

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 in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.
15. Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
16. No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage or overloading of the various components of the structure.
17. All works shall be carried out in a workmanlike manner as per the best techniques for the particular item.
18. All tools, templates, machinery and equipment for correct execution of the work as well as for checking lines, levels, alignment of the works during execution shall be kept in sufficient numbers and in good working condition on the site of the work.
19. The mode, procedure and manner of execution shall be such that it does not cause damage or over-loading of the various components of the structure during execution or after completion of the structure.
20. Special modes of construction not adopted in general Engineering practice if proposed to be adopted by the Contractor, shall be considered only if the contractor provides satisfactory evidence

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

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

SPECIFICATIONS OF MATERIALS**M-1 Water**

- 1.1.** Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil and injurious alkalis, salts, organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. Container for transport, storage and handling of water shall be clean. Water shall conform to the standard specified in I.S. 456-1978.
- 1.2.** If required by the Engineer-in-Charge it shall be tested by comparison with distilled water. Comparison shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I.S. 269-1976. Any indication of unsoundness 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 earned 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 un burnt 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	Percentage by Weight	I.S. Sieve	Percentage by Weight
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Designation	Passing through	Designation	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 free 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 rain till used up, covering it by tarpaulin or open sheds.

10.5. Use:

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

M-11. Cement Mortar

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

11.2. Proportion of Mix

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

11.3. Preparation of Mortar :

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

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

M-12. Stone Coarse Aggregate for Nominal Mix Concrete

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

12.2. The aggregate shall generally be cubical in shape unless special stones of particular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved. 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 some what by the Engineer-in-charge when considered necessary for obtaining better density and strength of concrete.

12.3. The grading test shall be taken in the beginning and at the change of source of materials. The necessary tests, indicated in I.S. 383-1970 and 456-1978 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 reaction with cement

13.3. The necessary tests indicated in I.S. 383-1970 and I.S.456-1978 shall have to be carried out to ensure the acceptability of the material.

13.4. If aggregate is covered with dust it shall be washed with water to make it clean.

M-14. Brick Bats Aggregate

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

14.2 The brick bats shall be measured by suitable boxes or as directed.

M-15. Bricks

- 15.1.** The bricks shall be hand or machine molded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws and nodules of free lime they shall have smooth rectangular faces with sharp corners and shall be of uniform colour.
The bricks shall be moulded with a frog of 100 mm. x 40 mm. and 10 mm. to 20 mm. deep on one of its flat sides. The bricks shall not break when thrown on the ground from a height of 600 mm.
- 15.2.** The size of modular bricks shall be 190 mm.x 90 mm.x 90 mm.
- 15.3.** The size of the conventional bricks shall be as under :
(9" x 4.3/8" x 2,3/4") 225 x 110 x 75 mm.
- 15.4.** Only bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work.
Length + 1/8" (3.0 mm.) Width \pm 1/16" (1.50 mm.) Height + 1/16" (1.50 mm.)
- 15.5.** The crushing strength of the bricks shall not be less than 35 Kg/Sq. Cm. The average water absorption shall not be more the 20 percent by weight Necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3495 (Part-I to IV) - 1976

M-16. Stone

- 16.1.** The stone shall be of the specified variety such as Granite/Trap Stone/ Quartzite or any other type of good hard stones. The stones shall be only from the approved quarry and shall be hard sound, durable and free from defects like cavities, cracks, sand holes, flaws injurious veins, patches of loose or soft materials etc. and weathered portions and other structural defects Or imperfections tending to affect their soundness and strength. The stone with round surface shall not be used. The percentage of water absorption shall not be more than 5% of dry weight. When tested in accordance with I.S. 1124-1974. The minimum crushing strength of stone shall be 200 Kg/Sq. Cm. unless otherwise specified.
- 16.2.** The samples of the stone to be used shall be got approved before the work is started
- 16.3.** The Khanki facing stone shall be dressed by chisel as specified in the item for khanki facing in required shape and size. The face of the stone shall be-so dressed that the bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on face to be plastered it shall not project by more than 19 mm. nor shall it have depressions more than 10 mm. from the average wall surface.

M-17. Laterite Stone

- 17.1.** Laterite stone shall be obtained from the approved quarry it shall be compacted in texture sound, durable and free from soft patch. It shall have minimum crushing strength of 100 Kg/Sq. Cm. in its dry condition. It shall not absorb water more than 20% of its own weight, when immersed for 24 hours in water. After quarrying, the stone shall be allowed to weather for some time before using in work.
- 17.2.** The stone shall be dressed into regular rectangular blocks so that all faces are free from waviness and unevenness, and the edges true and square
- 17.3.** Those types of stone in which white clay occurs should not be used
- 17.4.** Special corner stones shall be provided where so directed.

M-18. Mild Steel Bars

- 18.1.** Mild steel bars reinforcement for R.C C. work shall conform to I.S. 432 (Part -II) 1966 and shall be of tested quality. It shall also comply with relevant part of I.S. 456-1978.
- 18.2.** All the reinforcement shall be clean and free from dirt, paint, grease, mill scale or loose or thick rust at the time of placing
- 18.3.** For the purpose of payment, the bar shall be measured correct up to 10 mm. length and weight payable worked out at the rate specified below :

1.	6 mm	0.22 Kg./Rmt.	8.	20 mm.	2.47 Kg/Rmt.
2.	8 mm	0.39 Kg./Rmt.	9.	22 mm.	2.98 Kg/Rmt.
3.	10 mm	0.62 Kg./Rmt.	10.	25 mm.	3.85 Kg/Rmt.
4.	12 mm	0.89 Kg./Rmt.	11.	28 mm.	4.83 Kg/Rmt.
5.	14 mm	1.21 Kg./Rmt.	12.	32 mm.	6.31 Kg/Rmt.
6.	16 mm	1.58 Kg./Rmt.	13.	36 mm.	7.99 Kg/Rmt.
7.	18 mm	2.00 Kg./Rmt.	14.	40 mm.	9.86 Kg/Rmt.

M-19. High Yield Strength Steel Deformed Bars

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

M-20. High Tensile Steel Wires

- 20.1.** The high tensile wires for use in pre stressed concrete work shall conform to I.S.2090-1962.
- 20.2.** The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength the minimum strength shall be taken as per Para 6-1 of the I.S. 1785-1962. Testing shall be done as per I.S. requirements.

- 20.3.** The high tensile steel shall be free from loose mill scale, rust, oil, grease, or any other harmful matter. Cleaning of steel bars may be carried out by immersion in solvent solution, wire brushing or passing through a pressure box containing Carborundum.
- 20.4.** The high tensile wire shall be obtained from manufacturers. in coils having diameter not less than 350 times the diameter of wire itself so that wire springs back straight on being uncoiled .
- M-21. Mild Steel Binding Wire**
- 21.1.** The mild steel wire shall be of 1.63 mm. or 1.22 mm. (16 to 18 gauge) diameter and shall conform to I.S. 280-1972.
- 21.2.** The use of black wire will be permitted for binding reinforcement bars. It shall be free from rust oil paint, grease loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.
- M-22. Structural Steel**
- 22.1.** All structural Steel shall conform to I S. 226-1985: The steel shall be free from the defects mentioned in I.S 226-1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. River bars shall conform to I.S. 1148-1973.
- 22.2.** When the steel is supplied by the Contractor test certificate of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.
- M-23. Galvanised Iron Sheets**
- 23.1.** The galvanised iron sheets shall be plain or corrugated sheets of gauges as specified in item The G.I. Sheets shall conform to I.S.277-1977. The sheets shall be undamaged in carnage and handling either by rubbing off of zinc coating or otherwise. They shall have clean and bright surface and shall be free from dents, bends, holes, rust or white powdery deposit.
- 23.2.** The length and width of G.I. sheets shall be as directed as per site condition.
- M-23.A : G.I. Valleys gutter, ridges**
- 23.A.1.** The G.I. ridges and hips shall be of plain galvanised sheets Class - 3 of the thickness as specified in item. These shall be 600 mm. in width and properly bent up to shape without damage to the sheets in process of bending.
- 23.A.2.** Valleys gutters and flashings shall also be of galvanised sheet of thickness as specified in item Valleys Shall be 900 mm. wide overall and flashing shall be 380 mm. wide overall They shall be bent to the required shape without damage to the sheet in the process of bending.
- M-24. Asbestos Cement Sheets**
- 24.1.** Asbestos cement sheets plain, corrugated or semi-corrugated shall conform to I.S.459-1970 The thickness of the sheets shall be as specified in the item. The sheets shall be free from all defects such as cracks, holes, deformities chipped edges or otherwise damaged.
- 24.2. Ridges & Hips :**
- 24.2.1.** Ridges and hips shall be of same thickness as that of A.C. sheets. The types, of ridges shall be suitable for the type of sheets and location.
- 24.2.2.** Other accessories to be used in roof such as flashing pieces eaves filler pieces, valley gutters, north light, and ventilator curves, barge boards etc, shall be of standard manufacture and shall be suitable for the type of sheets and location.
- M-25. Mangalore Pattern Roof Tiles**
- 25.1.** The mangalore pattern tiles shall conform to I S 654-1972 for Class AA or Class A type as specified in item. Samples of the tiles to be provided shall be got approved from the Engineer-in-charge. Necessary tests shall be carried out as directed.
- M-26. Shuttering**
- 26.1.** The shuttering shall be either of wooden planking of 30 mm. minimum thickness with or without steel lining or of steel plates stiffened by steel angles The shuttering shall be supported on battens and beams and props of vertical bullies properly cross braced together so as to make the centering rigid. In places of bullies props, brick pillar of adequate section built in mud mortar may be used.
- 26.2.** The form work shall be sufficiently strong and shall 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 - Permoulded filler**
- 27.1.** The item provides for expansion joints in R.C C. frame structures for internal joints, as well as exposed joints, with the use of promoulded bituminous joint filler.
- 27.2.** Premoulded bituminous joints filler i.e. performed strip of expansion joints filler shall not get deformed, or broken by twisting bending or other handling when exposed to atmospheric condition. Pieces of joints filler that have been damaged shall be rejected
- 27.3.** Thickness of the per-moulded joints filler shall be 25 mm. unless otherwise specified.
- 27.4.** Premoulded bituminous joints filler shall conform to I S 1838-1961
- M-28. Expansion joints-Copper strips & hold .fasts**
- 28.1.** The item provide for expansion joints in R.C.C. frame structure for internal joints, as well as exposed joints, with the use of premoulded bituminous joints filler.
- 28.2.** Copper sheet shall be of 1.25 mm. width and or 1 25 mm. width and the " U " shape in the middle. Copper strip shall have holdfast of 3 mm diameter copper rod fixed to the plate soldered on strip at intervals of about 30 cm or as shown in the drawing or as directed. The width of each flange (horizontal side) of the copper plate Jo be embedded in the concrete work shall be 25 mm depth of "U" to be provided in the expansion joint, in the copper plate shall be of 25 mm.
- M-29. Teak wood**
- 29.1.** The teak wood shall be of good quality as required for the item to be executed. When the kind of wood is not specifically mentioned, good Indian teak wood as approved shall be used.
- 29.2.** Teak wood shall generally be free from large, loose dead or cluster knots, flaws, shakes, warps, twists, bends or any other defects. It shall generally be uniform in substance and of straight fibers as far as possible. It shall be free from rot decay, harmful fungi and other defects of harmful nature which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour shall be uniform as 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 or 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. The1 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 defectects 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 ± 1.2 mm. In Nominal height ± 3 m
- 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 from cold drawn steel wire "as drawn" or galvanized steel conforming to I.S. 226-1975 with longitudinal and transverse wire securely connected at every intersection by a process of electrical resistance welding and conforming to I.S.4948-1974. it shall be fabricated and finished in workmanlike manner and shall be free from injurious defects and shall be rust proof The type of mesh shall be oblong or square as directed The mesh sizes and sizes if wire for square 3b well as oblong welded steel wire fabric shall be as directed The steel wire fabric in panels shall be in one whole piece in each panel as far as stock sizes permit.

M-35 Expanded Metal Sheets

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

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

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

M-37. Plywood

- 37.1.** The plywood for general purpose shall conform I.S. 303-17-1975.
Plywood is made by cementing together than boards or starts of wood into panels. There are always an odd number of layers, 3,5,7,9, ply etc. The piles are placed so that grain of each layer is at right angles to the grain in the adjacent level.
- 37.2.** The chief advantages of plywood a single board of the same thickness is the more uniform strength of the plywood, along the length and width of the plywood and greater resistance to cracking and splitting with 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 weighting not less than 11.25 Kg/Sq. m. shall be used

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

38.3. Plate Glass:

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

38.4. Obscured Glass:

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

38.5. Wired Glass:

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

M-39. Acrylic Sheets

- 39.1.** Acrylic sheets shall be of thickness as specified in the item and of an specified shape and size as the case may be panels may be flat or curved It should be light in weight it shall be colourless or coloured or opaque as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Its light transmission rate shall be about 95% Transparency shall not be affected for the sheets of larger 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 of best quality free from any defects. "The particle boards shall be made with phenolmaldehyde adhesive The particle boards shall conform I S 3087-1905 "Specification for wood particle board for general purpose" The size and the thickness shall be as indicated.

M-41. Expanded polystyrene or framed styroper slabs

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

M-42. Resin bonded fiber glass.

- 42.1.** The resin bonded fiber glass tiles or rolls shall be of approved make and shall be of sizes. thickness and finish as indicated.
- 42.2.** For test of Mineral wool thermal insulation [Blanket I S 3144-1965 shall be followed
- 42.3.** Insulation wool blanks shall be with the following coverings on one or both sides as indicated
- (1) Bituminous Hessian Kraft paper suitable for use in position where moisture has to be excluded.
 - (2) Hessian cloth or Kraft paper for keeping out dust
 - (3) G.I wire netting, suitable for surfaces to be plaster over

M-43. Fixtures and fastenings

43.1. General:

- 43.1.1.** The fixtures and fastenings, that is butt hinges tee and strap hinges sliding door bolts, tower bolts, door latch, bath-room latch, handles door stoppers, casement window fasteners, casement stays and ventilators catch shall be made of the metal as specified in the item or its specification.
- 43.1.2.** They shall be of iron, brass, aluminum chromium plated iron, chromium plated brass, copper oxidised iron, copper oxidised brass or anodised aluminum as specified
- 43.1.3.** The fixtures shall be heavy medium or light type. The fixtures and fastenings shall be smooth finished and shall be such as will ensure 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 x 24.85 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 to 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 portland 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 or relevant I.S 1237-1980. 47.5.
- 47.5. (E) Chequered Tiles For Stair Cases :**
- 47.5.1.** The requirements of these tiles shall be the same as chequered tiles as per (D) above except in following respects :
- (1) The length of a tile including nose 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 Storm**
- 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 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.
- 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 Stone**
- 49.1.** Polished kotah stone shall have the same specification as per rough kotah stone except as mentioned below :
- 49.2.** The stones shall have machine polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. The stones to be used for dado, skirting, sink, veneering, sills, steps etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished.
- M-50. Dholpur Stone Slab**
- 50.1.** Dholpur stone slab shall be of best quality as approved by the Engineer-in-charge. The stone slab shall be without any veins, cracks, and flaws. The stone slab shall be even sound and durable, regular in shape and of uniform colour.
- 50.2.** The size of the stone shall be as specified in the item or detailed drawing or as approved by the Engineer-in-charge. The thickness of the stone shall be as specified in the item of work with the permissible tolerance of plus or minus 2 mm. The provision in respect of polishing as for polished kotah stone shall apply to polished Dholpur stone also. All angles and edges of the face of the stone slab shall be fine chiseled or polished as specified in the item of work and all the four edges shall be machine cut. All angles and edges of the stone slab shall be true and plane.
- 50.3.** The sample of stone shall be got approved by the Engineer-in-charge for a particular work. It shall be ensured that the stones to be used in a particular work shall not differ much in shade or tint from the approved sample.
- M-51. Marble Slab**
- 51.1.** Marble slab shall be white or of other and of best quality as approved by the Engineer-in-charge.
- 51.2.** Slabs shall be hard, close, uniform and homogeneous in texture. They shall have even crystalline grain and be free from defects and cracks. The surface shall be machine polished to an even and perfect plane surface and edges machine cut true and square. The rear face shall be rough to provide key for the mortar.
- 51.3.** Marble slabs with natural veins, if selected shall have to be laid as per the pattern given by the Engineer-in-charge. Size of the slab shall be minimum 460 mm x 450 mm and preferably 600 mm x 600 mm. However, smaller sizes will be allowed to be used to the extent of maintaining required pattern.
- 51.4.** The slab shall not be thinner than the specified thickness at its thinnest part. A few specimens of finished slab to be used shall be deposited by the Contractor in the office for reference.
- 51.5.** Except as above the marble slabs shall conform to I.S. 1130-1969.
- M-52. Granite Stone slab**
- 52.1.** Granite shall be of approved colour and quality. The stone shall be hard, even sound and regular in shape and generally uniform in colour. It shall be without any soft veins, cracks or flaws.
- 52.2.** The thickness of the stone shall be specified in items.

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

M-53. P.V.C. Flooring

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

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

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

(a) Thickness + 0.15 mm.

(b) Length or Width

(1) 300 mm. Square tiles ± 0.20 mm. (3) 900 mm Square tiles ± 0.60 mm.

(2) 600 mm. Square tiles ± 0.40 mm. (4) Sheets and roll ± 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.	± 6 mm	± 10 mm
9 cm.	± 3 mm	± 7 mm
4 cm.	± 1.5 mm	± 3 mm

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

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

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

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

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

M-55. White glazed tiles

55.1. The tiles shall be of best quality as approved by the Engineer-in-charge. They shall be flat and true to shape. They shall be free from cracks, crazing sports chipper) edges and corners. The glazing shall be of uniform shade.

55.2. The tiles shall be nominal size of 150 mm x 150 mm unless otherwise, specified. The maximum variation the stated sizes other than the thickness of tile shall be plus or minus 1.5 mm. The thickness of tile shall be 6 mm. Except as above the tiles shall conform to I.S. 1977-1970.

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 black an or front for connecting flush pipes as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 'S' trap with approximately 50 mm. Water seal and 50 mm. diameter vent horn.

M-62. A. Foot Rests

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

M-63. Glazed Earthen Ware Sink

63.1. The glazed earthen-ware sink shall be of specified size, colour and quality. They sink shall conform, to I.S. 771 Part – II – 1979. The brackets for sinks shall conform to I.S. 775-1970.

63.2. The pipes shall conform to I.S. 1239-part-I 1973 and I.S. 404-1962 for steel and lead pipes respectively. 32 mm. brass waste coupling of standard pattern with brass chain and rubble plug shall be provided with sink.

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

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

M-65. Low level Enamel flushing tank

65.1. The low level enamel flushing tank shall be of 15 liters capacity. It shall conform of I S 774-1971. The flushing cistern shall be of best quality and free from any defects. The flushing tank shall have outlet 32 mm. diameter. The outlet shall be connected with W.C. pan by lead pipe or P.V.C. pipe as specified. The flushing tank shall be provided with inlet and outlet for fixing G.I. inlet pipes and over-flow pipes. The flushing cistern shall be provided with chromium plated handle for flushing The flushing tank shall be provided with bracket of cast iron so that it can be fixed on wall at specified height. The brackets shall conform to I.S. 775-1970.

M-66. Cast iron flushing cistern.

66.1. The cast iron flushing cistern shall be of 15 liters capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality free from any defects. The flushing cistern shall have outlet of 32 mm diameter. The lead pipe shall conform to I.S. 404 (Part-I) - 1962; For fixing G.I. inlet pipes and overflow pipe 20 mm. dia. inlet and outlet shall be provided The flushing cistern shall be

provided with galvanised iron chain and pull of sufficient length and shall be got approved from the Engineer-in-charge. The cast iron flushing cistern shall be painted with one coat of anticorrosive paint and two coats of paints. The flushing cistern shall be fixed on two C I brackets. The C I brackets shall conform to I S 775-1970.

M-67. Flush cock

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

M-68. Cast iron pipes and fittings.

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

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

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

68.4. Tolerances :

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

Sr. No.	Nominal dia. of Bore	Thickness	Overall		
			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 from 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. It shall be some, free from defects such as fire-cracks or hair cracks. The glaze of the traps shall be free from crazing. They shall give a sharp clear note when struck with light hammer. There shall be no broken blisters.

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

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

M 71. Glazed Stone Ware pipe And Fittings

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

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

M-72. Wall Peg Rail

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

M-73. G.I. Water Spot

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

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

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

74.1. The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. 1626-1980. Special like bends, shoes, cowls, etc. shall conform to relevant Indian Standards. The interior of pipe shall have 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 line wires. One containing the barbs. The size of the line and point wires and barb spacing shall be as specified above. The permissible deviation from the nominal diameter of the line wire and point wire shall not exceed ± 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.
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GENERAL TECHNICAL SPECIFICATIONS**1.0 General :**

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

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

2.0 Measurement of lead for Materials :

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

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

3. Surface Regularity of Sub grade & Pavement Courses :

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

PERMITTED TOLERANCES OF SURFACE REGULARITY FOR PAVEMENT COURSES

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

Notes:-

- 1 . These are for machine laid surfaces. If laid manually, due to unavoidable reason, tolerance upto 50 percent above these values in this column may be permitted. However, this relaxation does not apply to

the values of maximum undulation for longitudinal and cross profiles mentioned in columns 3 and 8 in the table.

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

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

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

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

(iii) **Lime/Cement stabilized soil sub-base** : For Lime/Cement treated materials where the surface is high, the same shall be suitably trimmed while taking care that the material below is not disturbed due to this operation. However, where the surface is low, the same shall be corrected as described herein below. For cement treated material, when the time elapsed between detection of irregularity and the time of mixing of the material is less than 2 hours, the surface shall be scarified to a depth of 50 mm, supplemented with freshly mixed material as necessary and recomposed to the relevant specification. When this time is more than 2 hours, the full depth of the layer shall be removed from the pavement and replaced with fresh material to specification. In either case, the area treated shall not be less than 5 metres long by 2 metres wide. This shall also apply to lime treated material except that the time criterion shall be 3 hours instead of 2 hours.

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

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

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

4. **Quality Control Tests During Construction :**

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

5. **Tests on Earthwork for Embankment Construction :**

5.1 **Borrow Material :**

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

(d) Moisture Content Test (IS : 2720 Part-II)

One test for every 250 Cubic Metres of soil.

5.2 Compaction Control :

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

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

(1)Cement.....

(2)Sand for masonry.

(3).....Sand for concrete.

(4).....Coarse aggregate.

(5).....Mild Steel...

(6)High yield strength deformed bars

(a) Hot Rolled..... IS : 1139

(b) Cold Twisted..... IS : 1786

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

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

ITEMWISE SPECIFICATION**Item No. 1 :- Excavation for foundation upto 1.50 mt depth including sorting out and stracking of usefulmaterials and disposing the excaveted stuff upto 50 mt lead (B) Dense or Hard Soil****➤ All sorts of soil**

Any soil which generally require close application of picks or jumpers or scarifies to loosen it stiff clay, gravel and stone etc. fall under this category.

1.0. General

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

2.0. Clearing the site

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

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

3.0. Setting out

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

4.0. Excavation

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

5.0. Disposal of the excavated stuff

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

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

6.0. Mode of measurements & payment

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

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

Item No. 2 :- Excavation for foundation upto 1.50 mt depth including sorting out and stracking of usefulmaterials and disposing the excaveted stuff upto 50 mt lead (C) Hard Murrum

1.0 Hard murrum : The hard murrum shall be clean of good binding quality and of approved quality obtained from approved quarries, of disintegrated rocks which contain silicon's material and natural mixture of clay of calcarions origin. The size of hard murrum shall not be more than 20 mm.

2.0 Workmanship: The relevant specified of items No. 1 shall be followed except that the excavation work shall be carried in hard murrum.

3.0 Mode of measurement and payment :

3.1 The relevant specification of item No. 1 shall be followed.

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

Item No. 3 :- Excavation for foundation upto for depth from 1.5 M. to 3.0 M. including sorting out and stracking of usefulmaterials and disposing the excaveted stuff upto 50 mt lead (D) Soft Rock not requiring Blasting

1.0.Workmanship :

1.1. The relevant specifications of item No.1 shall be followed except that the excavation shall be carried out for foundation upon 1.5 m lift in soft rock not requiring blasting.

