and dry surface. Then the polishing machine fitted with bobs shall be run over it.
- 2.5. The holes required for Nahni traps, pipes and any other fittings shall be made, without any extra cost.

### **3.0. Measurement & payment**

- 3.1. The rate shall include the cost of all materials and labour involved in all the operations described above. The kota stone flooring shall be measured in square meters correct to two places decimal, length and breadth shall be measured correct to a centimeter and between the finished face of skirting dedo plaster and no deduction shall be made nor extra paid for any opening in floor of areas upto 0.1 sq.
- 3.2. The rate shall be for a unit of one **sq. meter**.

**Item No. 26 :- 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.**

**1.0. Materials**

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

**2.0. Workmanship**

The painting work shall be of putty and two coats of primer of approved brand & manufactures on new wall surface to give an even shade.

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

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

**2.2.1.** All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster again with a fine grade sand paper and made smooth. A coat of distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distemper is allowed. The surface affected by moulds, moss, fungi, algae lichens, efflorescence etc. shall be treated in accordance with I.S; 2395 (Part 01) 1966. Before applying distempering, any unevenness shall be made good by applying putty made of plaster of pairs mixed with water on entire surface including filling up the undulation and then sand papering the same after it is dry.

**2.3. Preparation of Mix :**

This shall be done as per manufacture's instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacturer instructions.

**2.4. Application :**

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

**2.4.2.** The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and consist of covering the area over with paint, brushing the surface hard for the first time over and then, brushing alternately in opposite direction two or three times and then finally brushing lightly in direction at right angles to the same. In this process, no brush Marks

shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

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

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

**2.5. Precautions :**

(a) Old brushes if they are to be used with emulsion paints shall be completely dried of turpentine or oil paint by washing in warm soap water. Brushes shall be quickly washed in water immediately after use and kept immersed in water fusing break periods to prevent the paint from hardening on the brush.

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

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

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

**2.6. Protective measures :** The surface of doors, windows, floors, articles, of furniture etc. and such other parts of the building not to be white washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any.

**3.0. Mode of measurements and payment**

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

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

(b) Area in individual item shall be worked out to the nearest 0.01 sq.m.

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

**3.2.** No deductions shall be made for ends of joists, beams, posts, etc. and openings not exceeding 0.5 sq mt. each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings not for finish around ends of joints, beams, posts etc.

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

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

(b) When each face of wall is provided with different finish, deduction shall be made for that side of frame for door, windows, etc. on which width of reveals is less than that of the other side. Where width of reveals on both faces of wall are equal, deduction of .50% of area of opening on each face shall be made from total area of finish.

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

**3..4** In case of area of openings exceeding 3 sq. mt. each, deductions shall be made for openings but jambs, soffits, sills shall be measured.

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

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

- (a) Corrugated steel sheets..... 14%
- (b) Corrugated A.C. sheets..... 20%
- (c) Semi corrugated A.C. Sheets..... 10%
- (d) Nainital pattern roof (Plain sheeting sheets)..... 10%
- (e) Naintial pattern roof (with corrugated sheets)..... 25%

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

**3.8** Extra payment shall be done on ceiling and sloping roofs.

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

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

**Item No. 27 :- Wall painting (two coats) with plastic emulsion paint of approved brand and manufacture on undecorated wall surface to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth.**

**1.0. Materials**

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

**2.0. Workmanship**

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

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

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

**2.2.1.** All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster again with a fine grade sand paper and made smooth. A coat of distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distemper is allowed. The surface affected by moulds, moss, fungi, algae lichens, efflorescence etc. shall be treated in accordance with I.S; 2395 (Part 01) 1966. Before applying distempering, any unevenness shall be made good by applying putty made of plaster of paris mixed with water on entire surface including filling up the undulation and then sand papering the same after it is dry.

**2.3. Preparation of Mix :**

This shall be done as per manufacture's instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacturer instructions.

**2.4. Application :**

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

**2.4.2.** The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and consist of covering the area over with paint, brushing the surface hard for the first time over and then, brushing alternately in opposite direction two or three times and then finally brushing lightly in direction at right angles to the same. In this process, no brush

Marks shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

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

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

**2.5. Precautions :**

(a) Old brushes if they are to be used with emulsion paints shall be completely dried of turpentine or oil paint by washing in warm soap water. Brushes shall be quickly washed in water immediately after use and kept immersed in water fusing break periods to prevent the paint from hardening on the brush.