1.2 The excavation in soft or disintegrated rock shall be carried out by crow bards, pickaxes or pneumatic drills or any their suitable means.

1.3 If contractor desires to reason to blasting, he can do so with permission of the Engineer-in-charge but nothing extra shall be paid to him.

1.4 The materials available from soft rock excavation shall be properly stacked within 50 m lead and 1.5 m lift and shall be the property of department.

1.5 The classification of strata of the foundation soil shall be done by the Engineer-in-charge and shall be acceptable to the contractor.

1.6 However this shall include the type of rock and boulder which may quarried or split with crow bars. Late rite and conglomerate also come under this category.

2.0Mode of measurement and payment :

2.1 The relevant specifications of item No.1 shall be followed.

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

Item No. 4:- Excavation for foundation upto for depth from 1.5 M. to 3.0 M. including sorting out and stracking of usefulmaterials and disposing the excaveted stuff upto 50 mt lead (C) Hard Murrum

1.0 Hard murrum : The hard murrum shall be clean of good binding quality and of approved quality obtained from approved quarries, of disintegrated rocks which contain silicon's material and natural mixture of clay of calcarions origin. The size of hard murrum shall not be more than 20 mm.

2.0 Workmanship: The relevant specified of items No. 1 shall be followed except that the excavation work shall be carried in hard murrum.

3.0 Mode of measurement and payment :

3.1 The relevant specification of item No. 1 shall be followed.

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

Item No.5 :- Providing and laying cement concrete 1:4:8 (1 cement : 4 coarse sand : 8 hand broken stone aggregate 40mm nominal size) and curing comoplete excluding cost of form work in (a) foundation and plinth

1.0. Materials

1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Crushed stone aggregate 40 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. 4 parts of coarse sand and 8 parts of **crushed** 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 ponding 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. 6 :- Providing and laying controlled cement concrete M250 work with curing etc. complete including the cost of form work but excluding cost of Reinforcement for RCC work in (A) Foundation footing base of columns and mass concrete.

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Item No.7:- Providing and laying controlled cement concrete M250 work with curing etc. complete including the cost of form work but excluding cost of Reinforcement for RCC work in Column upto Plinth Level.

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Item No.8 :- Providing and laying controlled cement concrete M250 work with curing etc. complete including the cost of form work but excluding cost of Reinforcement for RCC work in (C) For Plinth Beam, Tie Beams at Ground Levels

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Item No.14,16,17,18,19,20,21,105:-

Providing and laying controlled cement concrete M-200 with curing etc. complete including the cost of form work but excluding the cost of reinforcement for R.C.C. work in Column, Lintel/ Chhajjas/Beam/Slab/ Stair Case/Copping/Road. (for all floor)

1.0. Materials

1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Coarse aggregate shall conform M-12.

1.2. The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.

1.3. The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

2.0. General

2.1. The relevant specifications of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests, the proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained.

2.2. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./cm.

- 2.3.** The proportion of cement, sand and coarse aggregate shall be determined of weight. The weigh batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under:

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

In all cases, the 28 days compressive strength specified in above be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for purpose as concrete belonging to the lower of the grades between which its strength lies.

3.0. Workmanship

- 3.1.** The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.
- 3.2.** In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.
- 3.3.** It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg/m³ in plain concrete and not less than 250 kg/m³ in reinforced concrete.
- 3.4** The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

4.0. Clearing and Treatment of forms:

- 4.1.** All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and

thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars..

5.0 Stripping time:

5.1. In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.

(a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.

(b) Beam soffits, (props, left under).....7 days.

(c) Removal of props slabs:

(i) Slabs spanning up to 4.5. m.....7 days.

(ii) Spanning over 4.5 mm.....14 days.

(d) Removal of props t beams and Arches:

(i) Spanning up to 6 mm.....14 days.

(ii) Spanning over 6 m.....21 days.

6.0 Procedure when removing the form work :

6.1. All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

7.0 Centering:

7.1. The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

7.2. The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.

7.3. The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

8.0 Scaffolding:

8.1. All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to with stand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.

8.2. The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.

8.3. The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :

(a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.

(b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.

(c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.

(d) Dressing with oil to prevent adhesion of concrete with shuttering and.

(e) Raking or circular cutting.

9.0 Re-Use:

- 9.1.** Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.
- 10.0. Mode of measurement & payment**
- 10.1.** The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for
- (a) Ends of dissimilar materials such as joints, beams, posts, girders, falters, purling trusses, corbels and steps etc. up to 500 Sq. Cm. in section.
- 10.2.** Form work shall be measured as the area in square meters to shuttering in contract with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.
- 10.3.** Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.
- 10.4.** The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate includes the cost of form work.
- 10.5.** The rate shall be for a unit of **one cubic meter**.

Item No.9 :- P & L Brick work using common burnt clay Building bricks having crushing strength not less than 35 Kg/ Sq.Cm. In foundation and plinth in cement mortar 1:6 (1 Cement: 6-Fine sand) with curing etc.comp. (b) Conventional

- 1.0. Materials**
Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Bricks shall conform to M-15. Cement mortar shall conform to M-11.
- 2.0. Workmanship**
- 2.1. Proportion:**
- 2.1.1.** The proportion of the cement mortar shall be 1:6 (1 cement : 6 fine sand) by volume.
- 2.2. Wetting of bricks:**
- 2.2.1.** The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water is as indication of through wetting of bricks.
- 2.3. Laying:**
- 2.3.1.** Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete to bond; closures in such case shall be cut to required size and used near the ends of walls.
- 2.3.2.** A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.
- 2.3.3.** The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept uniform.
- 2.3.4.** The brick shall be laid with frog up wards. A set of tools comprising of wooden straight edges, man son's spirit level, square half meter rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.
- 2.3.5.** Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one meter over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.
- 2.3.6.** All fixtures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.
- 2.4. Joints:**
- 2.4.1.** Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exposed 12 mm. The face joints shall be raked out as directed by raking tools daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done.

- 2.4.2.** The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.
- 2.5. Curing:**
- 2.5.1.** Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.
- 2.6. Preparation of foundation bed:**
- 2.6.1.** If the foundation is to be laid directly on the excavated bed, the shall be leveled, cleared of all loose materials, cleaned and wetted before stating masonry, If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.
- 3.0. Mode of measurements & payment**
- 3.1.** The measurements of this item shall be taken for the brick masonry fully completed in foundation up to plinth. The limiting dimensions not exceeding those shown on the plinths or as directed shall be final. Battered tapered and curved portions shall be measured net.
- 3.2.** No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry of marking holes in respect of following item.
- (1) Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps, etc. where cross sectional area does not exceed 500 sq.cm.
 - (2) Opening not exceed in 1000 sq.cm.
 - (3) Wall plate sand bed plates bearing of slab, chhajjas and like whose thickness does not exceed 10 cms. and the bearing does not extend the full thickness of wall.
 - (4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.
 - (5) Iron fixtures, pipes up to 300 mm. dia. hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.
 - (6) Forming charges of section not exceeding 350 sq.cm. in masonry.
- 3.3** Apparatuses for fire places shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.
- 3.4.** The rate shall be for a unit of one cubic meter.

Item No.10:- Filling available excavated earth (excaluding rock) in trenches. Plinth, sides of foundation etc. in layers not exceeding 20cm. in depth consolidating each dispoisited layer by rammng and watering .

1.0 WORKMANSHIP

- 1.1.** The earth to be used for filling shall be free from salts, organic or other foreign matter all clots of earth shall be broken.
- 1.2.** As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris brick bats mortar dropping etc. and filled with earth in layers not exceeding 20 cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the ends of crow-bars, where rammer cannot be used.
- 1.3** The plinth shall be similarly filled with earth in layers not exceeding 20 cms adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.
- 1.4** The finished level of filling shall be kept to shape intended to be given to floor.
- 1.5** In case of large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation required shall also be as specified.

2.0. Mode of Measurements & Payment

- 2.1. The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids, if consolidated as instructed above.
- 2.2. The rate shall be for a unit of one cubic meter.

Item No.11:- Filling in foundation and plinth with murrum or selected soil in layers of 20 cm. thickness including watering, ramming and consolidating etc. Complete.

1.0 MATERIALS

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

2.0 WORKMANSHIP

- 2.1 The murrum or selected soil to be used for filling shall be free from salts, organic or other foreign matter all colds of murrum or selected soil shall be broken.
- 2.2 As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris brick bats mortar dropping etc. and filled with murrum or selected soil in layers not exceeding 20 cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The murrum shall be rammed with iron rammers where feasible and with the but ends of crow bars. Where rammer cannot be used.
- 2.3 The plinth shall be similarly tilled with murrum or selected soil in layers not exceeding 20 cms adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.
- 2.4 The finished level of filling shall be kept to shape intended to be given to floor.
- 2.5 In case of large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation required shall also be as specified.

3.0. MODE OF MEASUREMENTS & PAYMENT

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

Item No.12 :- Providing and Laying ordinary cement concrete 1:2:4 (1- Cement 2- coarse sand : 4- graded stone aggregates 20 mm nominal size) and finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C work in (floor slab,road etc.)

1.0. Materials

- 1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.
- (a) The bars shall be kept in position by the following methods :
- (i) In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4 cms. x 4 cms. section and of thickness equal to the specified cover shall be placed between the bars and shattering as to secure and maintain the requisite cover of concrete over the reinforcement. In case of cantilevered or doubly reinforce beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or supports bars at 1.0 to 1.2 meter centers.

- 1.2.** All bars projecting from pillars, columns, beams, slabs etc, to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.
- 1.3.** The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.
- 1.4.** The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

2.0. General

- 2.1.** The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.
- 2.2.** The designation ordinary M-100, M-150, M-200, M-250 specified as per I.S. corresponds approximately to 1:3:6, 1:2:4, 1:1.1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.
- 2.3.** The ingredients required for ordinary concrete containing one bag of cement of 50 kg. by weight (0.0342 Cu.M.) for different proportions of mix shall be as under:

TABLE

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

- 2.4.** The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.
- 2.5.** Workability of the concrete shall be controlled by maintaining a water cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.
- 2.6.** The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.
- 2.7.** For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.
- 2.8.** For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.
- 2.9.** Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.
- 2.10.** Admixture maybe used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

3.0. Workmanship

- 3.1. Proportioning :** Proportioning shall be done by volume, except which shall be measured in terms of bags of 50 kg. weight, the volume of one such bag being taken as 0.0342 cu. meter Boxes of

suitable size shall be used for measuring sand aggregate. The size of boxes (internal) shall be 35 x 25 cms. and 40 cms deep while measuring the aggregate and sand the boxes shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp saner, allowances for bulk age shall be made.

3.2. Mixing :

3.2.1. For all work, concrete shall be mixed in a mechanical mixed which along with other accessories shall be kept in first class working condition and so maintained throughout the construction Measured quantity of aggregate, sand and cement required for each batch shall be poured into the claim of the mechanical mixer while it is continuously running. After half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing he done for less than 2 minutes after-oil ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient tuning over the ingredients of concrete before and after adding water Mixing platform shall be so arranged that no foreign malarial gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be spread in n layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly be turning over to get a mixture to uniform colour. Specified quantity water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified.

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

3.2.4. The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor toe safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

3.3. Clearing and Treatment of forms:

3.3.1 All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shaft prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars.

4.0 Stripping time:

4.1. In normal circumstances and where ordinary cement is used forms may be struck after expire of following periods.

- (a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.
- (b) Beam soffits, (props, left under).....7 days.
- (c) Removal of props slabs:
 - (i) Slabs spanning up to 4.5. m.....7 days.
 - (ii) Spanning over 4.5 mm.....14 days.
- (d) Removal of props t beams and Arches:
 - (i) Spanning up to 6 mm.....14 days.
 - (ii) Spanning over 6 m.....21 days.

5.0 Procedure when removing the form work :

5.1. All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

6.0 Centering:

- 6.1.** The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.
- 6.2.** The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.
- 6.3.** The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.
- 7.0 Scaffolding:**
- 7.1.** All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to withstand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.
- 7.2.** The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.
- 7.3.** The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :
- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
 - (b) Filletting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
 - (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
 - (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
 - (e) Raking or circular cutting.
- 8.0 Re-Use:**
- 8.1.** Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.
- 9.0 Consistency:**
- 9.1.** The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete shall be determined by regular slump tests in accordance with I.S. 1199-193. The slump of 10 mm. to 25 mm shall be adopted when vibrators are used and 80 mm. when vibrators are not used.
- 9.2. Inspection:**
- 9.2.1.** Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the form work and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men machinery materials and for results obtained immediately before concreting all forms shall be thoroughly cleaned.
- 9.2.2.** Centering design and its erection shall be got approved from the engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber kapachi or metal pieces shall not be used for this purpose.
- 9.3. Transporting and laying:**
- 9.3.1.** The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All form work shall be cleaned and made free from standing water dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the engineer-in-charge has been obtained.

9.3.2. Concreting shall proceed continuously over the area between construction joints. Fresh concrete proper contraction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the engineer-in-charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.

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

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

9.4. Curing:

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

9.5. Sampling and testing of concrete:

9.5.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days and 28 days as per requirements in accordance with I.S. 526-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work	No of samples	Quantity of concrete in the works	No of samples
1 - 5 Cmt.	1	16-30 Cmt.	3
6 - 15 Cmt.	2	31-50 Cmt.	4
51 and above	4± one additional for each additional 50 mm. or part thereof.		

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

9.5.2. The average of the group of cubes cast for each day shall not be less than the specified cube strength of 150 K/g Cm² at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield

the specified strength, such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the Proportions given for a particular grade shall not, however be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

9.6. Stripping :

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

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

9.6.3. Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar, all fins, caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being furnished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surface which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of structure affected.

10.0. Mode of Measurement & Payment

10.1. The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for

(a) Ends of dissimilar materials such as joints, beams, posts, girders, gables, purling trusses, corbels and steps etc. up to 500 Sq. Cm. in section.

10.2. Form work shall be measured as the area in square meters to shuttering in contract with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.

10.3. Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.

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

10.5. The volume occupied by reinforcement shall not be deducted from R.C.C. work.

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

Item No. 13 : Applying general insecticide pest control treatment to floors, cupboards etc including labour material etc. complete. Using Heptachloride 20 EC. As Per 6113_pests Concentration Weight 0.50 percent is recommended one litre chemical

emulsion dilute with 39 liter of water will give. Total dilute concentration will be 40 litre inclusive of one litre chemical emulsion application 0.5 Litre chemical / Sqm of surface is recommended as per I.S

1.0 MATERIALS

The chemicals used for the soil treatment shall be only one of the following with concentration shown against each in aqueous emulsion.

	Chemicals	Concentration
1	Aldrin	0.50% (By Weight)
2	Heptachlor	0.50% (By Weight)
3	Chlordane	1.00% (By Weight)

2.0 WORKMANSHIP

- 2.1 The chemicals barrier shall be complete and continuous under whole of the structure to be protected.
- 2.2 The bottom and the sides of foundations up to a height of 30 cms from the bottom of excavation made for masonry foundation and for basement column pits shall be treated with the chemical emulsion at the rate 5 liters/sq.meters of the surface area.
- 2.3 The chemical treatment shall be carried out when the surface is quite dry. Chemical treatment shall not be carried out when it is raining or when the soil wet with rain or sub soil water.
- 2.4 Once formed, treated soil barriers shall be not disturbed. If by chance, treated soil barriers and disturbed, immediately steps shall be taken to restore the continuation and compactness of the barrier system.
- 2.5 The treatment against termite infection shall remain fully effective for a period not less than 10 years from date of issue of the final certificate to completion of work. If at any time during this period, any defects in treatment are revealed or any evidence of infection in any part of the building or structure is noticed, the contractor shall be rectify the concerned failure to do so, the Engineer-in-charge any get the same rectified through any other agency at Contractor's risk and cost, any decision of Engineer-in-charge as to the cost payable by contractor for the same shall be binding to the contractor.
- 2.6 A Guarantee bond on appropriately stamped paper shall be given by the contractor to the Department in the manner and form prescribed below.

FORM OF GUARANTEE BOND

I / We _____ (Contractor) here by guarantee that work will remain unaffected and will not be in anyway damaged by termite or any other germs of similar types. For a period for **10 years** after completion of the work of anti-termite as per the terms and conditions of the contract and damage that might be caused on account of termite and or other similar type of germs and hereby Guarantee to make good any loss of damages suffered by the Govt. of Gujarat and further guarantee to redo effective work without claiming any extra cost.

- 2.7 This guarantee shall remain in force for the period of 10 years from the completion of the work under the contract and it shall remain binding to the contractor for period of 10 years.
- 2.8 The deposit at the rate of 50% of the cost of this item from the running and final bills shall be recovered and remained for the first one year after completion of the work or at least on monsoon season passed which ever is later and 10% shall be retained for the balance of the guarantee period and shall be refunded only after completion of the guarantee period.

3.0 MODE OF MEASUREMENT AND PAYMENT

- 3.1. The length and breadth shall be measured correct to a cm. as per the dimensions of sanctioned plans. No deduction shall be made nor extra paid for any opening for pipes etc. up to 0.1 sq. mt. The rate shall include the cost of all labour and materials required for the operation involved for satisfactory completion of this item. The sides of the trenches 30 cms, each side and bottom shall be measured under this item.
- 3.2. The rate shall be for a unit of One sq. meter.

Item No.15,23:- Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/ Sq.Cm. In Super Structure above plinth level up to floor two level in cement mortar 1:6 (1 Cement: 6-Fine sand) with curing etc. (b)Conventional. for G.F. (For all Floors)

1.0. Materials

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

2.0. Workmanship

2.1. Proportion:

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

2.2. Wetting of bricks:

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

2.3. Laying:

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

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

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

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

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

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

2.4. Joints:

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

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

2.5. Curing:

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

2.6. Preparation of foundation bed:

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

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

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

- 2.9.** For the face of brick work, where plastering is to be done, joints shall be racked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.
- 3.0. Mode of measurements & payment**
- 3.1.** The masonry work of G.F. & First floor shall be measured and paid under this item rate includes cost of all materials & labour.
- 3.2.** Brick work in parapet shall be included in the corresponding masonry item of floor immediately below the floor above which the parapet is built.
- 3.3.** No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry of marking holes in respect of following item.
- (1) Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps, etc. where cross sectional area does not exceed 500 sq.cm.
 - (2) Opening not exceed in 1000 sq.cm.
 - (3) Wall plate sand bed plates bearing of slab, chhajjas, and like whose thickness does not exceed 10 cms. and the bearing does not extend the full thickness of wall.
 - (4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.
 - (5) Iron fixtures, pipes up to 300 mm. dia. hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.
 - (6) Forming charges of section not exceeding 350 sq.cm. in masonry.
 - (7) Apparatuses for fire places shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.
- 3.4.** The rate shall be for a unit of **one cubic meter**.

Item No. 22 :- Providing TMT Bar FE 500/500D reinforcement for R.C.C. work including Cutting, bending, binding and placing in position complete upto floor two level (For all floor)

1.0. GENERAL

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

2.0. MATERIAL

2.1. TMT Bars

Reinforcements may be either T.M.T. tensile steel, high strength deformed bars. They may be uncoated or coated 'with epoxy or with approved protective coatings.

2.2. T.M.T. bars reinforcement for R C C work shall conform IS 432 (Part II) 1966 and shall be of tested quality. It shall also comply with relevant part of IS 456-1966

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

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

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

3.0. Pitch

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

4.0. Binding wire

4.1. Mild steel binding wire shall be of 1.63 mm or 1.22 mm (16 to 18 gauge diameter and shall conform IS 280-1972

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

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

5.0. PROTECTION OF REINFORCEMENT

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

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

6.0. Workmanship

6.1. The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed by The Engineer in charge.

6.2. Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawing

7.0. BENDING OF REINFORCEMENT

7.1. Bar bending schedule shall be furnished by the Contractor and got approved by the Engineer before start of work.

7.2. Reinforcing steel shall conform to the dimensions and shapes given in the approved bar bending Schedules.

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

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

8.0. PLACING OF REINFORCEMENT

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

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

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

In case of beam and slab construction, industrially produced polymer cover blocks of thickness equal to the specified cover shall be placed between the bars and formwork subject to Satisfactory evidence that the polymer composition is not harmful to concrete and reinforcement. Cover blocks made of concrete may be

permitted by the Engineer, provided they have the same strength and specification as those of the member.

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

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

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

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

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

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

9.0. Lapping

9.1. All reinforcement shall be furnished in full lengths as indicated on the drawing. No splicing of bars, except where shown on the drawing; will be permitted without approval of the Engineer. The lengths of the splice shall be as indicated on drawing or as approved by the Engineer. Where practicable, overlapping bars shall not touch each other, and shall be kept apart by 25 mm or 1 1/4 times the maximum size of coarse aggregate, whichever is greater, If this is not feasible, overlapping bars shall be bound with annealed steel binding wire, not less than 1 mm diameter and twisted tight in such a manner as to maintain minimum clear cover to the reinforcement from the concrete surface. Lapped splices shall be staggered or located at points, along the span where stresses are low.

10.0. Welding

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

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

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

is 0.4 or less.

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

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

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

10.6. All reinforcement bars shall be accurately placed in exact position shown on the drawings and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm in size and by using say blocks or metal chairs spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals, Bars shall not be allowed to sag between supports not displaced during concreting or any other operations of the work All devices used for positioning shall be of not corrodible material wooden and metal supports shall not extended to the surface of the concrete, except where shown in drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wooden blocs shall not be used Layers of bars shall be separated by spacer bars pre-cast mortar blocks or other approved devices. Reinforcement after bending placed in position shall be maintained in a clean condition until completely embedded in concrete, Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement form corrosion, concrete cover shall be provided as indicated on drawings. All bars protruding from concrete and to which other bars are to be sliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout

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

As far possible bars of full length shall be used in case this is not possible, overlapping of bars shall be done as directed by the Engineer in charge When practicable overlapping bars shall not touch each other, but be kept apart by 25 mm Where no feasible overlapping bars shall be bound with annealed wires not less than 1 mm thick twisted tight The overlaps shall be staggered for different bars and located at points along the span where neither sheer not bending moments is maximum.

10.8. Whenever indicated on drawing or desired the Engineer in charge bars shall be jointed by coupling which shall have a cross section sufficient to transmit the full stresses of bars The end of the bars that are jointed by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross section of the bar. Threads shall be standards threads Steel for coupling shall conform to IS 226

10.9. When permitted or specified on the drawings joints of reinforcement bars shall butt-welded so as to transmit their full stresses Welded joints shall preferably be located at points when steel will not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded Only electric are welding using a process which excludes air form the molten metal and conforms to any or other special provisions for the work shall be accepted Suitable means shall be provided for holding bars securely in position during welding It shall be ensured that no voids are left in welding and when welding is done in two or three stages previous surface shall be cleaned properly Ends of bars shall be cleaned of all loose scale rust stages paint and other foreign matter before welding Only competent welders shall be employed on the work. The M S electrodes used for welding shall conform IS 814 Welded pieces of reinforcement shall be tested. Specimen shall be taken form the actual site and their number shall frequency to test shall be as directed by the Engineer in charge

11.0 MODE OF MEASUREMENTS & PAYMENT

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

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

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

11.2. Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to, in place lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tones on the same basis of as per table given above even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

11.3. The rate for reinforcement includes cost of steel binding wires, its carting from Department Store to work site with all leads and lifts (in case of it is supplied by department), cutting, bending, placing in position, binding and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars.

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

Item No.24 :- Providing & Fixing UPVC Single Door Partly Glazed /Fully Glazed of Fenesta,LG Hausys,Kömmerring Veka as per Instruction of Architect .Doorwith Frame section 58mmx60mm and door shutter of section size 102mmx60mm with Glass 5mm Thick including lock and aldrop with all necessary fittings and installation and filling gaps with Silicon etc complete

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Item No.25 :- Providing & Fixing UPVC Single Door Partly Glazed /Fully Glazed of Fenesta,LG Hausys,Kömmerring Veka as per Instruction of Architect .Doorwith Frame section 58mmx60mm and door shutter of section size 102mmx60mm with Glass 5mm Thick including lock and aldrop with all necessary fittings and installation and filling gaps with Silicon etc complete

MATERIAL

PVC standard section

1.1 Main outer frame of PVC standard section

PVC alloy used in the manufacture of extruded windows sections shall conform to IS designation HEA-WP of IS 733-1975 and also to IS Designation WVG-WP of IS 1285-1975 The section shall be as specified in the drawing and design

Outer frame shall be of standard colour anodized PVC hollow sections having weight per Rmt as described in Schedule B

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides. All sections shall be of best quality and free from any defect and shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

1.2 Shutter frame of PVC standard section

PVC alloy used in the manufacture of extruded windows sections shall conform to IS designation HEA-WP of IS 733-1975 and also to IS Designation WVG-WP of IS 1285-1975 The section shall be as specified in the drawing and design

Frame of shutters shall be of standard colour anodized PVC hollow sections of having weight per Rmt as described in Schedule B

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides. All sections shall be of best quality and free from any defect shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

1.2 Glazing clits

Glazing clits shall be of standard anodized PVC standard sections having weight per Rmt as described in Schedule B

Glazing clits shall be Free from any scratches or holes or any damages on surface. Glazing clits shall have finished luster surface on all sides. All sections shall be of best quality and free from any defect shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

1.3 Rubber Gasket

Rubber gasket shall be of best quality and free from any defect shall be undamaged in carriage and handling either by rubbing off of surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities tea red edges or other wise damaged.

2.0 Colour tinted glass

For glazing and framing purpose shall conform to IS 1761-1960

Colour tinted glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes, blisters and other defects. The kind of glass to be used shall be mentioned in the item of specification of in the special provision or as shown in the detailed drawings. The thickness of glass panels shall be uniform. The specification for different kinds of glass shall be as under.

Colour tinted glass shall be patent flattened glass of best quality and of approved colour and quality and shall be of best quality and free from any defect. Colour tinted 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.

The thickness of the Colour tinted glass shall be as per prescribed in description of the item the glass

3.0 12 mm thick Laminated Particle Board

The particle boards shall conform to I.S. 3087-1965 "Specification for wood particle board for general purpose. The size and the thickness shall be as indicated

For execution of this item specification of material as per item **M-40** shall be followed for booklet of Building specifications

Particle board shall be Both side laminated and of best quality and free from any defect and shall be undamaged in carriage and handling either by rubbing off of lamination or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

The Laminated Particle Board used for face panels shall be best quality free from any defects. The Laminated Particle Board shall be made with phenol formaldehyde adhesive. The Laminated Particle Board shall conform to I.S. 3087-1965 "Specification for wood particle board for general purpose. " The size and the thickness shall be indicated

4.0. Fixtures

4.1 Floor spring

Floor spring shall be of approved make and brand and free form any defect Top cover shall be of best quality with luster surface and free form any defect like scratches or holes etc and shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. Internal mechanism of the unit shall be in perfect working condition and shall be tested as directed by the Engineer in charge

4.2 Anodized PVC Handle

Handle of anodized PVC shall be heavy type handles of approved size and quality of approved make and shall be fixed in position as directed by Engineer in charge. Handle shall be of best quality and free from any defect like scratches or holes etc and shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise.

5.0 WORKMANSHIP

The door shall be fabricated as shown in detail architectural drawing and as per instruction of engineer in charge, only approved material shall be used in door colour of anodizing shall be approved colour and shall be anodized up to the satisfaction of engineer in charge. Completed door shall be fixed in position in true line and level and shall be got tested as shown in the drawing as per instruction of engineer in charge.

6.0 Mode of Measurement & Payment :

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

6.2. The PVC doors shall be measured for its **length and breadth** limiting dimensions to those specified on plan or as directed.

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

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

Item No. 26:- Providing & Fixing UPVC Partition Partly Glazed /Fully Glazed of Fenesta, LG Hausys, Kömmerling Veka as per Instruction of Architect . Partition with Frame section 58mmx60mm including with Glass 5mm Thick fittings and installation and filling gaps with Silicon etc complete

MATERIAL

PVC standard section

1.1 Main outer frame of PVC standard section

PVC alloy used in the manufacture of extruded windows sections shall conform to IS designation HEA-WP of IS 733-1975 and also to IS Designation WVG-WP of IS 1285-1975. The section shall be as specified in the drawing and design.

Outer frame shall be of standard colour anodized PVC hollow sections of **having weight per Rmt** as described in details in item of schedule B.

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides. All sections shall be of best quality and free from any defect and shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

1.2 Shutter frame of PVC standard section

PVC alloy used in the manufacture of extruded windows sections shall conform to IS designation HEA-WP of IS 733-1975 and also to IS Designation WVG-WP of IS 1285-1975. The section shall be as specified in the drawing and design.

Frame of shutters shall be of standard colour anodized PVC hollow sections **having weight per Rmt** as described in details in item of schedule B.

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides. All sections shall be of best quality and free from any defect shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

1.2 Glazing clits

Glazing clits shall be of standard colour anodized PVC standard sections **having weight per Rmt** as described in details in item of schedule B.

Glazing clits shall be Free from any scratches or holes or any damages on surface. Glazing clits shall have finished luster surface on all sides. All sections shall be of best quality and free from any defect shall be

undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

1.3 Rubber Gasket

Rubber gasket shall be of best quality and free from any defect shall be undamaged in carriage and handling either by rubbing off of surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities tea red edges or other wise damaged.

2.0 Colour tinted glass

For glazing and framing purpose shall conform to IS 1761-1960

Colour tinted glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes, blisters and other defects. The kind of glass to be used shall be mentioned in the item of specification of in the special provision or as shown in the detailed drawings. The thickness of glass panels shall be uniform. The specification for different kinds of glass shall be as under.

Colour tinted glass shall be patent flattened glass of best quality and of approved colour and quality and shall be of best quality and free from any defect. Colour tinted 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.

The thickness of the Colour tinted glass shall be as per prescribed in description of the item the glass

3.0 12 mm thick Laminated Particle Board

The particle boards shall conform to I.S. 3087-1965 "Specification for wood particle board for general purpose. The size and the thickness shall be as indicated

For execution of this item specification of material as per item **M-40** shall be followed for booklet of Building specifications

Particle board shall be of best quality and free from any defect and shall be undamaged in carriage and handling either by rubbing off of lamination or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

The Laminated Particle Board used for face panels shall be best quality free from any defects. The Laminated Particle Board shall be made with phenol formaldehyde adhesive. The Laminated Particle Board shall conform to I.S. 3087-1965 "Specification for wood particle board for general purpose. " The size and the thickness shall be indicated

4.0. Fixtures

4.1 Floor spring

Floor spring shall be of approved make and brand and free from any defect Top cover shall be of best quality with luster surface and free from any defect like scratches or holes etc and shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. Internal mechanism of the unit shall be in perfect working condition and shall be tested as directed by the Engineer in charge

4.2 Anodized PVC Handle

Handle of anodized PVC shall be heavy type handles of approved size and quality of approved make and shall be fixed in position as directed by Engineer in charge Handle shall be of best quality and free from any defect like scratches or holes etc and shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise

5.0 WORKMANSHIP

The door shall be fabricated as shown in detail architectural drawing and as per instruction of engineer in charge, only approved material shall be used in door colour of anodizing shall be approved colour and shall be anodized up to the satisfaction of engineer in charge. Completed door shall be fixed in position in true line and level and shall be got tested as shown in the drawing as per instruction of engineer in charge.

6.0 Mode of Measurement & Payment :

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

6.2. The PVC doors shall be measured for its **length and breadth** limiting dimensions to those specified on plan or as directed.

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

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

Item No.27:- Providing and fixing flush door both side (1 mm Thick Sunmica Sheet)laminated shutter fabricated from 35 mm thick solid core malemine faced three layered pre laminated flat pressed wood based exterior grade bonded BWP/BWR synthetic resin

having stamped IS 12823 grade I type II including three coats of lacquer polishing to exposed wooden surfaces and Stainless steel decorative type designs fixtures/fastening etc. including I.T.W. triangular batten patti of size 30 mmX30 mm etc as per architectural detailed drawing and as directed by engineer in charge.

1.0. Materials

Flush door shall conform to M-30. Teak wood shall confirm to M-29. Glass shall confirm to M-38. S.S. fixtures and fastening at all places.

2.0. Workmanship

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

2.1.1. Ready made shutters shall be of correct size and shall fit into the door or other openings without excessive scraping of edges. Adding of battens etc. to make up to the size shall not be allowed.

2.2. Frame with shutters

2.2.1. 35mm thick double shutter doors made frame size 5 x 12 cm, frame, top glazing using 5mm thick glass selected quality and with 35mm thick solid core flush door and 1 mm thick exterior lamination over it on both sides, colour, pattern and design is to be approved by the Architect, with stainless steel handle size 60 cm. long, tower bolt size 25cm, heavy duty floor spring & heavy stainless steel aldop as per detail.

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

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

2.3. Timber paneling:

2.3.1. Thickness of the panel shall be as specified in the item as shown in the drawing or as directed. If the panel is made from more than one piece the pieces shall be finished as shown in the detailed drawings and shall be joined with continuous groove with specified size. The end pieces of the panel and the top and bottom of the panel shall be provided with continuous tongue to frame into groove of the frame shutter. An air space of 1.5 mm. shall be left in the groove of frame of shutter while framing the panels in it.

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

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

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

2.5. Fixtures and Fastenings:

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

3.0. Mode of measurement & payment

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

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

3.3. The rate includes the cost of water proof plywood, laminated sheet, floor spring & all fixtures & fastenings as directed in item.

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

Item No.28 :- Providing and laying 19mm x 65mm round, 'D' edge and polished granite pencil patti on top, with cement paste and including backing coat in C.M. 1:4. All joints filled

with colour / epoxy grout and wiped to give sharp joints with flush pointing and washed clean with acid etc.

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. **19mm x 65mm round, 'D' edge and polished granite pencil patti** shall conform to M-49.

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 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 **19mmx65 mm.** (average) as specified in the item but not less than 10 mm. at any place of the slab.
- 2.2.** Bedding for the polished kota stone slabs shall be of cement plaster 1:4 (1 cement : 3 coarse sand) or L.M. 1:1.5 of average thickness 10 mm given in the description of the item. Sub grade shall be cleaned, wetted and mopped Mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one blue kota stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining, the walls shall enter not less than 10 mm. under the plaster, skirting or dedo. The junction between the wall 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 risers of steps, skirting or dedo shall be measured in sq. meter Length shall be measured along the finished faces of risers, skirting or dedo. Height shall be measured from finished level of treads of floor to top. Lining of pillars shall be measured under this item.
- 3.2.** The rate shall be for a unit of one sq. meter.

Item No. :-29 Providing and fixing factory-made UPVC combination sliding window of Fenesta, LG Hausys, Kömmerling make, System SY09 – Luxury Slider Combination, Design Code 615, overall size 1050 mm (W) × 2800 mm (H), comprising two fixed panels and two sliding shutters (configuration (DFix.DFix)/(XiX)). The window frame shall be made of uPVC multi-chamber sections having dimensions and shutter members shall consist of top & bottom rails of as per manufacturer's specification. Each openable

panel shall be fitted with 6 mm thick toughened glass (SG TGH) and all fixed panels shall have glass secured in the same profile system with EPDM gaskets and weather seals. All sections to have Foil 2S Walnut finish on both sides, with necessary hardware including handles, locks, rollers, and interlocking profiles. The installation shall be complete in all respects, ensuring perfect alignment, smooth operation, and weather resistance.

MATERIAL

PVC standard section

1.1 Main outer frame of PVC standard section

PVC alloy used in the manufacture of extruded windows sections shall conform to IS designation HEA-WP of IS 733-1975 and also to IS Designation WVG-WP of IS 1285-1975 The section shall be as specified in the drawing and design

Outer frame shall be of standard colour anodized PVC hollow sections having weight per Rmt as described in Schedule B

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides. All sections shall be of best quality and free from any defect and shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

1.2 Shutter frame of PVC standard section

PVC alloy used in the manufacture of extruded windows sections shall conform to IS designation HEA-WP of IS 733-1975 and also to IS Designation WVG-WP of IS 1285-1975 The section shall be as specified in the drawing and design

Frame of shutters shall be of standard colour anodized PVC hollow sections of having weight per Rmt as described in Schedule B

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides. All sections shall be of best quality and free from any defect shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

1.2 Glazing clits

Glazing clits shall be of standard anodized PVC standard sections having weight per Rmt as described in Schedule B

Glazing clits shall be Free from any scratches or holes or any damages on surface. Glazing clits shall have finished luster surface on all sides. All sections shall be of best quality and free from any defect shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

1.3 Rubber Gasket

Rubber gasket shall be of best quality and free from any defect shall be undamaged in carriage and handling either by rubbing off of surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities tea red edges or other wise damaged.

2.0 Colour tinted glass

For glazing and framing purpose shall conform to IS 1761-1960

Colour tinted glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes, blisters and other defects. The kind of glass to be used shall be mentioned in the item of specification of in the special provision or as shown in the detailed drawings. The thickness of glass panels shall be uniform. The specification for different kinds of glass shall be as under.

Colour tinted glass shall be patent flattened glass of best quality and of approved colour and quality and shall be of best quality and free from any defect. Colour tinted 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.

The thickness of the Colour tinted glass shall be as per prescribed in description of the item the glass

3.0 12 mm thick Laminated Particle Board

The particle boards shall conform to I.S. 3087-1965 "Specification for wood particle board for general purpose. The size and the thickness shall be as indicated

For execution of this item specification of material as per item **M-40** shall be followed for booklet of Building specifications

Particle board shall be Both side laminated and of best quality and free from any defect and shall be undamaged in carriage and handling either by rubbing off of lamination or surface or otherwise. And free from all defects such as Scratches cracks, holes, deformities chipped edges or other wise damaged.

The Laminated Particle Board used for face panels shall be best quality free from any defects. The Laminated Particle Board shall be made with phenol formaldehyde adhesive. The Laminated Particle Board shall conform to I.S. 3087-1965 "Specification for wood particle board for general purpose. " The size and the thickness shall be indicated

4.0. Fixtures

4.1 Floor spring

Floor spring shall be of approved make and brand and free from any defect Top cover shall be of best quality with luster surface and free from any defect like scratches or holes etc and shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise. Internal mechanism of the unit shall be in perfect working condition and shall be tested as directed by the Engineer in charge

4.2 Anodized PVC Handle

Handle of anodized PVC shall be heavy type handles of approved size and quality of approved make and shall be fixed in position as directed by Engineer in charge Handle shall be of best quality and free from any defect like scratches or holes etc and shall be undamaged in carriage and handling either by rubbing off of anodizing or surface or otherwise

5.0 WORKMANSHIP

The door shall be fabricated as shown in detail architectural drawing and as per instruction of engineer in charge, only approved material shall be used in door colour of anodizing shall be approved colour and shall be anodized up to the satisfaction of engineer in charge. Completed door shall be fixed in position in true line and level and shall be got tested as shown in the drawing as per instruction of engineer in charge.

6.0 Mode of Measurement & Payment :

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

6.2. The PVC doors shall be measured for its **length and breadth** limiting dimensions to those specified on plan or as directed.

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

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

Item No. 30 :- Providing & Fixing UPVC Ventilation with Movable Louvers of Fenesta,LG Hausys,Kömmerling Veka as per Instruction of Architect .Ventilation with Frame section 55mmx60mm including with Glass 5mm Thick fittings and installation and filling gaps with Silicon etc complete

1.0 MATERIALS

1.1 Standard extruded anodized PVC 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 PVC section of size 63mm x 38.10 mm x 1.2mm (of Jindal Section 2434 @wt. 0.643 Kg/mt.) with colour anodized PVC frame for ventilation [as directed by Engineer in charge](#).
- 1.2 Glass :** The frosted glass of louvers fixed to PVC 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 PVC 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 PVC 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.31 :- Providing and fixing in position collapsible steel shutters with Frame 35x35x6mm, vertical channels 20 X 10 X 2mm braced with flat iron diagonals 20 X 5 mm size with top and bottom rails of T- iron 40 X 40 X 6mm with 38mm dia steel pulleys, complete with bolts, nuts, locking arrangements stoppers, handles including applying a priming coat

1.0

1.0. Materials

The collapsible steel shutters shall conform to M-33 and Primer of red lead paint.

2.0. Workmanship

J-rails shall be fixed to the floor and to the lintel at top by means of Anchor bolts, embedded in cement concrete of floor and lintel. The anchor bolts shall be placed approximately at 45 mm. centers alternatively in groove shall be formed along the runner for the purpose. The collapsible gate shall fixed at the sites by fixing the double channels in the T-iron rail and also by hold fasts bolted to the end double channel and fixed in the masonry of the side walls or the otherwise. In case where the collapsible gate is not required to the lintel beams or slop above, a toe iron suitably

designed may be fixed at the top embedded in masonry and provided with necessary clamps and roller arrangement at the top.

All the adjoining work damaged while fixing of gate shall be made good to match the existing work without any extra payment. All the members of the collapsible gate including T-iron shall be thoroughly cleaned of rust, scales dust etc. and given a priming coat of red lead, before fixing them in position.

3.0. Mode of measurement and payment

3.1. The collapsible steel shutters shall be measured in quintal. The height of the gate shall be measured as the length of double channels and breadth from outside to outside of the end fixed double channels in open position of the gate. The rate includes providing handles, arrangements stoppers etc. and providing & applying a priming coat of red lead paint and two coats of oil painting etc. complete satisfactory of item as directed by Engineer in charge.

3.2. The rate shall be for a unit of **Quintal**.

Item No.32 :- Providing and fixing M.S. grills of required pattern to wooden frames of windows etc. with M.S. flats at required spacings and frame around, square or round bars with round headed bolts and nuts or by screws (A) Plain Grill.

1.0. Materials

The structural steel shall conform to M-22

2.0. Workmanship

2.1. The **M.S. grill** shall be prepared as per the drawing or as directed for fixing to **wooden** frames of windows etc.

2.2. The grill shall be fabricated to the designs and patterns shown in the drawings and the weight shall be as directed, and the joints shall be reverted or welded as shown in the plan or as directed. The grill so formed shall be fixed into the frames of the windows etc. before they are erected in position. The outside strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc. The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/screw per 30 cm. of the length of outer strip subject to minimum of 2 Nos. on each side of the frame or as indicated in the drawing or as directed.

2.3. The bolts and nuts or screws shall be counter sunk and shall be fixed with the top of their heads flush with the face of the frame strips.

3.0. Mode of measurements and payment

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

3.2 The rate shall include S.S. fixtures and fastenings including fixing with **round headed bolts and nuts or by screws including cutting, welding and fabrications etc. complete as directed.**

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

Item No.33 :- Providing and fixing 0.60 meterwide and 0.80Meter high sand which type platform including supplying and fixing granite stone 18 mm thick mirror polished stones in top and side position and vertical strip at front over 25 mm thick polished kotah stone platform fixing in top and sides and intermediates supports fixing with cement mortar and adhesive and finishing etc complete.

1.0 General

The work shall consist of construction of sandwich type cooking platform with polished kota stone slabs jointed with cement mortar in accordance with the details shown on the drawings as approved by the engineer in charge having granite top and stainless steel sink. Only trained personnel shall be employed for construction work & supervision

2.0 MATERIAL

Kota Stone

2.0 HAND DRESSED MACHINE POLISHED BLUE KOTAH STONE

2.1. Kota stone shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown coloured shall not be allowed for use. They shall be without any soft veins cranks of flaws

2.2. The size of the stone to be used for flooring shall be of size 600 mm x 600 mm and / or size 600 mm x 450 mm as directed. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified.

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

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

2.5. When machine cut edges are specified the exposed and the edges at joints shall be machine cut the thickness of the exposed machine cut edges shall be uniform.

2.6. The stones shall have machine polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. The stones to be used for dado, partitions skirting, sink, veneering, sills, steps, etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished.

3.0 Granite Stone Slab

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

3.2. The size of the Granite Stone to be used for top of platform shall be as per details shown on the drawings and as directed by the Engineer in charge However smaller sizes will not be allowed, Granite Stone shall be in a single piece only

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

3.4. The edges of Granite Stone Slab shall be truly machine cut and machine polished. All angles and edges shall be true, square and free chipping and surface shall be true and plain.

3.5. When machine cut edges are specified the exposed and the edges at joints shall be machine cut and machine polished the thickness of the exposed machine cut machine polished edges shall be uniform.

3.6. The stones shall have morror polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones to be used for top slab shall be double polished.

4.0. WATER

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

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

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

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

4.5 Hard and bitter water and sea water shall not be permitted for curing

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

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

4.8. As a guide following concentrations represent the maximum permissible values

- (a) to neutralize 200 ml sample of water using phenolphthalein as indicator, it should not require more than 2 ml of 0.1 normal NaOH
- (b) To neutralize 200 ml of water using methyl orange as an indicator, it should not required more than 10 ml of 0.1 normal HCl
- (c) the permissible limits for solids shall be as follows when tested in accordance with IS 3025

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

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

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

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

5.0 CEMENT

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

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

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

5.3. Cement conforming to IS:8112 and IS:12269 may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be achieved by finer grinding and higher constituent ratio of C₃S/C₂S, where C₃S is Tri-calcium Silicate and C₂S is Dicalcium Silicate In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

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

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

5.6. Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement also total sulfur content calculated as sulfuric anhydride (SO₃) shall in no case exceed 2.5 per cent and 3.0 percent when tri-calcium aluminate per cent by mass in up to 5 or grater than 5 respectively

5.7. Storage

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

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

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

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

6.0 SAND

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

6.2. For masonry works sand shall conform to the requirements of IS: 2116

6.3. For plain and reinforced cement concrete (PCC and RCC) or pre stressed concrete (PSC) works fine aggregates shall consist of clean, hard strong and durable prices of crushed stone, crushed gravel or suitable combination of natural sand crushed stone or gravel, They shall not contain dust lumps soft or flaky materials mica or other deleterious materials in such quantities as to reduce the strength and durability of concrete, or to attack the embedded steel. Motorized sand washing machines should be used to remove impurities from sand. Fine aggregate having positive alkali-silica reaction shall not be used. All fine aggregates shall conform to IS L 383 and tests for conformity shall be carried out as per IS : 2386 (Part I to VIII) The contractor shall submit to the Engineer in charge the entire information indicated in Appendix A of IS : 383. The fineness modulus of fine aggregate shall neither be less than 2.00 nor greater than 3.5.

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

6.5 Fine Sand: The fineness module shall not exceed 1.0 the sieve analysis of fine sand be as under

IS. Sieve Designation		% by wt. passing	
Zone I		Zone II	Zone III
10 mm	100	100	100
4.75 mm	90-100	90-100	90-100
2.3 6mm	60-95	75-100	85-100
1.18 mm	30-70	55-90	75-100
600 MC	15-34	35-59	60-79
300 MC	5-20	8-30	12-40
150 MC	0-10	0-10	0-10

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

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

7.0. Proportion

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

8.0 Mode of Measurement

8.1 Mode of measurement on Meter basis of finished area of top.

Item No. 34 :- Providing and fixing Godrej Type Steel cupboards in wall with steel frames and shutters using 18 gauge M.S. steel sheet including necessary fixtures , fastening like locks handles, hinges with approved shade of spray painting etc complete as directed

This work shall consist of Providing and placing **Goadrej type cupboards** in walls, 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

Readymade steel cupboard frame with M S steel shelves of proper size from approved manufacturer

1.1. Steel cupboard shall be of M S Steel sheets confirming to 18 Gage thickness. The frame shall be bended in proper and required shape shutter shall be made f 18 Gage M S Steel sheets properly fitted with the frame with 150 mm long iron hinges, and chromium Plated handles of 100 mm size Properly fitted with the inside locking system. The steel cupboards shall be provided with necessary shelves of MS steel sheets of 18 Guage thickness duly painted with spray paint

1.2 The steel cupboard shall be of quality approved by Engineer in charge and shall generally conform to the relevant Indian standard

1.3 The steel cupboard provide shall be with fitted on wall surface in front of Cupboard gap properly to close the gap in wall by drilling holes duly plugged by wooden gutties by appropriate size of screws as approved by Engineer in charge. Necessary shelves of M S Steel sheets shall be fitted as per requirements and direction of Engineer in charge

1.4. The Necessary fittings like, screws etc, shall be of best quality and makes as approved by the Engineer-in-charge.

1.4. The entire body of the steel cupboard frame and shutters shall be painted by spray painting of approved colour on all sides out side and inside as directed by Engineer in charge

2.0. WORKMANSHIP

Fitting

2.1. When the **steel cupboard** are to be Fitted, the surface of wall or tiles shall not be damaged. The **steel cupboard** shall be fitted on walls carefully by drilling holes in surface of walls or tiled surface of wall carefully to cover entire gap of cupboard

3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate of **steel cupboard** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings, and as directed by Engineer in charge finishing structure, etc, and all other incidental expenses for producing item of **steel cupboard** 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 **steel cupboard** shall include the cost of all labour, materials, fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

3.2. The **steel cupboard** shall be measured for its **Length or Width and height**, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Square meter.