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

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

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

**2.6. Protective measures :** The surface of doors, windows, floors, articles, of furniture etc. and such other parts of the building not to be white washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any.

**3.0. Mode of measurements and payment**

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

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

(b) Area in individual item shall be worked out to the nearest 0.01 sq.m.

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

**3.2.** No deductions shall be made for ends of joists, beams, posts, etc. and openings not exceeding 0.5 sq mt. each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings not for finish around ends of joints, beams, posts etc.

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

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

(b) When each face of wall is provided with different finish, deduction shall be made for that side of frame for door, windows, etc. on which width of reveals is less than that of the other side. Where width of reveals on both faces of wall are equal, deduction of .50% of area of opening on each face shall be made from total area of finish.

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

**3..4** In case of area of openings exceeding 3 sq. mt. each, deductions shall be made for openings but jambs, soffits, sills shall be measured.

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

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

(a) Corrugated steel sheets..... 14%

(b) Corrugated A.C. sheets..... 20%

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

(d) Nainital pattern roof (Plain sheeting sheets)..... 10%

(e) Naintial pattern roof (with corrugated sheets)..... 25%

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

**3.8** Extra payment shall be done on ceiling and sloping roofs.

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

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

**Item No. 28 :- Providing Z section Patti with U clamp for all size and types of pipe for fitting in position on wall face with different heights including labour etc. complete.**

➤ **Material**

Z section Patti with U clamp of best and approved quality as instructed by Engineer in charge.

Necessary fixtures & fastenings

➤ **Workmanship**

Z section Patti with U clamp for all size and types of pipe for fitting in position on wall face with different heights with necessary brass fixtures and fastenings as directed by Engineer in charge

➤ **MODE OF MEASUREMENT & PAYMENT:**

The rates include cost of all materials and labour required satisfactory completion of this item including fitting.

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

**Item No. 29 :- Providing marble pest treatment to ceiling/wall including removing & scraping old deteriorate plaster of any thickness and providing adhesive chemical solution to ceiling & wall and applying chemical (Italian marble) powder with chemical including all labour, material etc. complete as directed by Engineer in charge.**

**1.0. Material**

Chemical solution approved shall be of approved quality and make.

**2.0 Workmanship**

This work shall consist of removing, as here in after set forth, old deteriorated plaster of any thickness from ceiling / wall etc. which are in place but interfere with the new construction or are not suitable to remain in place and of salvaging and disposing of the resulting materials and backfilling the resulting trenches and pits.

The chemicals barrier shall be complete and continuous under whole of the structure to be protected. Providing adhesive chemical solution to ceiling and wall and applying chemical (Italian marble) powder with chemical including all labour, material etc. complete as directed by Engineer in charge.

**3.0 MODE OF MEASUREMENT & PAYMENT :**

- 3.1.** The unit rate of marble pest treatment to ceiling / wall shall include the cost of all materials, tools and plant chemicals for water proofing. Applying the same to specified surface as per drawings, finishing, painting with two coats etc. and all other incidental expenses for producing water proofing work to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.
- 3.2.** The marble pest treatment shall be measured for its length and width, limiting dimensions to those specified on plan or as directed.
- 3.3.** The payment will be made on **Sq.mt.** basis of the finished work.

**Item No. 30 :**    Dismantling doors, windows, ventilators etc. (wood or steel) shutters including chowkhats architraves, holdfasts and other attachment etc. complete and stacking them within all lead and lift. (i) Not exceeding 3 Sq.mt in area.

**1.0.    Workmanship**

The relevant specifications of **Item No. 1** shall be followed except that the door, windows, ventilators etc. (wood or steel) shutters including chowkhats, architraves, hold fasts and other attachments etc. are to be dismantled.

**2.0.    Mode of measurements & payment**

**2.1.**    The relevant specifications of **Item No. 1** shall be followed.

**2.2.**    The doors, windows, ventilator etc. not exceeding 3 sq.mt. in area (each) including shutters and chowkhats. Architraves, hold fasts and other attachments to frames etc. will be dismantled and measured under this item.

**2.3.**    The rate includes stacking the serviceable materials as and where directed with all leads and lifts.

**2.4.**    The rate shall be for a unit of one **number**.