3.3. The payment will be made on **square meter** basis of the finished work. In all respect.

Item No.35 :- Providing and laying machine cut free edges machine polished Kota stone for shelves in cupboard and walls in single piece (Miximum 150mm) 25 mm. th. including cutting grooves in walls and fixing the stone with neat cement slurry in true line and level as direct. including moulding where required

General

This work shall consist of **Providing and laying machine cut free edges machine polished Kota stone for shelves in cupboard and walls in single piece (Miximum 150mm) 25 mm. th.**

including cutting grooves in walls and fixing the stone with neat cement slurry in true line and level as direct. including moulding where required 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 marble slab shall confirm to M-52. Sand shall conform to M-6.

1.0 GRANITE MARBLE SLAB

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

1.2. The size of the Granite marble slab to be used for flooring shall be of size 600 mm x 600 mm size 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. For [vertical wall / Doors / windows sill and jams cladding](#) the granite marble 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 ± 1 mm.

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

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

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

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

2.5. Cement and sand for base layer shall be mixed in proportion as specified in the item, Cement and sand shall be proportioned by volume after making due allowance for bulking. The required quantity of water shall then be added and the mortar mixed to produce workable consistency.

2.6. Curing shall be started as soon as the mortar used for finished has hardened sufficiently no to be damaged when watered. It shall be kept wet for a period of at least 7 days. During this period, it shall be suitably protected from all damages.

- 2.7. During hot weather, all finished or partly finished work shall be covered or wetted in such manner as will prevent rapid drying of the flooring work.
- 2.8. Joints of Granite marble 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 marble 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 marble 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 **vertical wall / Doors / windows sill and jams cladding** 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 marble stone slab** flooring shall be measured in Square meter correct to 2 places of decimal. Length and breadth shall be measured to correct to a centimeter and between the finished the finished face of the skirting, dado or wall plaster and no deduction shall be made nor extra paid for any opening in floors or areas up to 0.1 square meter.
- 3.3. The rate shall be for a unit of **one Square meter**.

Item No.36 :- **P & L 24" x 48" vitrified 8 mm thick tile flooring over 20 mm (average) base of cement mortar 1:6 (1 cement: 6 coarse sand) on new surface or fixing on existing flooring by adhesive material including dismantling of existing flooring and jointed with color cement slurry including finised with flush pointing & cleaning the surface etc. complete for light shade/ Dark Shade and providing and filling epoxy based grout in grooves of size up to 6mm x 6mm in flooring or dado with PVC spacer of BAL Endura / Kerakoll / BASF or equivalent as per approved make of approved shade and color. Rate shall be inclusive of protecting the edges, cleaning the grooves before filling and protecting tile upto satisfaction of EIC. Rate shall be inclusive of filling groove through epoxy based filler with PVC spacer as per manufacturer specification. Item shall be paid in theoretical consumption on site.**

1.0. Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. **24" x 48" cm size Vitrified tiles 8 mm thick** (Kajeria, Asian, Bell ceramic, Somani or equivalent 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. 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. thick in C.M. 1:6 (**1 cement : 6 coarse sand**). 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 at any place 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.37 :- Providing and laying Granite slab (18 mm thick) one side polished flooring ,Stair Riser Tread over 20 mm (average) base of cement mortar 1:6 (1 cement: 6 coarse sand) or L.M 1:1.5 laid and jointed with grey cement slurry including rubbing and polishing Etc complete.

1.0. Materials

1.1. Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11. **25mm thick polished 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 cranks of 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 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 dedo, skirting, sink, veneering, sills, steps etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished.

2.0. Workmanship

- 2.1. Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving a plane surface. The thickness shall be 20 mm. (Average) as specified in the item but not less than 25 mm. at any place of the slab.
- 2.2. Bedding for the polished kota stone slabs shall be of cement mortar 1:6 (1 cement : 6 coarse sand) or L.M. 1:1.5 of average thickness 20 mm given in the description of the item. Sub grade shall be cleaned wetted and mopped mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one blue kota stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining, the walls shall enter not less than 10 mm. under the plaster, skirting or dedo. The junction between the wall 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.38:- Providing and laying 24" x 24" Vitrified double charge 8 mm thick tile flooring over 20 mm (average) base of cement mortar 1:6 (1cement : 6 coarse sand) or L.M 1:1.5 laid on new surface or fixing on existing flooring by adhesive material including dismantling of existing flooring and jointed with colour cement slurry including finished with flush pointing & cleaning the surface etc. Pattern Colour and shade as approved by architect. etc completed & Fitting Tiles with Spacer 4mm/5mm thick and filling Groove with approved epoxy sealant and Hardner Resin as directed by A.I.C. complete For Antiskid

The work shall be executed as per specification of **Item No. 36** except for the work of **Providing and laying 24" x 24" Vitrified double charge 8 mm thick tile flooring over 20 mm (average) base of cement mortar 1:6 (1cement : 6 coarse sand) or L.M 1:1.5 laid on new surface or fixing on existing flooring by adhesive material including dismantling of existing flooring and jointed with colour cement slurry including finished with flush pointing & cleaning the surface etc. Pattern Colour and shade as approved by architect. etc completed & Fitting Tiles with Spacer 4mm/5mm thick and filling Groove with approved epoxy sealant and Hardner Resin as directed by A.I.C. complete For Antiskid shall be considered.**

Item No.39:- Providing and laying Vitrified tiles 8 to 10 mm thick , 24" x 24" in skirting risers of steps and dedo on 10mm thick cement plastered Wall and Jointing or fitting tile with Tile adhesive Chemical(Roff,K2,Laticrete,Mapisa,pidilite C2TE S1 Only) and providing 4mm/5mm thick Spacer and filling Groove with approved epoxy sealant and Hardner Resin epoxy based grout(BAL Endura / Kerakoll / BASF or equivalent as per approved make & approved shade and color) in grooves in flooring or dado removing PVC spacer etc. complete.as directed by A.I.C..

1.0. Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. 24 x 24" cm. size matt finished Vitrified tiles 10 mm thick (Kajeria, Asian, Bell ceramic, Somani or equivalent standard quality) shall conform to relevant Indian standard.

2.0. Workmanship

2.1. Preparation of Surface:

In case of brick masonry wall, the joints shall be raked out to a depth of least 10 mm. while the masonry is being laid. In case of concrete wall the surface shall be chiseled and roughed with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

2.2. Laying ;

2.2.1. The wall surface shall be covered with 10 mm. thick plaster of cement mortar 1:3 mix and allowed to harden. The plaster shall be roughened with wire brushes both way. The back of tiles shall be floated with grey cement slurry 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.40 :- Providing and laying chequered terrazzo tiles 22mm thick with marble chips of sizes upto 6mm in floors on 25mm thick bed of Lime mortar 1:1.5 (1-Lime putty : 1.5 coarse sand) or C.M. 1:6 (1 - cement : 6 - coarse sand) jointed with neat cement slurry mixed with pigment to match the shade of the tiles including rubbing and polishing complete. (B) Dark shades using ordinary cement.

1.0 Materials :1. Water shall conform to M-1 cement shall conform to M-3 Lime mortar shall conform to M-10.. Cement mortar shall conform to M-11. The precast terrazzo tiles of 20 mm. Thick shall be of light shade using white cement and conform to M-47.

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

2.2 Bedding :

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

2.2.2. In case of RCC floors, the top shall be left a little rough, all points of level for the finished surface shall be marked out. The lime mortar of proportion 1:1.5 (lime putty : 1.5 fine sand) or cement mortar of proportion C.M. 1:6 as directed shall be tenn evenly and smoothly spread over the base, Bedding layer of mortar shall be not less than 10 mm . and average thickness of bedding shall be 25 mm.

2.3 Laying :

2.3.1 Before laying the terrazzo (Marble / Mosaic) tiles, the tiles shall be thoroughly wetted with water. Neat cement grout of required consistency at 4.4 kg cement/Sq.mt shall be spread on the mortar bed. The tiles shall be laid on the neat cement float and shall be evenly and firmly bedded to the required level and slope. There shall be no hollows left. The joints shall be of uniform thickness and in straight line as per the pattern.

2.3.2 The surface of flooring shall be checked frequently with a straight edge at least two meters long go as to obtain a true surface with required slope.

2.3.3. The tiles which are fixed in the floor adjoining the wall shall go about 10 mm. under plaster. Skirting or dado shall be left unfinished for about 50 mt. above finished floor level and unfinished strip them left earlier shall be finished .

2.3.4 In places where full tiles cannot be fixed, the tiles shall be cut to the size and smoothened at edges to give straight and true joints.

2.3.5 After the tiles have been laid, the surplus cement slurry and the joints shall be cleaned and washed fairly deep before cement hardens.

2.3.6 The day after tiles have been laid, the joints shall be cleaned of grey cement grout with a wire brush to a depth of about 5 mm. and then grouted with white cement with or without pigment to match the shade of the topping of tiles. The same cement slurry shall then be spread over the wheel surface in a thin coat to protect the surface from abrasive damage and to fill pin holes that may exist on the surface.

2.4 Curing :

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

2.5 Polishing :

2.5.1 After the tiles are properly cured, first grinding shall be done with carborundum stone of 48 to 60 grade grit fitted in machine. Water shall be properly used during grinding. When the chips show up and the floor has been uniformly rubbed, it shall be cleaned with water, baring all pin holes. It shall be covered with a thin coat of white cement mixed with or without pigments to match the colour of the topping of the tiles. Pin holes if any shall thus be filled. This grout shall be kept moister for a week. Thereafter second grinding shall be started with carborundum of 120 grit. Grouting and curing shall follow again. Final grinding shall be done when other work are finished. The machine shall be fitted with carborundum of grit 220 to 350 using water in abundance. The floor shall then be washed clean with water. Oxalic acid powder shall than be dusted at 33 grams per square meter on the surface and the surface rubbed with machine fitted with hessian bobs or rubbed hard with pad of wooden rags. The floor shall then be washed clean and dried with a soft cloth or linen. The finished floor shall not sound hollow when tapped with a mallet.

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

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

1.0 Mode of measurements & payment :

3.1 Terrazzo tiles flooring shall be measured in sq.meter for visible area of work done.

3.2 No deductions shall be made nor extra paid for any opening in the floor area upto 0.1 sq.mt.

Nothing extra shall be paid for use of cut tiles or for laying the floors at different levels in the same room or court yarn. Mosaic tiles laid in floor borders and bands etc. shall be measured in the same item and nothing extra shall be payable on account of these or similar bonds formed of half or multiples of half size standard tiles/or other uncut tiles.

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

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

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

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

Item No.41:- Providing 10 mm thick cement plaster in single coat on Ceiling and soffits of stairs up to floor level for interior plastering upto floor two level and finished even and smooth in cement mortar 1:3 (1 cement : 3 sand) including finishing with a floating coat a neat cement slurry.

1.0. Materials

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

2.0. Workmanship

2.1. Scaffolding:

Wooden bullies, bamboos, planks, trestles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2. Preparation of back ground :

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

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

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

2.2.4. For external plaster, the peasting operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and

cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3. Application of plaster :

- 2.3.1. The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.
- 2.3.2. Cement plaster shall be used within half an hour after addition of water and mortar or plaster which is partially set shall be rejected and removed forthwith from the site.
- 2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.
- 2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags oh the outside of the plaster and keeping them wet.
- 2.3.5. The plastering work shall be in single coat on rough side of half brick wall for interior plastering up to floor two level, finished even and smooth in C.M. 1:4.
- 2.3.6. The coat of cement and fine sand mortar of proportion 1:1 (1.5 mm thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the base coat is still plastic.
- 2.3.7. In any continuous face of wall the finishing treatment should be carried out continuously and day lo day breaks made to coincide with architectural breaks in order to avoid unsightly Junctions
The smooth concrete shall be suitably say read to provide necessary bond before plastering.
- 2.3.8. **Curing :** All the plaster work shall be kept damp continuously for a period 7 days.
- 3.0. **Mode of measurements & payment**
- 3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.
- 3.2. All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.
- 3.3. Thickness of the plaster shall be exclusive of he thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum **10 mm** at any point on this surface.
- 3.4. This item includes plastering up to floor two level.
- 3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.
- 3.6. Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.
- 3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq.mt each in area and for openings exceeding 0.5. sq.mt and not exceeding 3.00 sq.mt. in each area deductions and additions shall be made in the following manners.
 - (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq.mt each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.
 - (b) Deduction for openings exceeding 0.5 sq.mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for ravels, jambs, soffits, sills etc. of these openings, (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face

- only, (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.
- 3.8.** For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.
- 3.9.** In case of openings of area above 3 sq.mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.
- 3.10.** The payment shall be made extra for this work over and above the plaster work
- 3.11.** The rate shall be for a unit or 1 Kg of water proofing materials used in 1 bag of weighing 50 Kg. cement used extra over the rate of plastering work.
- 3.12.** The rate shall be for a unit of **One sq. meter.**

Item No.42,43 :-

Providing 15 mm thick cement plaster in single coat on bricks/concret walls for interior plastering up to floor two level and finished even and smooth in cement mortar 1:3 (1 cement : 3 sand) including finishing with a floating coat a neat cement Slurry. (FOR G.F., F.F.)

1.0. Materials

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

2.0. Workmanship

2.1. Scaffolding:

Wooden bullies, bamboos, planks, trestles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2. Preparation of back ground :

- 2.2.1.** The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be toughened by wire brushing if it is not hard and by hacking if it is hard. In case of concrete surface, if a chemical retarded has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the readers if left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.
- 2.2.2.** Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.
- 2.2.3.** The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such area shall be moistened again.
- 2.2.4.** For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3. Application of plaster :

- 2.3.1.** The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.
- 2.3.2.** Cement plaster shall be used within half an hour after addition of water and mortar or plaster which is partially set shall be rejected and removed forthwith from the site.
- 2.3.3.** In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of

the wall and nearer than **15 cm.** to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

- 2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags on the outside of the plaster and keeping them wet.
- 2.3.5. The plastering work shall be in single coat on brick / concrete walls for interior plastering up to floor two level, finished even and smooth in **C.M. 1:3**.
- 2.3.6. The coat of cement and fine sand mortar of proportion 1:1 (15 mm thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the base coat is still plastic.
- 2.3.7. In any continuous face of wall the finishing treatment should be carried out continuously and day to day breaks made to coincide with architectural breaks in order to avoid unsightly junctions
- 2.3.8. **Curing** : All the plaster work shall be kept damp continuously for a period 7 days.
- 2.3.9. Providing necessary grooves between structural members as directed by Engineer in charge.
- 3.0. **Mode of measurements & payment**
- 3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.
- 3.2. All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.
- 3.3. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum **15 mm** at any point on this surface.
- 3.4. This item includes plastering for **all floors**.
- 3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.
- 3.6. Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.
- 3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq.mt each in area and for openings exceeding 0.5. sq.mt and not exceeding 3.00 sq.mt. in each area deductions and additions shall be made in the following manners.
 - (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.
 - (b) Deduction for openings exceeding 0.5 sq. mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only, (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.
- 3.8. For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.
- 3.9. In case of openings of area above 3 sq.mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.
- 3.10. The payment shall be made for a unit of 1.0 sq.mt of work done over and above the finishing of work of base coat.
- 4.0. The rate shall be for a unit of **One sq. meter**.

Item No.44:- 20mm.thick sand faced cement plaster on walls upto height 10 meters above ground level consisting of 12mm. Thick backing coat of CM.1:3 (1-cement:3-sand) and 8mm.thick finishing coat of C.M. 1:1 (1-cement:1-sand) etc. complete.

1.0. Materials

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

2.0. Workmanship

2.1. The work shall be carried out in the coats. The backing coat (base coat) shall be 12 mm. thick in C.M. 1:3.

2.2. Scaffolding:

Wooden bullies, bamboos, planks, trestles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.3. Preparation of back ground :

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

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

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

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

2.4. Application of plaster :

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

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

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

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

2.4.5. Before the first coat hardens its surface shall be beaten up by edges of wooden tapers and close dents shall be made on the surface. The subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days, depending upon the weather conditions. The surface shall not be allowed to dry during this period.

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

2.4.5. The plastering work shall be in single coat on rough side of half brick wall for interior plastering up to floor two level, finished even and smooth in C.M. 1:3 including providing synthetic granules water proofing treatment on wall surface etc. complete.

2.4.6 Curing :

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

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

3.0. Mode of measurements & payment

- 3.1.** The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.
- 3.2.** All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.
- 3.3.** Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum **20 mm** at any point on this surface.
- 3.4.** This item includes plastering up to floor two level including making necessary cornices as directed.
- 3.5.** The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.
- 3.6.** Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.
- 3.7.** For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq.mt each in area and for openings exceeding 0.5. sq.mt and not exceeding 3.00 sq.mt. in each area deductions and additions shall be made in the following manners.
 - (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.
 - (b) Deduction for openings exceeding 0.5 sq. mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only, (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.
- 3.8.** For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.
- 3.9.** In case of openings of area above 3 sq. mt. each, deduction shall be made for openings but jambs, soffits sand sills shall be measured.
- 3.10.** The rate shall be for a unit of **One Sq. meter. No extra payment for making necessary cornices shall be made.**

Item No.45 :- Providing and applying 2mm thick Texture Plaster Terre Plaette (Spectrum, Coral or equivalent) incoprating fine fillments made of polymer and aggergating natural stone powder with making grooves on base coat of 20 mm thick smooth mala plaster (which paid seperately) etc. complete.Colour and shade as approved by Architect/ Engineer in charge for at all floor, all height.

1. Scope of Work

The work consists of providing all labor, premium materials, tools, scaffolding, and equipment necessary for the application of a 2mm thick decorative texture plaster (Spectrum, Coral, or an equivalent architect-approved brand). This incorporates fine filaments made of polymer and aggregated natural stone powder, complete with customized architectural grooves, applied over a pre-existing, cured, and separately paid 20mm thick smooth mala plaster base coat. The application covers all floors, at any height or level, in strict accordance with the approved colors, patterns, and shades.

2. Material Specifications

- Texture Compound: Must be a premium-grade, ready-mixed, or tintable acrylic/silicone-modified polymer matrix containing lightfast pigments, biocides, and graded natural stone powder aggregates [1].
- Reinforcement Filaments: Factory-blended fine synthetic/polymer filaments designed to enhance tensile strength, resist micro-cracking, and improve flexibility.

- **Primer Coat:** A dedicated exterior-grade, alkali-resistant acrylic primer recommended by the texture manufacturer, tinted to match the final shade.
- **Water:** Clean, potable, and free from organic impurities, iron, or high salinity.

3. Base Surface Preparation

- **Inspection:** The 20mm thick smooth mala plaster base coat must be completely cured (minimum 14 days), structurally sound, clean, and free of dust, oil, grease, or efflorescence.
- **Moisture Content:** The base plaster must be completely dry. Moisture levels should not exceed 4% to 6% before application.
- **Rectification:** Any minor surface undulations, pinholes, or cracks in the base coat must be repaired using a compatible exterior putty or polymer mortar before the texture application begins.

4. Execution and Application Method

A. Primer Application

- Apply one uniform coat of anti-alkali primer using a roller or brush on the clean mala plaster surface.
- Allow the primer to dry completely for a minimum of 4 to 6 hours.

B. Layout and Grooves Making

- Mark architectural lines and groove locations precisely on the dried primer coat as per the architect's drawing.
- Fix high-quality masking tape or specialized groove channels along the marked lines to ensure perfectly straight, sharp, and clean-edged grooves.

C. Texture Application

- Stir the texture material thoroughly using a mechanical mixer to achieve a uniform consistency. Do not over-thin with water.
- Apply the material evenly to a strict thickness of 2mm using a stainless-steel trowel or putty blade.
- While the material is still wet, use a plastic float, specialized roller, or specified trowel technique to create the Terre Palette pattern/finish.
- Carefully peel away the masking tape before the texture sets to reveal clean, sharp architectural grooves.

D. Curing and Protection

- The material cures via air drying. Protect the freshly applied surface from direct heavy rain, strong winds, and dust for at least 24 hours.

5. Quality Standards & Workmanship

- **Scaffolding:** Properly secured independent or double scaffolding must be used for higher floors. The finish must look seamless without showing patches or "lap marks" at scaffolding joints.
- **Consistency:** The texture, aggregate distribution, shade, and groove alignments must be completely uniform across all walls and floors.
- **Approval:** A mockup sample of at least $(1 \text{ meter})^2$ must be prepared on-site and approved by the Architect/Engineer-in-charge regarding shade, thickness, and pattern before proceeding with mass execution.

6. Mode of Measurement

- **Unit of Measurement:** Square Meters (m^2) or Square Feet (ft^2).
- **Deductions:** Standard deductions for openings (doors, windows) will be made according to local building code guidelines (e.g., IS 1200 in India).
- **Inclusions:** The rate includes all materials, application labor, masking tapes, groove making, scaffolding, cleaning of splashes on adjoining surfaces, and working at any height/floor level.

Item No.46 :- Applying two coats of birla(White cement based) or Asian (acrylic lappy putty) or equivalent 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 matter foreign and sand papered smooth.

1.0. Materials

Water shall be conform M-1. The **White cement based** shall conform to I.S.: 5411-1969 (Part-I). **Birla or Asian acrylic lappy (putty)** and primer shall be of approved brand and manufacture.

2.0. Workmanship

The painting work shall be for subsequent coat of **White cement based** of approved brand & manufactures on **undecorated ceiling and slopping for all floors to give an even shade as directed.**

The lappy (putty) shall be carried out on ceiling and soffits 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. Priming coat :**
- 2.3.1.** A priming coat of primer of approved manufacture and shade shall be applied over the papered surface in case of new work on undecorated surface. If the distemper priming is done after the wall surface dries completely, the distemper primer shall be applied.
- 2.3.2.** Application of primer shall be done as under: The primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. This entire operation will constitute on coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for at least 48 hours before oil bound distemper or paint is applied.
- 2.3.3. 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 surfaces** 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 **wall surfaces** are provided with finish, deduction shall be made for one face only.

(b) When each face of **wall surface** 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** The rate includes cost of ail materials, labours, scaffolding, protective measures etc. involved in all the operations described above. This shall also include conveyance, delivery, handing, unloading, storing work etc.
- 3.9** The rate shall be for a unit of **One sq.** meter.

Item No. 47 :- Providing and applying Wall painting (three coats) with plastic emulsion paint of approved brand and manufacture on under coated wall surface to give and even shade including thoroughly brushing the surface free from mortor droppings and other foreign matter and sand paperd smooth on new work to give an even shade.for all height

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 acrylic 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 distempers, 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 **three coats** of cement water proofing paint. The second or subsequent coat shall not be started until the proceeding coat as become sufficiently hard to resist marking by brushing being used.

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

2.5. Precautions :

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

(b) In the preparation of wall for plastic emulsion painting, no oil base putty shall be used 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. 48:- **Finishing wall with weather proof exterior emulsion paint on wall surface (three coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt, and remains of loose powdered materials etc. complete.**

General

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

MATERIALS

1.0 Exterior Emulsion Paint

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

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

2.0 WORKMAN SHIP

2.1 Scaffolding :

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

3.0 Application coat :

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

- 3.1** For undecorated surfaces, after the primer coat is dried for at least 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the exterior emulsion paint, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. Minimum two coats of the exterior emulsion paint shall be applied with brushes in horizontal strokes followed immediately by vertical strokes which together shall constitute one coat. The subsequent coats shall be applied after a time interval of at least 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surface shall be even and uniform without patches, brush marks, distemper drops etc.
- 3.2** Sufficient quantity of the exterior emulsion paint shall be mixed to finish one room at a time.
- 3.0 MODE OF MEASUREMENT & PAYMENT :**
- 3.1.** The unit rate wall painting with exterior emulsion paint shall include the cost of all materials, tools and plant required for mixing, cleaning brushing sand papering & painting with all required specials and Lapi compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing pipe line work of specified diameter to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.
- 3.2** The rate of wall painting with exterior emulsion paint shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.
- 3.3.** The wall painting with exterior emulsion paint shall be measured for its length and height limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.
- 3.4.** The payment will be made on square meter basis of the finished work.

Item No.49 :- Painting Two coats (including priming Coat) on New Steel And Other Metal Surface with enamel paint, brushing shade including cleaning of all dust, dirt and other foreign matter sand papering and stopping.

1.0. Materials

The enamel paint shall conform to M-44 B.

2.0. Workmanship

- 2.1. General :** The materials required for work of painting work shall be obtained directly from approved manufactures or approved dealer and brought to the site in maker's drums; kegs. etc. with seal unbroken.
- 2.1.2.** All materials not in actual use shall be kept properly protected, lids of containers shall be kept closed and surface of paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin. The materials which have become state or flat due to improper and long storage shall not be used. The paint shall be stirred thoroughly in its container before pouring into small containers. While applying also, the paint shall be continuously stirred in smaller container. No left over paint shall be put back into stock tins. When not in use the containers shall be kept properly closed.
- 2.1.3.** If for any reasons, things is necessary, the brand of thinner recommended by the manufacturer shall be used.
- 2.1.4.** The surface to be painted shall be thoroughly cleaned and dusted. All rust, dirt and grease shall be thoroughly removed before painting is started. No painting on exterior or other exposed part o the work shall be carried out in wet, damp or otherwise unfavorable weather and all the surfaces shall be thoroughly dry before painting work is started.
- 2.2. Application of paint:**
- 2.2.1.** Brushing operations are to be adjusted to the spreading capacity advised by the manufacture of particular paint. 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 the surface hard for the first time over and then 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 will constitute one coat.

- 2.2.2. Each coat shall be allowed to dry completely and lightly rubbed with very fine grade of sand-paper and loose particles brushed off before next coat is applied. Each coat shall vary slightly in shade and shall be got approved from Engineer-in-charge before next coat is started.
- 2.2.3. Each coat the last shall be lightly rubbed down with sand paper of fine pumice stone and cleaned of dust before the next coat is applied. 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.
- 2.2.4. Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc. Approved best quality brushes shall be used.

3.0. Mode of measurements and payment

- 3.1. The [new steel and other metal surface](#) shall be measured under this item.
- 3.2. 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.
- 3.3. 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.
- 3.4. 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.
- 3.5. 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.
- 3.6. The rate shall be for a unit of One sq. meter.

Item No.50:- Providing and laying chaina mosaic water proofing treatment on terrace including applying neat cement slurry 2.75 Kg./Sqm. Of cement admixed with water proofing compound after cleaning the surface (b) 'Providing and laying cement concrete flooring 1:2:4 (1-cement : 2-coarse sand : 4-graded stone aggregate 20mm nominal size) laid in one layer and finished with a floating coat of neat cement. (A) 50mm thick. (upto 10 ton) admixed with water proofing compound over 20 mm thick layer of C.M. 1:5 to required slope including rounding of junction of walls and slabs (a) after two days providing and Laying chaina mosaic for terrace using 12mm to 20mm broken pieces of glazed tiles to be Laid over CM-1:3 to plane or slope and to be tamped to bring mortar crême out upto surface using white cement including rounding off Junction and extending them upto 15cm along the wall clearing with water and oxalic acid etc

1.0 Material

1.0 WATER

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

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

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

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

1.5 Hard and bitter water and sea water shall not be permitted for curing

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

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

1.8. As a guide following concentrations represent the maximum permissible values

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

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

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

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

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

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

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

2.0 CEMENT

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

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

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

2.3. Cement conforming to *IS:8112* and *IS:12269* may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be

achieved by finer grinding and higher constituent ratio of C_3S/C_2S , where C_3S is Tri-calcium Silicate and C_2S is Dicalcium Silicate. In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

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

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

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

2.3. Storage

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

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

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

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

3.0 SAND

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

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

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

3.2 FINE SAND: The fineness module shall not exceed 1.0 the sieve analysis of fine sand be as under:

IS. Sieve Designation	% by wt. passing
4.75 mm	100
2.3 6mm	. 100
1.18 mm	75 to 100
600 MC	40 to 85

300 MC	05 to 50
150 MC	00 to 10

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

4.0. water proofing compound

Water proofing compound shall be of approved quality and make as approved by Engineer in charge

5.0. Brick bats

Brick bat aggregates shall be broken form well burnt or slightly over burnt and dense bricks it shall be homogeneous in texture roughly cubical in shape clean and free from dirt or any other foreign material brick bats shall be of 40 to 50 mm nominal size unless otherwise specified in the item the under burnt or over burnt bricks bats shall not be used

6.0. China Mosaic Tile Pieces

china mosaic tiles pieces shall be of 50 mm to 90 mm nominal size. tile pieces shall be made form hard and good quality of tiles.

7.0. WHITE CEMENT

White cement shall be of approved make it shall confirm definition of I S 8042 –E-1978 the sample of white cement shall be approved by Engineer in charge

8.0 WORKMAN SHIP

8.1 First of all surface of the entire terrace shall be cleaned by thoroughly brooming and then by wire brushes All the loose material dust and debris shall be removed thoroughly for the entire surface of the terrace

8.2 All joints and cracks shall be raked off and cut in v trench which shall be filled by neat cement slurry admixed with water proofing compound The joints with parapet shall be raked up to 30 cm height and shall be applied by neat cement slurry admixed with water proofing compound

8.3 Neat cement slurry shall be prepared and a water proofing compound of approved make shall be mixed with the slurry in proportion specified by the manufacturer of the compound and shall be laid throughout the surface of the terrace by the use of brushes mala etc Cement slurry shall be prepared by adding adequate quantity of water so as to spread it uniformly on the surface.

8.4. cement concrete 1:5:10 (using 50% of cement mortar 1:5 1part of cement and 5 part of coarse sand by volume admixed with water proofing compound of approved make in specified proportion) of specified thickness shall be laid (specification of cc 1:5:10 shall be followed for the execution of this layer) all over the surface of the terrace in true level and required slope including rounding of junctions of walls and slab

8.5. After two days of proper curing applying a second coat of cement slurry on entire surface of the terrace

8.6. the entire surface shall be finished with 20 mm thick C M 1:4 and china mosaic tilling in true level and slope as directed by Engineer in charge & finally finishing the surface with trowel with white cement slurry (specification of white glaze tiles flooring shall be followed for the execution of this item.)

8.7. finishing the surface with 20 mm thick C M 1:4 and china mosaic tilling & finally finishing the surface with trowel with white cement slurry

F. After two days proper curing the terrace shall be flooded for 15 days.

9.0 MODE OF MEASUREMENT & PAYMENT :

9.1. The unit rate **laying Indian type water proofing treatment** 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, compacting, finishing, curing mirror polishing, providing treatment of 30 cm high all over the length of parapets 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 of **laying Indian type water proofing treatment** shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.

9.2. The **laying Indian type water proofing treatment** work shall be measured for its **length** and **width**, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.

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

FORM OF GUARANTEE BOND

Contractor I / We _____) here by guarantee that work will remain unaffected and will not be in anyway damaged by water rain and will not leak from surface for a period for 5 years after completion of the work of water proofing treatment as per the terms and conditions of the contract and damage that might be caused on account of water rain and or other similar type of dampness of leakage from walls or above floor.

The guarantee shall remain in force for the period of 5 years from the completion of the work under the contract and it shall remain binding to the contractor for period of 5 years.

The deposit at the rate of 20% of the cost of this item from the running and final bills shall be recovered and remained for the first one year after completion of the work or at least on monsoon season passed which ever is later and 10% shall be retained for the balance of the guarantee period and shall be returned only after completion of the guarantee period.

MODE OF MEASUREMENT AND PAYMENT

The length and breadth shall be measured correct to cm. as per the dimension of the sanctioned plants. No deduction shall be made not extra for paid for any opening for pipes etc. upto 0.1 sq.mt. The rate shall include the cost of all labour and materials required for the operation involved. For satisfactory completion of work & measurement shall be paid on unit of Sq.m. of finished work.

Item No.51 :- Providing and fixing 3mm thick PVC sheets as signage and display of health signs/information of required size having retro reflective letters/design as per requirement, fixing the same through approved adhesive etc. complete, work shall be carried out as per instruction of engineer-in-charge. (Approved make PVC foamed sheets only)(45 x 15 cms)

Materials:

Approved 3mm thick PVC sheets specified manufacturer

Workmanship:

The PVC signage of 3mm thick of 45 cms x 15 cms shall be prepared. Various signage and letters shall be prepared on this sheets by using retro reflective colour as per instruction of Engineer-in-charge. The work shall be carried out in best workman like manner as directed by Engineer-in-charge.

Mode of Measurement and Payment:

The rate includes for all labour, materials, tools and equipment required to complete the work in satisfactory manner.

The rate shall be for an unit of one number.

Mode of measurement: on No basis

Mode of Payment: on No basis

Item No.52 :- Steel work welded in built up sections framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint. [A.] In beams and joists, channels angles tees, flats with connecting plates or angle cleats as in main and cross beams, Hip and jack rafters, purlins connected to common rafters and the like.

1.0. Materials

The structured steel work shall conform to M-22. Red lead paint shall conform to I.S : 102-1962.

2.0. Workmanship

2.1. The steel sections as specified or required, shall be cut, square and to correct lengths, as per drawings and design. The .cut ends exposed to view shall be finished smooth. No two pieces shall

be welded or otherwise jointed to make up the required length of member, except as indicated in the drawing or as directed. All straightening and shaping to form shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in such a manner as not to impair the strength of the metal. All operations shall be done in cold state unless otherwise directed/permitted.

2.2. Steel riveted or bolted in built up sections, frame work.

2.2.1. The steel structure as shown in the drawings or as per direction of the Engineer-in-charge shall be laid out on a level platform to full scale and to full size in parts. A steel tape shall be used for measurements to ensure maximum accuracy.

2.2.2. Wooden templates 12 mm. to 19 mm. thick or metal sheet template shall be made to correspond to each connecting gussets plate and rivet holes shall be accurately marked on them and drilled. The templates shall be laid on the steel members and holes of the steel members shall also be marked for cutting. The base of steel column and the position of Anchor bolts shall be carefully set out

2.2.3. All stiffeners shall be formed by pressure and where practicable the metal shall not be cut and welded in making these. In major work, or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure including location, type, size, (origin and details of rivets, bolts or weld shall be prepared in advance of the actual fabrication and as distinctly marked or stenciled with paint with the identification mark as given in the shop drawings. The bars shall be thickened at the ends, so as to provide for screwed threads and gradually tapered off to meet their normal section. Great accuracy shall be observed in fabrication of various member, so that these can be assembled without being unduly packed, strained, or forced into position and when built up, shall be true and free from twists, bends, buckles, or open joints. Before making holes in individual members for fabrication the steel work intended to be riveted or bolted together shall be as aligned or clamped properly and tightly so as to ensure close abutting or lapping of the surfaces of the different members. All stiffeners shall bear tightly both at top and bottom without being drawn or caulked. The abutting joints shall be cut or crossed true and straight and fitted close together. Web splice plates and fillers under stiffened shall be cut to fit within 3 mm. or flange Angles Web plates of Girders shall have no cover. Plates shall have their ends flush with the top of angles forming the flanges unless otherwise required. The web plates when spliced shall have clearance of not more than 6 mm. The erection, clearance for created ends of members connecting steel shall preferably be not greater than 5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for a practical reason greater clearance is necessary, suitably designed seating shall be provided. Pains and rollers shall be accurately tuned to gauge. These straight and smooth and free from flaws. The roller bearing shall be provided with adequate arrangements for holding the girders or truss resting on it. In columns caps and bases, the ends of shafts together with the attached gussets Angles, channels etc after riveting together shall be accurately mechanized so that the parts connected Butt against each other over the entire surfaces of contact connecting angles or channels shall be fabricated and placed in position with greater accuracy so that they are not unduly reduced in thickness by machining. The ends of bearing stiffeners shall be mechanized or ground to fit tightly both at the top and bottom, All holes shall generally be drilled to the required size and at required, position. Sub punching shall be permitted provided it is done 3 mm. or less in diameter and reamer thereafter to the required size. The holes for rivets and bolts shall be larger by

0 4. to 6 mm. than the nominal diameter of rivets or black bolts depending upon the diameter of rivets. Holes shall have their axis perpendicular to the surface bored through. The drilling or reamming shall be free from burrs, and the holes should be clean and accurate holes for counter sunk bolts shall be made in such a manner that their heads fit flush with the surface after fixing.

The fabrication work shall be completed in workshop as far as it is practicable to do so. Site joints shall be done with rivets and fitted bolts or black bolts, as shown in the drawings or as directed. Generally the following principles shall govern the use of rivets turned and fitted bolts, and black bolts.

- (i) Rivets and turned and fitted bolts shall be used where the connections is such that slip under load has to be avoided.
- (ii) Black bolts may be used very sparingly where a force is carried through a connection without impact, vibration or reversal or stresses.

2.2.4. Riveting:

The parts assembled for riveting shall be in close contact with each other and the bearing stiffeners shall bear tightly both at top and bottom without being drawn or caulked. Members to be riveted shall be properly pinned or bolted and rigidly held to gather while riveting. Drifting of holes shall not be permitted except to draw the parts together and the drifting tools so used shall have maximum diameter not exceeding, the nominal diameter of rivets or bolts. Drifting done during assembling shall not distort the metal or enlarge the holes. The shanks of rivets shall project beyond the plate-surface sufficiently so as to fill hole thoroughly and form the required head after riveting. The riveting shall be done by hydraulic or pneumatic process. However where such facilities are not available, hand riveting may be permitted. The rivet shall be heated red hot, care being taken to control the temperature of heating so as not to burn the steel. Rivets of diameter less than 10 mm. may be fitted cold. Rivets shall be of heat finish with heads full and of equal size. All loose, burnt or badly formed rivets with concentric or deficient heads shall be cut out and replaced. The heads of rivets shall be central to shanks and shall grip the assembled member firmly. In cutting out rivets, care shall be taken so as not to injure assembled members, caulking or re-equipping shall not be permitted.

For testing rivets, a hammer weighing approximately 0 25 kg shall be used. Both heads of the rivets shall be tapped. Slack rivets will give a hollow sound and a jar. All rivet heads shall be painted with red lead paint within a week of their fixing.

- 2.2.5.** All bolt heads and nuts shall be hexagonal and of equal size unless specified otherwise. The screwed heads shall conform to I.S. 1363-1960 and the threaded surface shall not be tapered. The bolts shall be of such length so as to project two clear threads beyond the nuts when fixed in position and these shall sit in the holes without any shakes. The nut shall be fit in the threaded ends of bolts properly. Where turned and fitted bolts are required to be used in place of rivets shall be provided with washers not less than 6 mm. thick so that the nut when tightened shall not bear on the unthreaded body of the bolt. Tapered washers shall be provided for all heads and nuts bearing on leveled surfaces. The threaded portion of the bolt shall not be within the thickness of the parts bolted together, the faces of the bolt heads and nuts abutting against steel members shall be machine finished. Where there is a risk of the nut being removed or becoming loose due to vibrations or reversal of stresses, these shall be secured from slackening by the use of locknuts, spring washers, cross-cutting or hammering down of threads as directed.

Bolts, nuts, and washers shall be thoroughly cleaned and dipped in double boiled linseed oil before use. The whole steel work shall be painted with a coat of priming coat of red lead, as per relevant specification of painting.

3.0 Mode of measurements & payment

3.1. The steel work shall be measured in general as under:

- (a) All work shall be measured on the basis of finished dimensions as fixed at site and measured net unless specified otherwise.
- (b) The weight of steel sections, steel rods, and steel strips in finished work shall be calculated on standard weight on the same basis on which steel is supplied to Contractor by department or those given in relevant I.S. if steel is arranged by the contractor.
- (c) The weight of steel plates and strips shall be taken from relevant I.S. based on 7.35 kg./ sq. meter for every millimeter sheet thickness if steel is supplied to the contractor by department.
- (d) Unless otherwise specified, weight of cleats, brackets, packing pieces, bolts, nuts, washer, distance pieces, separators, diaphragm gusset (taking overall square dimensions) fish plates etc. shall be added to the weight of respective items.
- (e) In riveted work allowance is to be made for weight of rivet hands. No deductions shall be made for rivet or bolts holes excluding holes for anchor or holding down bolts.
- (f) For forged steel and steel castings, weight shall be calculated on the basis of 7850 kg./cum.
- (g) Unless otherwise specified, no allowance shall be made for the weld metal in case of welded steel structure.
- (h) Dimensions other than cross sections and thickness of plates shall be measured to nearest 0.001m
- (i) Mill tolerance shall be ignored when weight is determined by calculation.

3.2. The rate includes cost of all material, labour, erection, hoisting scaffolding, protective measure, required for proper completion of the item of work. This shall also include conveyance and delivery handling, loading, unloading and storing etc. required for completing the item described above including necessary wastage involved.

3.3. The rate shall be for a unit of per Quintal.

Item No. 53 :- Providing corrugated G.I. sheet of class-3 roofing fixed with galvanized iron J or L Hooks, Bolts and nuts 8mm diameter with bitumen and G.I. limpet washer or G.I. limpet washer. filled with white lead complete excluding the cost of purlins, Rafters and Trusses.(1) 0.80 mm thick sheet.

1.0. Materials :

1.1. Corrugated G.I. sheet of Class-3 shall conform to M-23.

2.0. Workmanship

2.1. Spacing of purlins : One purlin shall be provided at the ridge and one at the eaves. The spacing of other purlins for 0.80 mm. thick G.I. sheet shall not exceed 1.80 meters. The purlin shall coincide with the centre line of the end lap. The ridge purlins shall be placed in such a way that the ridges can be fixed properly. The portion overhanging the wall support shall not be more than one fourth of the spacing of purlins.

2.2 The top surfaces of the purlins shall be painted before the sheets are fixed over them. Embedded portions of purlins shall be finished with two coats of coal-tar.

2.3. Laying of Sheets

- 2.3.1** The sheets shall be laid in purlins to a true plane with the line of corrugations truly parallel or normal to the sides of area to be covered. The sheets shall not generally be built into gables and parapets. They shall be bent up along their side edges close to the wall, and the junction shall be protected by suitable flushing or by projecting drip course.
- 2.3.2** The laps at end shall be provided 150 mm. minimum for roof slopes 1 in 2 (1 vertical : two horizontal) and steeper but 200 mm. shall be provided for flatter slopes than those above. The side lap shall be provided two ridges of corrugations at each side.
- 2.3.3.** The sheets shall be cut to the dimensions or the shape of the roof either along their lengths or their width or in slant across the line of corrugations at hips and valleys. The sheets shall be cut carefully with a straight edge and chisel to give straight finish. The sheets shall be laid such that the laps are turned away from the usual direction of local heavy rain.

2.3.4 Fixing of Sheets :

- 2.3.4.1** Sheets shall be fixed to the purlins or other roof members such as hips or valley rafter etc. with 'J' or 'L' galvanized hook bolts, and galvanized nuts 8 mm. dia. with bitumen limpet washers and G.I. washers. Limpet washers with white lead shall be used. Length of hook bolt shall be varied to suit the site requirement. Bolts shall be sufficiently long so that after fixing the project above the top of their nuts by not less than 12 mm the grip of 'J' or 'L' book bolts on the sides of purlins shall not be less than 25 mm. There shall be minimum of three hooks bolts placed at the ridge of corrugations in each sheet in every purlin and their spacing shall not exceed 300 mm. Coach screw shall not be used for fixing the sheets to purlin, where the slopes of roof are not less than 2.1/2 degree (1 vertical and 2.1/2 horizontal). Sheets shall be jointed together at the side laps by galvanized iron bolts and nuts 25 mm. x 6 mm. size each bolt with a bitumen and G.I. limpet washer filled with white lead. Where the overlaps at the sides extend to two corrugations, these bolts shall be placed zigzag over lapping corrugations, so that the ends of the overlapping sheets are drawn tightly towards each other. The spacing of same bolts shall not exceed 600 mm. along each of the staggered rows.
- 2.3.5.** Holes for all bolts shall be drilled and not punched in the ridges of the corrugations from the under side, while the sheets are on the ground. The holes in the sheets shall be at least 50 mm. from the edge. Sheets drilled wrongly shall be rejected. The holes in the washers shall be of the exact diameter of the hook bolts or the beam bolts. The nuts shall be tightened from above to give a leak-proof roof.

3.0. Mode of measurements and payment

- 3.1.** The measurements of the G.I. sheet of Class-3 roofing shall be taken for finished work in superficial area in general plane (not girthed on the roof). The laps between the G.I. sheet both at their ends and along the side edges shall not be measured. The overlaps of G.I. sheet over the valley piece and their under lap under the ridge, hip and flashing piece shall be included in the measurements.
- 3.2** No deductions in measurements shall be made for openings for chimney stacks, sky light etc. of area up to 0.40 sq. mt. nor extra be paid for labour in cutting and for wastage etc. in forming such openings.
- 3.3.** The rate of roof shall include the cost of all materials and labour involved in all operations described above. The rate also includes the cost of provision, erection and removal of the

scaffolding, benching, ladders, templates and tools required for the proper execution and erection of the work. The rate includes the cost of purlins, rafters and trusses.

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

Item No.54 :- Providing and Placing Bed Side Medical Curtain with S.s. Rail with SS Ring etc complete rate incl. fabric fittings & accessories of approved make curtain fire retardent

The Item of Providing and Placing Bed Side Medical Curtain with S.s. Rail with SS Ring etc complete rate incl. fabric fittings & accessories of approved make curtain fire retardant shall be executed as per instruction given by Engineer-in-Charge.

Item No.55 :- Providing and laying 16-18 mm thick polished granite stone machine cut in single piece (Max. available) in sill and jambs of door, window,ventilation & lift wall cladding,staircase risers & treads, skirting laid over 10 mm thick cement Plaster and Jointed with only Tile Adhesive chemical(Roff,K2,Laticrete,Mapisa,pidilite C2TE) with matching pigment incl. rubbing and polishing,half rounding edge and incl. fixing of hilty fastener at every 1/3 span of sill as required size etc. complete colour and shed as approved by architect engineer in charge.

General

This work shall consist of **Providing and laying 16-18 mm thick polished granite stone machine cut in single piece (Max. available) in sill and jambs of door, window,ventilation & lift wall cladding,staircase risers & treads, skirting laid over 10 mm thick cement Plaster and Jointed with only Tile Adhesive chemical(Roff,K2,Laticrete,Mapisa,pidilite C2TE) with matching pigment incl. rubbing and polishing,half rounding edge and incl. fixing of hilty fastener at every 1/3 span of sill as required size etc. complete colour and shed as approved by architect engineer in charge** 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 marble slab shall confirm to M-52. Sand shall conform to M-6.

1.0 GRANITE MARBLE SLAB

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

1.2. The size of the Granite marble slab to be used for flooring shall be of size 600 mm x 600 mm size 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. For [vertical wall / Doors / windows sill and jams cladding](#) the granite marble 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 ± 1 mm.

1.4. The edges of Granite marble 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. The Granite marble 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 dedo, skirting, sink, veneering, sills, steps, etc.

2.0 WORKMANSHIP

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

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

- 2.3. Cement and sand for base layer shall be mixed in proportions of 1:6 (1 cement : 6 coarse sand by volume). Cement and sand shall be proportioned by volume after making due allowance for bulking. The required quantity of water shall then be added and the mortar mixed to produce workable consistency before mixing platform shall be thoroughly cleaned before changing from one type of cement to another.
- 2.4. The mixing for base layer shall be done intimately. The operation shall be carried out on clean water tight platform, and cement sand shall be first mixed dry in the required proportion to obtain uniform colour and then the mortar shall be mixed for at least two minutes after addition of water. In case of cement mortar, that has suffered because of evaporation of water the same shall be re-tempered by adding water as frequently as needed to restore the requisite consistency but its re-tempering shall be permitted only within thirty minute from the time of addition to water at the time of initial mixing.
- 2.5. Cement and sand for base layer shall be mixed in proportion as specified in the item, Cement and sand shall be proportioned by volume after making due allowance for bulking. The required quantity of water shall then be added and the mortar mixed to produce workable consistency.
- 2.6. Curing shall be started as soon as the mortar used for finished has hardened sufficiently so as not to be damaged when watered. It shall be kept wet for a period of at least 7 days. During this period, it shall be suitably protected from all damages.
- 2.7. During hot weather, all finished or partly finished work shall be covered or wetted in such manner as will prevent rapid drying of the flooring work.
- 2.8. Joints of Granite marble 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 marble 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 marble 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 **vertical wall / Doors / windows sill and jams cladding** 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 marble 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.56 :- Fabricating, supplying and fixing in position S.S. Railing for staircase and balcony with brush finish and 304 grade as per Indian Standard and detailed drawing including grinding, cleaning and filling the welded spots with S.S. finish.

General

This work shall consist of **supplying and fixing in position S.S. Railing for staircase and balcony with brush finish and 304 grade as per Indian Standard and detailed drawing including**

grinding, cleaning and filling the welded spots with S.S. finish of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

1.0 MATERIAL

1.1 50 mm diameter hollow stainless steel pipe for railing

Hollow stainless steel pipe conform to I.S. 226-1985: The Hollow stainless steel pipe 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.

When the stainless steel pipe is supplied by the Contractor test certificate of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

Hollow stainless steel Pipe for railing shall be of 50 mm diameter and confirming general Indian standards. Hollow pipe shall be free from the defects and shall have smooth finish.

Vertical support shall be fixed in RCC slab at 1.2 m C/C incl. 3 horizontal S.S. pipe of 25mm dia. of 16 gauge at equal distance fixed by 18.75 mm S.S. pipe with balastrode including accessories.

2.0 Workmanship

2.1. Vertical / Horizontal supports of to get 90 cm height of railing shall be fixed as directed and round hollow pipe shall be fixed by welding in true line and level and slope the railing shall be powder coated finish as per standards

2.0 Mode of Measurement & Payment :

2.1 The payment will be made on Running Meter basis of the finished work.

2.3 All necessary labour materials, equipments, tools and plant, conveyance including loading and unloading etc. shall be provided by the Contractors directed by the Engineer in charge.

2.4 The **S.S. railing** shall be measured for its length, limiting dimensions to those specified on plan or as directed and shall be measured in running meters.

2.5 The rate shall be for a unit of **one Running meter**.

Item No.57:- Fabricating, supplying and fixing in position GRAB BAR 18" (450MM) for handicapped toilet with brush finish and (S.S.304) grade as per Indian Standrd and detailed drawing including grinding, cleaning and filling the welded spots with S.S. finish.

1.0. Materials

The Materials for the item shall be of Standard Brand & Quality & approved by engineer-in-charge.

2.0. Workmanship

Fabricating, supplying and fixing in position GRAB BAR 18" (450MM) for handicapped toilet with brush finish and (S.S.304) grade as per Indian Standrd and detailed drawing including grinding, cleaning and filling the welded spots with S.S. finish.

3.0. Mode of measurement and payment

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

3.2. The rate shall be for Unit of a **Number**.

Item No. 58:- Wall painting (two coats) with antibacterial polyurethane paint of approved brand and manufacture on internal walls to give an even and smooth surface. Thoroughly brushing the surface free from mortar droplings and other rareing matter and sand papered smooth. Surface Etc. complete

General

This work shall consist of **Wall painting (two coats) with antibacterial polyurethane paint** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

MATERIALS

Antibacterial wall paint :

As per the detailed technical specifications and as per approved list of makes The internal surfaces of the corridor walls should be sprayed with water based, non – reflective liquid plastic paint with a minimum dry film thickness of 300microns. Coating applied should be water resistant, does not support bacteriological or fungicidal growth and is resistant to most chemicals commonly used in hospital departments. The sterile coating should remain unaffected by radiation and other ionizing radiation at levels in excess of 1000 mrad and is classified to class I when tested in accordance with the requirements specified under BS.476: Part 7 1971,

2.0 WORKMAN SHIP

2.1 Scaffolding :

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

3.0 Application coat :

The **Wall painting (two coats) with antibacterial polyurethane paint** shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturer only. Sufficient quantity of distemper required for a day's work shall be prepared.

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

3.2 Sufficient quantity of the **Wall painting (two coats) with antibacterial polyurethane paint** shall be mixed to finish one room at a time.

3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate wall painting with **Wall painting (two coats) with antibacterial polyurethane paint** shall include the cost of all materials, tools and plant required for mixing, cleaning brushing sand papering & painting with all required specials and Lapi compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing pipe line work of specified diameter to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

3.2 The rate of **Wall painting (two coats) with antibacterial polyurethane paint** shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.

3.3. **Wall painting (two coats) with antibacterial polyurethane paint** shall be measured for its length and height limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.

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

Item No.59 :- **Pro. And fixing single layer water proof gypsum board 12.5 mm thick sections using water proof board of size 1220 mm x 1830 mm x 8.0 mm suspended by GI suspender channel of size 25 mm x 3 mm with intermediate channel of size 18 mm x 40 mm x 0.8 mm at 1220 mm center to center ceiling section of size 40 mm x 35 mm x 0.55 mm at 457 mm c/c and perimeter channel A of size 20 mm x 27 mm x 30 mm x 0.5 mm at edges**

& drops incl.paper tap sand soffit cleat, anchor fastener, scotch bolt connecting cleat,joining compound top coat on ceiling incl.making necy.opening for light fitting,diffuser etc. comp. as per detail drawing as directed

1. Scope of Work

Providing and fixing a single-layer waterproof gypsum board suspended ceiling system. This includes supplying all materials, erecting the metal framework, fixing the boards, taping, jointing, finishing, and making necessary cutouts for services as per the detailed drawings.

2. Materials

- Ceiling Board: Waterproof/Moisture-Resistant Gypsum Board.
 - Thickness: 12.5 mm.
 - Sheet Size: 1220 mm x 1830 mm x 8.0 mm (Note: The core sheet description specifies 12.5 mm total thickness framework application, standard boards are 1200x1800mm or 1220x1830mm).
- Main Suspenders: Galvanized Iron (GI) Suspenders.
 - Size: 25 mm wide x 3 mm thick metallic strips.
- Intermediate Channels: GI sections.
 - Size: 18 mm x 40 mm x 0.8 mm.
 - Spacing: Placed at 1220 mm center-to-center (c/c).
- Ceiling Sections: GI hat-shaped or box sections.
 - Size: 40 mm x 35 mm x 0.55 mm.
 - Spacing: Placed at 457 mm center-to-center (c/c).
- Perimeter Channels: GI perimeter channels at walls, edges, and vertical drops.
 - Size: 20 mm x 27 mm x 30 mm x 0.5 mm flange dimensions.
- Hardware & Fasteners: Soffit cleats, concrete anchor fasteners, scotch bolts, and connecting cleats designed for suspended grid alignment.
- Finishing Compounds: Fiber/paper jointing tape, jointing compound, and top-coat finishing plaster. [1, 2, 3, 4, 5]

3. Installation & Workmanship

- Grid Marking: Mark the final ceiling level on walls. Mark the anchor points on the concrete slab at maximum 1220 mm intervals.
- Suspension: Secure the soffit cleats to the slab using anchor fasteners. Bolt the 25x3 mm GI suspenders to the cleats using scotch bolts.
- Framework Assembly: Connect the intermediate channels (18x40x0.8 mm) to the suspenders at 1220 mm c/c. Fix the ceiling sections (40x35x0.55 mm) perpendicular to intermediate channels at 457 mm c/c using connecting cleats. Fix perimeter channels along the walls.
- Board Fixing: Screw-fix the 12.5 mm waterproof gypsum boards to the ceiling sections. Use rust-resistant drywall screws spaced at a maximum of 300 mm c/c. Keep a 2-3 mm gap between board joints.
- Jointing and Finishing: Apply paper tape over joints embedded in the jointing compound. Apply a subsequent top coat smoothly over joints and screw heads. Sand the dried compound to a seamless finish ready for painting.
- Service Openings: Cut neat, precise openings for light fixtures, AC diffusers, fire sprinklers, and access hatches as per the MEP layout drawings. [1, 2, 3, 4, 5]

4. Mode of Measurement

- The finished work shall be measured in Square Meters of the visible flat or stepped ceiling area.

Item No.61 :-

**Supplying FRP Planter 15"x15"x15" made of white or any shade required
FRP (Fibre Reinforced Polymer) Planter**

1. Scope of Work

The work consists of supplying, delivering to the site, and placing in position Fibre Reinforced Polymer (FRP) planters of the specified size, color, shape, and finish. This includes ensuring structural stability to withstand soil and water pressure without bulging or cracking. [1, 2]

2. Material and Dimensions

- **Material Composition:** High-grade Fiber Reinforced Polymer (FRP) using premium quality unsaturated polyester resin, UV-stabilized pigments, gel-coat, and chopped strand mat (glass fiber) reinforcement.
- **Dimensions:** 15 inches × 15 inches × 15 inches maintaining uniform wall thickness
- **Shape:** Cubical (Square top, bottom, and profile).
- **Color & Finish:** Solid white or any other custom shade specified by the Architect/Engineer-in-Charge. The surface finish must be a high-gloss, semi-gloss, or matte UV-resistant gel coat that prevents fading, peeling, or yellowing under direct sunlight. [1, 2, 3, 4, 5]

3. Performance & Construction Features

- **Waterproofing:** The internal surface must be coated with a water-resistant resin layer to prevent structural sweating or seepage.
- **Drainage:** The planter must be provided with pre-drilled drainage holes (typically 12 mm to 15 mm diameter) at the bottom to prevent waterlogging.
- **Weather Resistance:** Must be completely weatherproof, corrosion-resistant, shatterproof, non-conductive, and capable of withstanding extreme outdoor temperatures.
- **Structural Integrity:** The top rims must be neatly rounded or folded back to provide rigidity and eliminate sharp edges. The base must sit flat and stable on floors or structural slabs. [1, 2, 3, 4, 5]

4. Execution & Workmanship

- The planters must be cast using precision molds to ensure straight lines, sharp corners, and a uniform aesthetic appearance free from air bubbles, cracks, or fiber exposure.
- Upon delivery, planters must be inspected for surface defects, scratches, or structural deformation.
- Placement must follow the landscape layout drawings. [1, 2]

5. Mode of Measurement

- The item shall be measured and paid for on a Per Number (Each / Nos.) basis for fully delivered and accepted units.

Item No.62 :- PVC Fluted Panel Wall Panelling : Providing & Fixing wall paneling made from 12mm thk Marine plywood (IS:710) grade with back cladding of 3-4 mm ACP sheet fixed level on wall with necessary hardware & Facia / Front Cladding with 10 to 12 mm Thick PVC Fluted Panel Patta of approved make finished with groove pattern With TOP & Side Edges Covered with Teak Wood Beading Patti as per detailed Drawings and design completed finish as directed by EIC / Architect as per the sample approved by the Architect.

1. Scope of Work

Providing and fixing high-end interior wall panelling consisting of a Marine Plywood structural base, a protective Aluminium Composite Panel (ACP) back cladding, a front finish of PVC Fluted Panel Patta, and solid Teak Wood perimeter beading. The work includes surface preparation, framing, fixing, and finishing in strict accordance with the detailed architectural drawings and as directed by the Engineer-in-Charge (EIC) or Architect. [1, 2, 3]

2. Material Specifications

- **Structural Base:** 12 mm thick Marine Grade Plywood conforming to IS:710. The plywood must be boiling waterproof (BWP), chemically treated against termites, borers, and fungus.
- **Back Cladding:** 3 mm to 4 mm thick Aluminium Composite Panel (ACP) sheet. This serves as a moisture-barrier layer between the masonry wall and the wooden backing.

- Front/Facia Cladding: 10 mm to 12 mm thick PVC Fluted Panel Patta (interlocking planks) of an approved brand, shade, and texture. Panels must feature a distinct, uniform groove/flute pattern.
- Edge Framing: First-quality seasoned Teak Wood (TW) Beading Patti, sized to fully cover exposed top and side edges.
- Hardware & Adhesives: Rust-resistant (SS or GI) screws, star-headed fasteners, nylon sleeves/dash fasteners, and premium-grade synthetic rubber or polyurethane (PU) adhesives. [1, 2, 3, 4, 5]

3. Workmanship & Installation Sequence

- Surface Preparation: The existing wall surface must be cleaned of loose plaster, dust, and dampness. The wall line and level must be checked using a plumb bob and spirit level.
- Backing & Leveling: Fix the 3-4 mm ACP sheet directly to the wall structure to seal against moisture transmission. Secure the 12 mm IS:710 Marine Plywood framework over the ACP base, plumbing and leveling it perfectly using packing shims where necessary. Fix securely using heavy-duty anchor fasteners and screws.
- Facia Panel Installation: Apply high-tack adhesive to the plywood face. Mount the 10-12 mm PVC Fluted Panels seamlessly onto the marine plywood. Interlock the panel grooves tightly to ensure zero visible joints, gaps, or adhesive stains on the face.
- Edge Finishing: Fix the Teak Wood Beading Patti on all exposed top and side edges to conceal the layered profile of the plywood and PVC panel. The teak wood must be finely sanded and polished or painted to match the architect's approved color scheme.
- Provisions for Services: Make clean, sharp cutouts for electrical switchboards, wall lights, and data conduits using appropriate hole saws, ensuring no cracking or chipping of the PVC flutes. [1, 2, 3]

4. Quality Assurance & Approvals

- Prior to mass execution, the contractor must construct a sample mock-up panel on-site.
- The shade, texture, flute width, and overall alignment of the PVC panels must be approved in writing by the Architect/EIC before procurement.

5. Mode of Measurement

- The finished paneling work shall be measured in Square Meters based on the actual visible surface area covered.
- No deductions will be made for minor electrical cutouts up to 0.1 m².
- Teak wood beadings around the perimeter are typically considered inclusive of the panelling item unless a separate running meter item is specified in the contract

Item No.63 :- Providing and making PVC planks for FALSE CEILING/wall covering using 8mm thick Panel Size of 250mm Wide x 3000 mm Length with wooden or approved Shade and pattern & including all hardware fixtures and fasteners, S.S. screws, grips & Conrner angles including necessary framework wheerever required and as per design, pattern, shapes and levels specified in detail drawings including cutting for light fixtures. Complete as per architect's instructions & sized specified in detail drawings. Material selection should be as per engineer in charge and architect.

1. Scope of Work

Providing and installing PVC plank paneling for false ceilings or wall coverings using interlocking PVC panels. The scope includes surface preparation, erecting the necessary support

framework, fixing the PVC planks, installing perimeter corner angles, and making neat cutouts for light fixtures or other services. All work must align precisely with the levels, shapes, and patterns indicated in the detailed architectural drawings and follow the instructions of the Architect or Engineer-in-Charge (EIC).

2. Material Specifications

- PVC Planks: Heavy-duty, rigid Polyvinyl Chloride (PVC) hollow-core panels.
 - *Thickness*: 8 mm.
 - *Dimensions*: 250 mm wide × 3000 mm long.
 - *Finish*: Wooden texture or any approved solid shade and pattern with a UV-protective coating to prevent fading.
- Support Framework (Ceiling/Wall):
 - *For Ceilings*: Galvanized Iron (GI) suspended grid sections (minimum 0.5 mm thickness), including perimeter channels, ceiling sections, and intermediate channels.
 - *For Walls*: Aluminum square sections (minimum 25 mm × 25 mm × 1.2 mm thick) or heavy-duty PVC batten grid fixed directly to the masonry wall.
- Trims and Accessories: Matching PVC or aluminum corner angles, H-joints, edge trims, and perimeter U-channels of the same color/finish as the planks.
- Fasteners & Hardware: Stainless Steel (SS) screws, dash fasteners/nylon grips, and high-tack polyurethane or silicone-based adhesives.

3. Workmanship & Installation Sequence

- Surface & Level Marking: Establish the final finished line and level for the ceiling or wall using a water level or laser alignment tool. Mark the grid positioning on the structural surfaces.
- Framework Installation:
 - *Ceiling*: Fix GI perimeter channels along the walls. Suspend intermediate and ceiling sections using GI hangers or soffit cleats at maximum 600 mm intervals to ensure a rigid, sag-free frame.
 - *Wall*: Secure the aluminum or PVC battens vertically or horizontally at a maximum spacing of 450 mm center-to-center using nylon grips and SS screws, correcting any wall unevenness.
- Plank Fixing: Install perimeter corner angles and U-channels securely. Slide the first 8 mm PVC plank into the trim and screw the interlocking tongue/flange directly to the framework using SS screws. Progressively interlock subsequent planks tightly to ensure seamless, flush, and waterproof joints.
- Services & Cutouts: Cut clean, precise openings for recessed spot lamps, LED strip profiles, fan hooks, or AC vents using appropriate hole saws or cutters. Ensure the cuts do not chip or structurally weaken the panels.
- Final Cleaning: Remove any protective plastic film, glue marks, or dust from the finished surface, leaving it spotless.

4. Quality Assurance & Approvals

- The contractor must submit material samples showing the core thickness, weight per square meter, and surface laminate options for written approval from the Architect/EIC before starting procurement.
- The finished surface must show absolutely no visible sagging, waviness, or open gaps between the interlocking planks.

5. Mode of Measurement

- The completed work shall be measured in Square Meters based on the actual visible surface area covered.
- No deductions will be made for minor service cutouts up to 0.1 m2
- All necessary framework, corner angles, edge trims, and fasteners are considered integrated parts of the item and will not be paid for separately.

Item No.64 :- shrubbery Plantation: Supplying well grown shrub plants of average height 3' to 4' and planting in 300 x 300 x 300 mm size pits by mixing of FYM & existing soil in ration 1:3 with soil, pesticide & insecticide. Plants should be disease free and fungus free in 8" x 10" polythene bag. Plastic bags or pots should be removed carefully and soil around the roots should not be dropped or disturbed much. Bill shall be placed after 45 days of plantation of shrubs. Mortality rates to be inclusive. work shall be done as shown in the drawing or as directed and approved by EIC/Architect. The ground coverage should be dense and uniform throughout the planting area.

1. Scope of Work

The work involves supplying, delivering to the site, preparing pits, and planting healthy, well-grown shrub plants to achieve dense and uniform ground coverage. The scope includes mixing soil with Farm Yard Manure (FYM), applying pest and fungal treatments, careful transplantation, a mandatory 45-day stabilization/maintenance period, and the complete replacement of dead or dying plants within this period at the contractor's cost. All works must comply with the landscape layout drawings and instructions from the Architect or Engineer-in-Charge (EIC).

2. Material Specifications

- **Shrub Plants:**
 - *Condition:* Well-branched, bush-formed, vigorous, completely free from diseases, scale insects, and fungal infections.
 - *Height:* Average height must be between 3 feet to 4 feet (900mm to 1200mm) measured from the soil collar line to the top foliage crown.
 - *Packaging:* Supplied in heavy-duty (8"x10") ((200 x 250mm) polythene bags with a stable, unbroken root ball.
- **Manure & Soil Matrix:** First-quality, well-decomposed, weed-free Farm Yard Manure (FYM) or vermicompost.
- **Chemical Treatments:** Broad-spectrum, approved systemic pesticides and insecticides (such as Chlorpyrifos or Neem-based formulations) and anti-fungal powders to prevent termite or root-rot attacks.

3. Workmanship & Plantation Sequence

- **Pit Excavation:** Dig individual pits precisely sized at (300mm x 300mm x 300mm) at the designated spacing shown in the landscape layout to ensure complete, dense canopy coverage.
- **Soil Blend Preparation:** Thoroughly mix the excavated topsoil with FYM in a strict volume ratio of 3:1 (3 parts existing soil to 1 part manure). Blend in the specified quantities of pesticide and insecticide powders evenly throughout this matrix.

- **Transplantation:** Slit and remove the polythene bags carefully using a sharp blade without fracturing, dropping, or disturbing the core earth ball surrounding the root system. Place the root ball vertically in the center of the pit.
- **Backfilling & Compaction:** Fill the pit with the prepared soil matrix in layers, gently tamping it down around the root ball to eliminate air pockets while ensuring the plant's original collar line aligns perfectly with the finished ground level.
- **Initial Watering:** Create a shallow soil ring (saucer basin) around the base of each shrub and water it immediately and thoroughly to settle the soil.

4. Stabilization, Mortality, and Billing Clauses

- **Maintenance & Stabilization:** The contractor must water, weed, prune, and tend to the shrubs for a minimum stabilization period of 45 days post-plantation.
- **Mortality Clause:** The item rate is entirely inclusive of mortality risks. Any shrub showing signs of drying, fading, disease, or death during these 45 days must be replaced immediately with a fresh plant of matching size and species at no extra cost to the client.
- **Billing Eligibility:** The contractor shall submit the bill for payment only after the successful completion of the 45-day observation window, provided the ground coverage remains dense, uniform, and healthy as verified by the Architect/EIC.

5. Mode of Measurement

- The completed plantation work shall be measured and paid for on a Per Number (Each / Nos.) basis for healthy, thriving plants surviving at the end of the 45-day period.

Item No.65 :-

Tree Plantation: supply and planting of tree of specified variety including excavation of pit 600 × 600 x 600 mm depth mixing of FYM & existing soil in ratio 1:3 termite treatment and planting of plants (height 8' x 10" above bags/pots). Soil mounts 4'-8" in size. Tree plantation should be carried on neatly accurately and with perfection as per drawing and instruction given by the ECI. Plastic bags or pots should be removed carefully and soil around the roots should not be dropped or disturbed much. Bill shall be placed after completion of maintainance period but not before stablizing the hedges. Rates for mortality to be inclusive. Providing and fixing tripod made of wooden ball, height 1.50 mtr. Top bracket to be 300 mm x 300 mm leg embedded in ground up to 300 mm and to have tar coat. Work shall be done as shown in the drawing or as directed and approved by ECI.

1. Scope of Work

The work involves supplying, delivering to the site, preparing pits, and planting healthy, tall-grown trees of specified varieties, followed by constructing soil mounds and erecting protective wooden tripod supports. The scope includes soil enrichment with Farm Yard Manure (FYM), termite treatment, careful transplantation, a mandatory maintenance/stabilisation period, and the immediate replacement of dead plants within this period at the contractor's cost. All works must comply with the landscape layout drawings and instructions from the Engineer-in-Charge (EIC) or Architect. [1, 2, 3, 4]

2. Material Specifications

- **Tree Saplings:**

- *Condition:* Straight-stemmed, well-branched, healthy, vigorous, and completely free from pests, scale insects, and fungal infections.
- *Height:* 8 feet to 10 feet (2.4m to 3.0) measured strictly *above* the top of the root bag or pot.
- *Root Ball:* Secured in a stable, unbroken soil mass within a heavy-duty polythene bag or pot.
- Manure & Soil Additives: Well-decomposed, weed-free Farm Yard Manure (FYM) or compost.
- Chemical Treatments: Non-hazardous, approved anti-termite emulsion or chemical powder (such as Chlorpyrifos) to protect root systems from underground infestations.
- Wooden Tripod Support:
 - *Material:* Strong, seasoned wooden ballies (poles) capable of withstanding local wind pressures.
 - *Height:* 1.50 meters total height above ground.
 - *Top Bracket:* 300 mm × 300 mm bracing frame to secure the tree trunk gently without bruising.
 - *Preservative:* Anti-rot black tar (bitumen) coat applied to the bottom section embedded in the earth. [1, 2, 3, 4, 5]

3. Workmanship & Installation Sequence

- Pit Excavation: Dig individual pits precisely sized at 600 mm × 600 mm × 600 mm depth at designated layout coordinates.
- Soil Blend & Treatment: Thoroughly mix the excavated topsoil with FYM in a volume ratio of 3:1 (3 parts existing soil to 1 part manure). Treat the blended soil and the interior walls of the dug pit uniformly with anti-termite chemicals.
- Transplantation: Slit and remove the plastic bags or pots carefully using a sharp blade without fracturing or dropping the core earth ball surrounding the roots. Place the sapling vertically in the center of the pit.
- Backfilling & Mounding: Fill the pit with the treated soil matrix, tamping it down gently to eliminate structural air pockets. Construct a stable soil mound measuring 4 feet to 8 feet ((1.2 m) to (2.4 m)) in diameter around the tree base to retain moisture and guide irrigation water.
- Tripod Fixing: Install three wooden ballies around the tree to form a rigid tripod. Embed the legs at least 300 mm deep into the ground, ensuring the tar-coated section covers the buried portion to prevent rot. Fasten the 300 mm × 300 mm top bracket securely around the tree trunk using a soft rubber or burlap buffer lining to prevent bark abrasion. [1, 2]

4. Stabilisation, Mortality, and Billing Clauses

- Maintenance & Stabilisation: The contractor must water, weed, check alignment, and maintain the tree until it successfully establishes and stabilises alongside the surrounding hedges/landscape.
- Mortality Clause: The item rate is entirely inclusive of mortality risks. Any tree showing signs of drying, trunk decay, disease, or death during the stabilization period must be replaced immediately with a fresh sapling of matching height and species at no extra cost to the client.
- Billing Eligibility: The contractor shall submit the bill for payment only after the complete stabilization of the trees and adjacent hedges, verified and approved in writing by the EIC.

5. Mode of Measurement

- The completed tree plantation work shall be measured and paid for on a Per Number (Each / Nos.) basis for healthy, thriving trees surviving at the end of the maintenance period, inclusive of the tripod support structure.

Item No.66 :- Fibre Pot Container 35x35cm

1. Scope of Work

The work consists of supplying, delivering to the site, and placing in position Fibre Pot Containers of the specified size, shape, color, and finish. The pots must possess adequate structural strength to resist bulging, cracking, or degradation when filled with wet soil and plants.

2. Material and Dimensions

- **Material Composition:** First-grade Fiber Reinforced Polymer (FRP) / Fiberglass composite material. It must be manufactured using high-quality unsaturated polyester resin, UV-stabilized pigments, gel-coat, and chopped strand fiberglass mat reinforcement.
- **Dimensions:** 35 cm top diameter/width × 35 cm total height ($(350\text{ mm}) \times 350\text{ mm}$)), maintaining a uniform wall thickness of a minimum of 2.5 mm to 3.0 mm.
- **Shape:** Cylindrical or square-tapered profile, as per the approved architectural drawing.
- **Color & Finish:** Available in a solid white, charcoal grey, terracotta, or any custom color shade specified by the Architect. The exterior surface must feature a high-quality UV-resistant gel coat finish (matte, semi-gloss, or gloss) that is completely free from air bubbles, pinholes, or visible fiber strands. [1, 2]

3. Performance & Construction Features

- **Weathering & Durability:** The pot must be completely weatherproof, corrosion-proof, shatter-resistant, lightweight, and engineered to withstand direct, prolonged outdoor sunlight without fading, cracking, or yellowing.
- **Waterproofing:** The internal walls must be treated with a water-resistant resin seal layer to eliminate structural sweating, dampness, or moisture leaching through the outer walls.
- **Drainage:** The base of each container must feature pre-molded or pre-drilled drainage holes (typically 10 mm to 12 mm in diameter) to ensure efficient drainage and prevent root rot.
- **Structural Edge:** The top rim must be neatly rolled, rounded, or reinforced to provide structural rigidity and ensure comfortable handling during plant installation.

4. Execution & Workmanship

- All pots must be cast using precision molds to guarantee perfectly straight lines, uniform symmetry, and smooth profiles.
- Upon delivery to the site, the containers must be thoroughly inspected for transport scratches, structural damage, or surface warping.
- The pots shall be carefully placed at designated indoor or outdoor landscape coordinates as shown in the layout drawings.

5. Mode of Measurement

- The item shall be measured and paid for on a Per Number (Each / Nos.) basis for fully delivered, placed, and accepted units.

Item No.67 :-

Semi Carpet Lawn as per park and Garden SOR Gandhinagar

The work consists of developing a natural semi-carpet lawn over a designated ground area within a park or garden. This includes complete site clearing, deep soil trenching, subgrade preparation, adding fertile topsoil and decomposed manure (organic matrix), leveling, grading, installing approved live grass mats/turf rolls, compacting with a roller, initial heavy watering, and comprehensive post-plantation maintenance until a dense, seamless, and uniformly green turf layout is fully established.

Item No.68 :- Providing and fixing bright finish 2 mm thick Stainless steel (Grade 304) letters size up to 350 cm height in English language fixed in wall with screws and nails and any height including scaffolding etc complete as per instruction of Engineer-in-charge.

1. Scope of Work

The work consists of fabricating, supplying, and securely fixing bright-finish Stainless Steel (Grade 304) signage letters on wall surfaces at any elevation. The scope includes providing heavy-duty structural scaffolding, surface marking, precision drilling, fixing hardware, and final polishing. All works must be executed neatly and accurately in strict accordance with the approved typography, detailed architectural drawings, and instructions from the Engineer-in-Charge (EIC). [1, 2]

2. Material Specifications

- **Stainless Steel Sheet:** True Marine Grade **Stainless Steel (SS 304)** conforming to international standards (ASTM A240/A240M).
 - *Thickness:* Minimum **2 mm thick** solid sheet.
 - *Finish:* Premium **Bright Finish (Mirror / High-Gloss)**. The surface must be completely free from scratches, dents, pitting, scaling, or manufacturing laminations.
- **Fixing Hardware:** High-quality **Grade 304 or 316 Stainless Steel** threaded studs, anchor screws, and matching expansion rawl plugs/sleeves. Ordinary MS (Mild Steel) or GI fasteners are strictly prohibited to prevent galvanic corrosion and rust streaking on the wall.
- **Scaffolding:** Heavy-duty, rigid steel pipe (cup-lock or tubular) scaffolding system equipped with stable working platforms, guard rails, and safety nets to facilitate safe installation at heights. [1, 2, 3, 4, 5]

3. Fabrication & Workmanship

- **Cutting:** The English language letters must be precision laser-cut or water-jet cut from the 2 mm SS sheets. The edges must be perfectly sharp, straight, and true to the digital vector font files approved by the Architect. All cut edges must be finely deburred and polished to eliminate roughness or burrs.
- **Mounting Studs:** Heavy-duty SS threaded studs must be neatly welded to the rear (back) face of the 2 mm thick letters using argon/TIG welding. The welding must be done carefully to ensure no heat discoloration, warping, or distortion appears on the front bright mirror surface. [1]

4. Installation Sequence

- **Scaffolding & Safety:** Erect rigid steel scaffolding up to the required height where the signage is to be installed. The scaffolding must be anchored safely to the building structure and approved for safety before workmen ascend.
- **Template Marking:** A full-scale (1:1 ratio) paper or vinyl plotter template showing the exact kerning, spacing, and alignment of the letters must be temporarily fixed to the wall surface. The template alignment must be checked and approved using a digital spirit level or laser line level.

- **Drilling:** Mark and drill precise holes into the masonry wall, concrete, or stone cladding at the exact stud locations using a rotary hammer drill. Insert high-quality nylon or lead expansion plugs into the drilled holes.
- **Fixing:** Apply an industrial-grade epoxy or weather-proof silicone adhesive inside the drilled holes and over the studs. Push the rear studs of the SS letters firmly into the wall plugs. The letters must either sit completely flush against the wall or maintain a uniform, specified standoff distance using matching SS spacer sleeves, ensuring perfectly level alignment.
- **Final Cleaning:** Remove the protective plastic film from the face of the SS letters. Clean and polish the bright surfaces using an approved stainless steel cleaner/solvent to remove all fingerprints, grease, and adhesive residue. [1, 2, 3]

5. Quality Assurance & Approvals

- The contractor must submit material test certificates confirming the SS sheet is genuine **Grade 304** prior to fabrication.
- A physical sample of one fully finished letter must be presented to the EIC/Architect for written approval of the edge finish, mirror quality, and welding strength before bulk production begins.

6. Mode of Measurement

- The work shall be measured and paid for on a **Per Centimeter Height per Letter** basis or a **Per Number (Each)** basis for fully installed letters up to 350 cm height, as explicitly detailed in the BOQ schedule.

Item No.69:- Providing and fixing in position S.S. daso by providing top 50 mm dia stain less steel pipe rail with starting and end point vertical post of 50 mm dia with wall/column including bending welding and fixing for staircase and balcony as directed. (testing is required of s.s 304) for all floor

General

This work shall consist of **Providing and fixing in position S.S. daso by providing top 50 mm dia stain less steel pipe rail with starting and end point vertical post of 50 mm dia with wall/column including bending welding and fixing for staircase and balcony as directed. (testing is required of s.s 304) for all floor** of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

1.0 MATERIAL

1.1 50 mm diameter hollow stainless steel pipe for railing

Hollow stainless steel pipe conform to I.S. 226-1985: The Hollow stainless steel pipe 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.

When the stainless steel pipe is supplied by the Contractor test certificate of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

Hollow stainless steel Pipe for railing shall be of 50 mm diameter and confirming general Indian standards. Hollow pipe shall be free from the defects and shall have smooth finish.

Vertical support shall be fixed in RCC slab at 1.2 m C/C incl. 3 horizontal S.S. pipe of 25mm dia. of 16 gauge at equal distance fixed by 18.75 mm S.S. pipe with balastrode including accessories.

2.0. Workmanship

- 2.1. Vertical / Horizontal supports of to get 90 cm height of railing shall be fixed as directed and round hollow pipe shall be fixed by welding in true line and level and slope the railing shall be powder coated finish as per standards

2.0 Mode of Measurement & Payment :

- 2.1** The payment will be made on Running Meter basis of the finished work.
- 2.3** All necessary labour materials, equipments, tools and plant, conveyance including loading and unloading etc. shall be provided by the Contractors directed by the Engineer in charge.
- 2.4** The [S.S. railing](#) shall be measured for its length, limiting dimensions to those specified on plan or as directed and shall be measured in running meters.
- 2.5** The rate shall be for a unit of **one Running meter**.

Item No.70 :- Providing & Fixing the Chickenmesh - 20 guage (Crimp Jali) of approved size applying between the RCC and masonry junction in proper line, level and plumb with all material, labour, tools, tackles and equipment. Including providing and fixing the jali with nails, etc complete as directed by the site-in-charge.

Materials:

20 gauge galvanized chicken mess of approved make and manufacturer shall be used as per the direction of Engineer in Charge. Workmanship shall be as per the prescribed standards of approved manufacturers and requirement of Engineer in Charge.

Workmanship

Areas to be provided with chicken mesh shall be thoroughly scrubbed with wire brush and washed with water. Chicken mess shall be fixed at the required surfaces/joints including flattening or bending to shapes by means of suitable cement mortar or galvanized nails or 18 gauge annealed binding wire as per the direction of Engineer in Charge. Laps shall not be less than 150 mm on all sides.

Item to include

All labour, Material, use of equipment, tools plants, and removal of scaffolding, etc. complete.

Mode of Measurement and Payment:

Measurement shall be as per plan area and Payment shall be done on Smt basis. No Payment

Item No.71,72,73 :- Providing laying and jointing in true line and level 15/25/40mm dia. U.P.V.C. Pipe (SCH- 40) for cold water including fittings make PRINCE / SUPREME / ASTRAL / FINOLEX or equivalent as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre C/C or shall be cancelled as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.[A] 15 mm.(B) 25 mm (C) 40 mm.

1.0. Materials

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

2.0. Workmanship**2.1. Cutting, Laying & Jointing**

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

- 2.1.2.** The taps and dies shall be used only for straightening screw threads which have becoming bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the water tight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.
- 2.1.3.** In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all times free from dust and dirt during fixing. But from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temperately plugged to prevent access of water, soil, or any other foreign matter. Jointing shall be carried out with proper chemical adhesive material and allow to dry.
- 2.1.4.** Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.
- 2.2. Fixing concealed to wall, ceiling & floors.**
- 2.2.1.** In case of fixing **concealed cement point to** walls or ceilings, these shall run on the surface of the wall, or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or pipe fixed in ducts or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls or solid floors, where unavoidable, pipe may be buried for short distances provided that adequate protection is given against damage and where so required joints are not buried. Where required M.S. tube sleeve shall be fixed at a place a pipe is passed through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.
- 2.2.2.** All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight lengths at 2 MC/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to 25 mm. dia the holes in the walls and floors shall be made by drilling with chisel or jumper and not by dismantling the brick work or concrete. However for bigger diameter pipes the holes shall be carefully made (1 cement : 3 coarse sand), and properly finished to match the adjacent surface.
- 2.3. Testing of joints :**
- 2.3.1.** After laying and jointing, the pipes and fillings shall be inspected under working conditions of pressure and flow. Any joints found leaky shall be redone, and all leaking pipes removed and replaced without extra cost.
- 2.3.2.** The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg./Sq cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shocks and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes

and fittings shall be tested in sections as the work laying proceeds, keeping, the joints exposed for inspection during the testing.

3.0. Mode of measurements and payment

- 3.1.** The description of the item shall, unless otherwise stated be held to include where necessary conveyance and delivery, handling, unloading, storing fabrication, hoisting, all labour for finishing to required shape and size, setting, fitting in position straight, cutting and waste return of packing etc.
- 3.2.** The length shall be measured on **running meter** basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed to wall, ceiling. floors etc shall be measured and paid under this item.
- 3.3.** All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.
- (i) Dimension shall be measured to the nearest 0.01 meter.
- (ii) Area shall be worked out to the nearest 0.01 sq. meter.
- 3.4.** All measurements of cutting shall unless otherwise stated 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. 74 :- **Providing and fixing concealed center point to wall ceiling & floor CPVC (SDR 13.5) PIPE having National Sanitation Foundation (NSF) seal for potable water of following dia. nominal bore tube fittings and clamps including making good the wall, ceiling and floor etc. complete.[A] 15 mm.**

1.0. Materials

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

2.0. Workmanship

2.1. Cutting, Laying & Jointing

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

- 2.1.2.** The taps and dies shall be used only for straightening screw threads which have becoming bent or damaged and shall not be used for turning of the threads so as to make them slack as the latter procedure may not result in the water tight joint. The screw threads for tube and fitting shall be protected from edge until they are fitted.
- 2.1.3.** In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapping around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all times free from dust and dirt during fixing. But from the joints shall be removed after screwing. After laying the open ends of the pipes shall be temperately plugged to prevent access of water, soil, or any other foreign matter.
- 2.1.4.** Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti-corrosive paint to prevent corrosion.
- 2.2. Fixing of tube fittings to wall, ceiling & floors.**
- 2.2.1.** In case of fixing of tubes and fittings **concealed center point** to the walls or ceilings, these shall run on the surface of the wall, or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or pipe fixed in ducts or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls or solid floors, where unavoidable, pipe may be buried for short distances provided that adequate protection is given against damage and where so required joints are not buried. Where required M.S. tube sleeve shall be fixed at a place a pipe is passed through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.
- 2.2.2.** All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight lengths at 2 MC/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to 25 mm. dia the holes in the walls and floors shall be made by drilling with chisel or jumper and not by dismantling the brick work or concrete. However for bigger diameter pipes the holes shall be carefully made (1 cement : 3 coarse sand), and properly finished to match the adjacent surface.
- 2.3. Testing of joints :**
- 2.3.1.** After laying and jointing, the pipes and fittings shall be inspected under working conditions of pressure and flow. Any joints found leaky shall be redone, and all leaking pipes removed and replaced without extra cost.
- 2.3.2.** The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg./Sq cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shocks and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes

and fittings shall be tested in sections as the work laying proceeds, keeping, the joints exposed for inspection during the testing.

3.0. Mode of measurements and payment

- 3.1.** The description of the item shall, unless otherwise stated be held to include where necessary conveyance and delivery, handling, unloading, storing fabrication, hoisting, all labour for finishing to required shape and size, setting, fitting in position straight, cutting and waste return of packing etc.
- 3.2.** The length shall be measured on [running meter](#) basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed [concealed center point](#) to wall, ceiling, floors etc shall be measured and paid under this item.
- 3.3.** All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.
- (i) Dimension shall be measured to the nearest 0.01 meter.
- (ii) Area shall be worked out to the nearest 0.01 sq. meter.
- 3.4.** All measurements of cutting shall unless otherwise stated by held to include the consequent waste.
- 3.5.** In case of fitting of unequal bore, the targets bore shall be measured for the test.
- 3.6.** Testing of pipe lines fittings, and joints include for providing all plant appliances necessary for obtaining access to the work to be tested an carrying out the tests.
- 3.7.** The rate includes [C.P.V.C. \(SDR 13.5\) pipe having National Sanitation Foundation \(NSF\) seal for potable water](#) with screwed socket joints to gather with all fittings (such as bends, sockets springs, elbows, test, crosses, short pieces, clamps and plugs, unions etc.) and fixing complete with clamping wall hooks, wooden plug etc. and also curing, screwing and waste and for making forged (or hand made) bends on piping as required. Connector shall be inserted where required or directed. The rate also includes cutting through walls, floors etc. and their making good and painting exposed threads with anti-corrosive paint as above and testing where tubes are to be fixed to wall, ceiling and flooring, the rates shall not include painting of pipes, providing sleeves and sand filling under floor for which separate payment shall be made.
- 3.8.** The rate shall be for a unit of one running meter.

Item No.75 :- Providing and fixing 15 mm dia brass chromium plated screw down bib taps.

General

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

1.0 MATERIAL

1.0 Bib Cock

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

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

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

1.6. 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 leaky 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, keeping 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.76 :- Providing & Fixing Surgical Bib cock of FLR-5043N of Jaquar or Equivalent as directed and complete.

Materials and Workmanship:

The work shall be carried out as per Item Market Rate except that CP surgical BIB cock of approved make shall be used in place of bib taps

Mode of Measurement and Payment:

As per item Market Rate

Mode of measurement: on NO basis

Mode of Payment: on NO basis

Item No.77 :- Providing & Fixing C.P. Brass angle valve 15mm etc. complete.

Materials and Workmanship:

The work shall be carried out as per Item Market Rate except that **C.P. Brass angle valve 15mm** of approved make shall be used in place of bib taps

Mode of Measurement and Payment:

As per item Market Rate

Mode of measurement: on NO basis

Mode of Payment: on NO basis

Item No.78 :- Providing and fixing brass Chromium Plated brass half turn Flush cock of approved quality including fixing in pipe line etc Complete. 25mm dia.

1.0. Materials : Chromium plated brass half turn flush cock shall conform to M-67.

2.0. Workmanship

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

2.1 All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1:3 (1 cement : 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight lengths at 2 MC/C interval in horizontal run and 2.5 m. interval in vertical run. For pipe of 15 mm. dia. up to **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 cement : 3 coarse sand), and properly finished to match the adjacent surface.

2.2. Testing of joints :

- 2.2.1.** After laying and jointing, the pipes and fillings shall be inspected under working conditions of pressure and flow. Any joints found like shall be redone, and all leaking pipes removed and replaced without extra cost.
- 2.3.2.** The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg./Sq cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shocks and water hammer. The draw off takes and stop cock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work laying proceeds, keeping the joints exposed for inspection during the testing.
- 3.0. Mode of measurements and payment**
- 3.1.** The rate includes cost of all materials and labour required for satisfactory completion of this item including fittings and testing.
- 3.2.** The rate shall be for a unit of One number.

Item No.79 :- Providing & fixing gun metal check or non-return full way wheel valve (A)15 mm dia.

Item No.80 :- Providing & fixing gun metal check or non-return full way wheel valve (C)25 mm dia

Item No.81 :- Providing & fixing gun metal check or non-return full way wheel valve (E) 40 mm dia

1.0. Materials :

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

2.0. Workmanship

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

3.0. Mode of measurements and payment

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

Item No.82 :- Providing and fixing 600mm x 450mm bevelled edge mirror of superior glass mounted on 6mm thick A.C. sheet or plywood sheet and fixing to wooden plug with C.P. brass screws and washers.

1.0. Materials

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

2.0. Workmanship

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

3.0. Mode of measurements & payment

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

Item No.83:- Providing and fixing C.P. brass towel rail complete with C.P. brass brackets fixed to wooden plugs with C.P. brass screws.(B) 600mm x 20mm size.

1.0. Materials

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

2.0. Workmanship

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

3.0. Mode of measurements and payment

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

Item No.84:- Supplying and Installing 3 layer PVC water tank (ISI) of required capacity each with all necessary fittings and connection etc. complete on terrace.

General

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

1.0 MATERIAL

1.1 PVC WATER TANK

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

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

1.2 NIPPLE

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

1.3 BALL VALVE

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

1.4 CONNECTIONS

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

2.0 WORKMANSHIP

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

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

3.0 MODE OF MEASUREMENT AND PAYMENT

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

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

3.2 The **PVC water tank** work shall be measured for its **volume** to specified capacity to those specified on plan or as directed. The rate shall be for a unit of **one liter basis**.

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

Item No.85 :- Drilling of 215 mm dia. Bore in over burden strata (0-30) including lowering and fixing of 175 mm nominal dia UPVC pipe/175 mm dia ERW pipe upto required depth and further drilling of 165mm dia bore hole in rocky strata by DTH rig.

GENERAL

The work shall consist of Drilling of 200 mm diameter bore hole for 175 / 200 mm diameter ERW/UPVC pipe up to required depth in over burden strata (maximum up to 30 meters or up to the depth and further drilling of 200mm diameter bore hole in remaining rocky or sandstone strata up to 100 mtr. Depth or as suggested by Geologist / Hydrologist

Only trained personnel shall be employed for construction and supervision.

1.0 DRILLING

1.1 Drilling of 215mm diameter bore hole for 175/ 200 mm diameter ERW/UPVC pipe up to required depth in over burden strata (maximum up to 30 meters or up to the depth as suggested by Engineer in Charge or Geologist / Hydrologist) and further drilling of 165 mm diameter bore hole in remaining rocky or sandstone strata up to 100 meter Depth or suggested by Geologist / Hydrologist. The drilling shall be done by the down the hole hammer type drilling Rig & lowering 175/200 mm diameter ERW/UPVC Pipes, Bore cap shall have to be provided by the Contractor free of Cost. The carting of pipes and other materials etc. shall be carried out by contractor with all lead and lift to the site of work at his own cost.

1.2. Drilling work shall be carried out at the sites directed by the Engineer in Charge. The diameter of the hole shall be 200 mm in over burden strata and 165mm diameter in Rocky & Sandstone strata up to over all specified depth of 100 meters or as per suggested by Engineer in Charge or Geologist / Hydrologist. The Drilling shall be carried out in over burden strata up to maximum 30 Meters or up to the depth as suggested by Engineer in Charge or Geologist / Hydrologist. If further drilling can not be done due to overburden up to 30 meters, or in rocky & Hard or Sandstone strata due to Mechanical failure up to specified depth the drilling shall have to be stopped in consultation with Engineer-in- charge and no payment shall be made for such drilling carried out by the Contractor.

1.3. The 175/200mm diameter ERW / UPVC pipes should be lowered by the contractor in over burden strata. Contractor as desired by the Engineer in charge will carry out the jointing of pipes. Necessary jointing materials, steel bended plates etc. should be provided by the Contractor at his own cost.

2.0 DRILLING OPERATION

2.1. The Drilling operation for drilling of Bores should be carried out by suitable rig to satisfy following.

2.2. For Drilling Through overburden:

1. The diameter of the bore in the over burden shall be sufficient for insection of 175/200mm diameter ERW/UPVC casing pipes with the joints and leaving sufficient annular space for grouting the casing pipe with sticky clay or local soil etc. Annular space between bore hole and casing pipe should be filled up with sticky clay on local materials etc
2. After completion of overburden strata, the bore should drilled up to 0.15 meters. In rocky Hard/Sandstone strata So that casing pipes can be properly embedded in the Rocky Hard/Sandstone formation.
3. After the casing pipe is embedded in the rock, the same is to be ground with materials like sticky clay or local materials etc. so, as to avoid leaking of drain water in the bore.
4. Drilling of 200 mm diameter bore in over burden strata is compulsory up to 30 mtrs. Or as directed by Engineer in Charge or as suggested by geologist Hydrologist.
(A) For Drilling Through Rock :

2.3. Bore though rocks shall be of 165mm diameter and the total depth from the ground level of the bore shall up to 100 meters. or as per the recommendation of the Hydrologist /Jr. Geologist.

3.0. LOWERING OF CASING PIPES

- 3.1.** Casing pipes shall be properly socketed welded & forewed so as to ensure a continuous length lowered through the over burden, so as to reach at least 0.15 meter. Inside the hard rock. The length of casing pipes should be kept such that at least 0.30 meters. remains projected above the Ground Level After completion of the work at site the top of the casing pipes shall have to be closed either by a screwed or by welded cap plug (if required for HP Installation) unless pump is fitted immediately after completion of the bore.
- 3.2.** The casing pipe shall be lowered in such a manner so that it remains vertical so as to ensure installation of pump.
 1. After completion of the bore the Contractor shall have to arrange for testing the yield of the bore by "V" notch at his own cost in presence of the Engineer in charge or his authorized representative. No extra payment shall be made for such testing.
 2. The depth of bore to be drilled as per the recommendation of Jr. Geologist Hydrologist shall be less or more depth. If the bore required to be drilled beyond the specific depth 100 meters. The contractor shall be bound to carry out such work at the rate mentioned in "Schedule : B ".
 3. All the tools and tackles or plants and other suitable machinery required for work for drilling developing gauging etc. for the Tube well shall be provided by the Contractor at his own cost at the site of work.
 4. Is case of any item not covered by the specifications stated herein the Contractor shall carry out such work strictly, according to written instructions of Engineer in charge, which will be binding to the contractor and shall have to carry out such work at Departmental Schedule. The rate shall be mutually agreed up on, however the decision of the Engineer in charge will be final.
 5. During the Drilling Operation, if the water bearing strata found at a depth lesser than estimated depth the Executive Engineer or his representative shall have authority to instruct the Contractor to stop the work for reduction in the quantity of the work, the Contractor shall not be eligible for any compensation.
 6. If the bore is required to be drilled above the specified depth the Contractor shall be bound to carry out such additional work including drilling providing and lowering of casing pipes as may be necessary. The relevant specification regarding drilling providing and lowering pipe, taking yield test and strata sample etc. shall also apply in case of such additional work. The rates for a additional work be paid as per the rate fixed.
 7. Lowering and fixing of housing and casing shall be carried out in workman like manner. The contractor shall be responsible for workman compensation in case of any accident. In case of

- dispute or overlooked items the decision of the concerned Executive Engineer shall be final and binding to the Contractor.
8. No further drilling of bore wells is allowed, if more than two bores will remain untested at a time. This clause will be applicable without any prejudice (i.e. compensation for delay)
 9. The contractor shall clear the site before of the work and after completion of the work and shall hand over the bore with final finishing of the work. As directed by the Engineer in charge which shall have to be done by the Contractor at his own cost.
 10. The approach roads to site of work may be Kachha roads and contractor shall have to make his own arrangements for repairing of the road and maintain the same for transporting his materials and equipment at his cost which shall be utilized by the department for inspection etc. purpose.
 11. The list of the locations, where bore well are to be drilled will be provided on finalization of Tender and Similarly, the actual site of work will be given to the contractor by the Geologist or Engineer-in – charge from the respective Mechanical division Sub Division.
 12. If a well is rejected on account of faulty workmanship or negligence on the part of the Contractor as well as if the verticality is not within the permissible limit the bore shall be rejected and the Contractor shall have to drill a new bore including lowering pipes etc. at his own cost.
 13. If, further drilling can not be carried out due to encountering the sticky clay or over burden beyond limits (i.e. beyond 30 meters.) or in rocky / sandstone up to specified / suggested depth in a such a case the decision of the Engineer in Charge or recommendation of Hydrologist will be binding to the Contractor as finalized by Engineer in Charge and or Geologist / Hydrologist.
 14. The Contractor will have to make arrangement at his own cost for cleaning of bore hole, if filled up by clay, sand, dust & boulders etc.
 15. If bore is not completed up to design/ recommended depth due to Mechanical failure or any other reason, no payment shall be made for such abandoned bore.
 16. On completion of drilling work up to the required depth, the bore is to be developed and cleaned by suitable capacity air compressor up to the sand free discharge or for minimum one hour.
 17. The Contractor will have to make arrangement at his own cost for
 - (A) Rig Vehicles, Machineries etc.
 - (B) Facilities for moving bulky materials.
 - (C) Realizing the Transporting Materials.
 - (D) Keeping in custody Department Materials until finally taken over by the office –in-charge of the work.
 - (E) Repairing to the damages caused in the process of the executing works.
 - (F) Approach road to the site.

4.0. MODE OF MEASUREMENT & PAYMENT :

- 4.1. Drilling work shall be measured in its depth for each class of strata, limited to the dimensions shown on the drawing or as directed by the Engineer-in-charge. drilling over increased diameter or depth shall be deemed as convenience for the contractor in executing the work and shall not be measured and paid for separately.
- 4.2. The contract under rate for the items of excavation for structures shall be paid in full for carrying out the required operations including:
- 4.3. Setting out and fixing bench marks and centre lines stones.
- 4.4. Removal of all logs, stumps, grubs and other deleterious matter and obstructions for placing the foundations including trimming of bottoms of excavations
- 4.5. Foundation sealing, dewatering including pumping,
- 4.6. All labour, materials, tools equipment, safeguards and incidentals necessary to complete the work to the specification.
- 4.7. Drilling work shall be for soil such as vegetation or organic soil, turf, sand, silt, loam, clay, mud, black cotton soil, soft shale or soft murrum, required drilling equipment
- 4.8. The drilling work shall be measured for its depth, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one meter.

Item No.86:- Manufacture, supply and delivery of ISI marked (IS-12818) with latest amendment. c) 175 mm nominal dia. "CS" type

General

This work shall consist of providing and lowering of PVC casing pipe in over burden strata.

MATERIALS

Best quality of PVC casing pipe made of PVC confirming IS 4985 shall be supplied.

The pipe shall be of best quality and of approved brand and manufacturer.

- 1.1. Specials shall be provided and fitted as per site requirements and shall be of approved brand and manufacturer and of best quality.

2.0 WORKMAN SHIP

- 2.1. The PVC casing pipe of specified diameter shall be fixed as directed by Engineer in charge.

- 2.2. Due allowance shall be made for thermal expansion of rigid PVC casing pipe in all pipe lines for any change in length of pipe line which may occur during installation or when pipe line is in service.

- 2.3. PVC casing pipe line shall be jointed with the use of necessary solutions and fittings or specials as directed by Engineering in charge.

- 2.4. The joints of the PVC casing pipe lines shall be filled with adhesive solution of approved make as directed by Engineer in charge.

- 2.5. The PVC casing pipe shall be in full length as per manufacturers specified length.

- 2.6. All PVC casing pipe shall be lowered in bore in true line and alignment.

- 2.10 All PVC casing pipe shall have wire ball over carded or cowl when ventilating pipes are carried in pipe shaft the shaft shall be of minimum size of 1 meter If the shaft are also used to give light and air to road the ventilating pipes must be carried out to a horizontal distance at roof line not less than five meter from the site of the shaft.

3.0 MODE OF MEASUREMENT & PAYMENT :

- 3.1. The unit rate PVC casing pipe shall include the cost of all materials, tools and plant required for mixing, lowering in bore hole in position, all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge and all other incidental expenses for producing pipe line work of specified diameter to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

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

- 3.2. The PVC casing pipe line work shall be measured for its length limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one running meter.

- 3.3. The payment will be made on **running meter** basis of the finished work.

Item No.87 :- **Single phase borewell submersible pump motor set**
MOC: Casing: CI-FG260, Impeller: Bronze & Shaft: SS:410
Category Q-1.2, 20 LPM Discharge, 90 m Head, 1.5 HP

General

This work shall consist of **Single phase borewell submersible pump motor set**
MOC: Casing: CI-FG260, Impeller: Bronze & Shaft: SS:410
Category Q-1.2, 20 LPM Discharge, 90 m Head, 1.5 HP conforming to these Specifications of an approved brand and make as approved by the Engineer in charge.

1.1. Submersible pump set

- 1.2. **Submersible pump set** of specified capacity and of I.S.I. mark of approved brand and make and quality shall be supplied
- 1.3. Specification of item no 9.4.1 of Electrical S O R Item form specification booklet of Electrical work shall be followed for this item

2.0 WORKMAN SHIP

2.1. Submersible pump set shall be approved quality and as per IS standard make. Material used in manufacturing tank shall be confirmed to relevant IS code. The

2.2. The **Submersible pump set** shall be fitted and installed properly in a desired position and making all required necessary connection as specified and as directed by the Engineer in charge

3.0 MODE OF MEASUREMENT & PAYMENT :

3.1. The unit rate of **Submersible pump set** shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings, and as directed by Engineer in charge finishing structure, etc, and all other incidental expenses for producing item of **Submersible pump set** 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 **Submersible pump set** shall include the cost of all labour, materials, tools and plant scaffolding and all incidental expenses as described herein above.

3.2. The **Submersible pump set** 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.

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

Item No.88 :- Manufacture, supply and delivery of following ISI marked HDPE pipes (IS:4984/1985 with latest amendment) having material Grade PE-80 in approximate 100 meter coil length or as per GWSSB requirement with SS- 316 nipple at both ends having 11 TPI threads as per specifications, press fitted and bolted having nominal diameter as under as per detailed technical specifications. DN 40 mm PN-10

H.D.P.E. PVC Column pipe plain and pipe shall confirm to I.S. The diameter of pipes shall be got approved by Engineer in charge. The minimum thickness shall be 40 mm. dia. The measurement shall be on meter basis.

The payment shall be done on meter basis

Item No.89 :- PVC insulated flat submersible cable as per detailed technical specifications of R/C of GWSSB conforming to IS 694, IEC 60227 / 60228. 1 R x 3 C x 2.5 mm²

The specification cover the supply and installation of medium voltage, cables either in ground in trenches depending on site conditions and include installation with accessories for the same. The work considering of supplying jointing terminating and connection P.V.C. power cables.

The contractors shall supply cables as required to make the instalation works including diggings and back filling of the trenches as required.

All power cable shall be PVC instalabled and PVC sheathed ground around unaaround standard alluminium cable and shall comply with I.S. 1554 Part- I 1964 and I.S. 1554 Part II 1976. All cable shall be of

I.S.I. marks all cabling materials such as cable compound, cable laye taps shall be of approved quality acceptable of the type recommended by the manufacture or the cable for which it is approved by the Engineer in charge. Brass cable glad of cromium plated with rubber washer and switch for earthing terminal shall be used.

Installation of all equipment shall also conform to the applicable code and partices as per the I.S. and shall be executed to comply with the latest Indian Electricity rules as regard safety.

Item No.90 :- Lifting or Lowering of single phase submersible pump set complete with required length of HDPE pipe & cable in bore well and fitting of control panel board including wiring work and satisfactory testing as per instruction of Engineer-in-charge including carting of material to site. Up to 90 meter depth

WORKMANSHIP

The item provide for labour for lowering of Submersible Pump set complete with required No. and size of casing pipe erected by means of proper chain pulley block and pipe wrenches after checking of thread of each pipe with coupling to taken the load of pipe assembly filled with water with trial testing wiring G.E.B.'s test report. (1) [above 90 mt. and 120 mt.](#) as per required standard as per instruction and direction given by Engineer-in-charge.

MODE OF MEASUREMENT & PAYMENT

The rate shall be made on [No. base](#) of one work done.

Item No.91:- Honey Comb Brickwork With Common Burnt Clay Building Bricks Having Crushing Strength Not less than 35 Kg / Sqmt (i) In Cement Mortar 1:6 (1 Cement 6 Coarse Sand) etc. Complete .

1.0 Materials : Bricks shall conform to M-15 cement of proportion shall conform to M-11.

2.0 Workmanship : The relevant specifications of item No. 6.32 (A) shall be followed except that the masonry work shall be carried out Honey-comb in thickness of half bricks in cement mortar 1:4 (1 cement : 4 coarse sand) and where directed with all lifts.

3.0 Mode of measurement and payment :

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

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

Item No.92:- (i) Half brick masonry in common brunt clay building bricks having crushing strength not less than 35 Kg/Sq.Cm. in Cement mortar 1:4 (1- Cement : 4 -coarse sand) in foundation and plinth (B) Conventional (upto 10 ton)

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. 8 \(Brick Work\)](#) 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 [3 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

3.0. Mode of measurement and payment

- Item No.93,94 :-** Providing and fixing to wall, ceiling and floor 10.0 Kg f/cm2 working pressure polythelene pipes of the following outside dia. high density, complete with special flange compression type fittings wall clamps etc. including making good the wall, ceiling and floor (i) 75mm (ii) 110mm

2.9.1. The pipes shall be laid over uniform relatively soft fine trained soil found to be free of presence of hard object such as large flints, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.

2.9.2. The pipes laid underground shall not be less than one meter from the ground level. The pipe shall be positioned in the trenches so as to avoid any induced stressed due to deflection. Any deviation required shall be obtained by using proper type of rubber ring joints.

3.0. Mode of measurements & payment

3.1. The description of the item shall, unless otherwise stated be held to include where necessary conveyance and delivery, handling, unloading, storing fabrication, hoisting, all labour for finishing to required shape and size, setting, fitting in position straight, cutting and waste return of packing etc.

3.2. The length shall be measured on running meter basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed to wall, ceiling, floors etc shall be measured and paid under this item.

3.3. All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.

(i) Dimension shall be measured to the nearest 0.01 meter. (ii) Area shall be worked out to the nearest 0.01 sq. meter.

3.4. All measurements of cutting shall unless otherwise stated by held to include the consequent waste

3.5. In case of fitting of unequal bore, the targets bore shall be measured for the test.

3.6. Testing of pipe lines fittings, and joints include for providing all plant appliances necessary for obtaining access to the work to be tested an carrying out the tests

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

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

Item No.95 :- Provdg. & fixing on wall face PVC rain water pipe of FINOLEX, SUPREME, KISHAN or PRINCE brand is used incl. filling the joints with spun yarn soaked in neat cement slurry and cement mortar 1:2 (1 cement : 2 fine sand) . PVC pipe 6 Kg/Sqcm.
(ii) 110 mm Dia

1.0. Materials

1.1. The low density PVC Rain water pipe of specified diameter with **6.0 Kg/Sq.cm.** shall conform to I.S. 3076-1968. The specials and fittings required shall be of best quality.

2.0. Workmanship

2.1. The P.V.C. Rain water pipes of specified diameter shall be fixed and laid as directed by Engineer in charge. Due to thermal expansion of rigid P.V.C. Rain water pipes, due allowance shall be made particularly in over ground pipe lines for any change in length of pipe line which may occur during installation or when pipe line which may occur during installation or when pipe line is in service.

2.2. Above ground installation of rigid P.V.C. Rain water pipe should be under taken after preparations are observed for their protection against direct sun rays and mechanical damage.

2.3. The rigid P.V.C. Rain water pipe lines should not be kept exposed above ground when it passes through public places, railway lines, road side and foot paths.

- 2.4.** P.V.C. Rain water pipes shall be supported at the intervals as directed.
- 2.5.** Closer support spacing shall be provided if recommended by the manufacture.
- 2.6.** The guide lines indicated by the manufacturer regarding handling, transportation, storing, laying and jointing pf pipes shall be kept in view during execution.
- 2.7.** P.V.C. Rain water pipes shall be fixed on wall with wooden plugs and suitable plastic clamps.
- 2.8. Jointing the pipes :**
- 2.8.1.** The pipes and sockets shall be accurately cut. The ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper, and then solvent cement joint. Since solvent cement is aggressive to P V.C. care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped of after jointing. Empty solvent cement tins, brushes, rags, or paper impregnated with cement should not be buried in the trenches. They should be gathered not left scattered about, as-they can prove to be a hazard to animals, which may chew them.
- 2.8.2.** If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.
- 2.8.3** All necessary testing should be carried out.
- 3.0. Mode of measurements & payment**
- 3.1.** The description of tem 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 PVC Rain water pipe with screwed socket joints. to gather with all fittings (such as bends, sockets springs, elbows, test, crosses, short pieces, clamps and plugs, unions etc.) and fixing complete with clamping wall hooks, wooden plug etc. and also curing, screwing and waste and for making forged (or hand made) bends on piping as required. Connector shall be inserted where required or directed. The rate also includes cutting through walls, floors etc. and their making good and painting exposed threads with anti-corrosive paint as above and testing where tubes are to be fixed to wall ceiling and flooring, the rates shall not include painting of pipes, providing sleeves and sand filling under floor for which separate payment shall be made.
- 3.8.** The unit rate shall be for a unit of One running meter.

Item No. 96 :- Providing and fixing PVC SWR Nahni trap IS 14735 for drain - 100 mm diameter with jali of the following nominal diameter of self cleansing design with C.I scread down or hinged grating including the cost of cutting and making good the walls.

1.0. Materials

- 1.1. The [PVC SWR](#) Nahni trap 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 Nahni trap with 100 mm. dia inlet and 50 mm. dia. outlet shall be fixed as per drawing or as directed.
- 2.2. The Nahni trap shall be jointed with C.I. pipe, 75 mm. dia. with lead joints. The lead joints shall be done in conformation with I.S. 782-1976.

3.0. Mode of measurements and payment

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

Item No. 97 :- Providing & Fixing white or coloured glazed China Veterious China Orissa Pattern water closet squatting pan size 580 mm. x 440 mm. including providing and fixing vetrious china 100 mm. size S or P trap including jointing the trap with pan and soil pipe in C.M. 1:1 including all fitting and fixtures.

1.0. Materials

- 1.1. Water closet squatting pan (Orissa 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 long pattern white or colour 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.98 :- Providing and fixing wash down wall hung water closet (European type) of jaquar or equivalent with integral 'P' trap jointed within C.I pipe in C:M 1:1 including matching seat cover, chair braket, Conceled metropole of jaquar or equivalent, 2 way bibcock of jaquar or equivalent, health foucet of jaquar or equivalent with 1 m extension pipe, toilet paper holder of jaquar or equivalent with all accessories etc. complete.

1.0. Materials

Wash down water closet ([European type](#) W.C. pan) 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 joint between the trap of W.C. and [PVC flushing cistern with a pair of C.I. or Mild steel brackets complete with fittings such as lead value siphon, 15 mm. nominal size brass ball valve with polythene float, C.P. Brass handle unions and couplings for connections with inlet, outlet and over flow pipes, 40 mm. dia. flush bend including cutting holes in walls and making good the same connecting the flush bend with cistern and closet etc. comp. including plastic sheet cover including jointing trap with pipe in C.M. 1:1 \(A\) Vitreous china in white or color as directed.](#)
- 3.0. Mode of measurements and payment**
- 3.1.** The rate shall include the cost of all materials and labour involved in all the operations described under workmanship including testing.
- 3.2.** The rate includes cost of all labour for fixing pans and seat and cover, inlet, connections etc. complete including testing the same. The payment of seat and cover shall be made separately.
- 3.3.** The rate shall be for a unit of one number.

Item No.99 :- **Providg. & Fixing urinal of approved quality incl. connection with trap and with integral longitudinal flush pipe. (A) Squating plate pattern white earthenware 550mm x 300mm.**

- 1.0. Materials:**
The white earthenware [flat back or corner type size 500mm x 300mm](#) shall conform to M-64.
- 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. 15mm thick stop cock of approved quality by Engineer in charge should be provided.
- 3.0. Mode of measurements and payment**
- 3.1.** The rate shall includes 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.100 :- **Providing and fixing Veterious China flat back wash basin with single hole for pillar trap with CI or MS brackets painted with including cutting holes and making good the same including all necessary fittings in white colour.including pillar trap15mm Dia & Waste Pipe 32mm Dia**

- 1.0. Materials**
- 1.1.** The [Vitreous China](#) flat back wash basin shall be [550 mm. x 400mm.](#) of 1st quality and make as approved by the Engineer-in-charge. The wash basin shall conform to M-59.
- 2.0. Workmanship**
- 2.1.** The washbasin shall be fixed on the wall as and where directed. The wash basin shall be supported on a pair of M.S. or C.I. brackets fixed in C.M. 1:3 (1 cement : 3 sand). The bracket shall conform to I.S. : 775-1962. The wall plaster on the rear shall be cut to rest the top edge of the washbasin. After fixing the basing, plaster shall be made good and surface finished to match the existing one.
- 2.2.** The brackets shall be painted white with ready mixed paint.

- 2.3.** The C.P. brass trap and union shall be connected to 32 mm. dia. waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to a gully trap or direct in to gully trap on the ground floor and shall be connected to a waste pipe through a floor trap on the upper floors. C.P. brass trap and union may not be provided where the surface drain or a floor trap is placed directly under 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 pillar cocks, C.P. brass waste trap waste pipe, stop cock, chain wish rubber plug etc. shall be fixed.
- 2.6.** The payment of fittings shall be made separately under separate items.
- 3.0. Mode of measurements & payment**
- 3.1.** The rate includes cost of 32mm dia. C.P. brass waste, 32mm dia. M.I. fisher union, 15 mm brass screw down stop cock, 15mm pillar cock with all labour, materials, tools and plant etc. required for satisfactory completion of this item as specified in workmanship.
- 3.2.** The rate shall be for a unit of One number.

Item No.101 :- Providing and fixing (600 X 450 X 150 mm) size vitreous china laboratory sink /Kitchen Sink with CI or MS brackets painted white including cutting holes in wall and making good the same 40 mm dia CP waste couplin rails etc. complete.

- 1.0. Materials**
- 1.1.** Stainless steel kitchen sink of 600mm x 450 mm x 155mm size shall conform to M-63.
- 2.0. Workmanship**
- 2.1.** The Kitchen sink of Nirali or equivalent approved brand and standard as directed by the Engineer in charge. The kitchen sink shall be supported on a pair of M.S. or C.I. brackets fixed in cement mortar 1:3 (1 cement : 3 coarse sand). The M.S. or C.I. brackets shall conform to I.S. 775-1962. The wall plaster on the rear shall be cut to rest over the top edge of the sink. After fixing the sink, plaster shall be made good and the surface finished to match with the existing one.
- 2.2.** The C.P. brass trap and union shall be connected to 40 mm. nominal bore galvanized mild steel waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to gully-trap or direct into the gully-trap on the ground on floor and shall be connected to a waste pipe through a floor trap on the upper floors. C.P. brass trap and union may not be provided where surface drain or a floor trap is placed directly under the sink and the waste is discharged to it vertically.
- 3.0. Mode of measurements & payment**
- 3.1.** The rate includes cost of all labour, materials, tools and plant and other equipment required for satisfactory completion of this item as described in workmanship.
- 3.2.** The rate shall be for a unit of One number.

Item No.102,103:- Providing and fixing in position PVC Cowel vent to pipes (i) 75 mm. dia .(ii) 110.00 mm dia

General

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

Material

- 1.0. Cowl vent**
- 1.1.** Cowl vent shall be sound and free from porosity or other defects which affect serviceability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from craze, chips and other flaws or any other kind of defects which affect serviceability. The size of Cowl vent shall be specified.

- 1.2. Cowl vent shall be of quality approved by the Engineer-in-charge and shall generally conform to the relevant Indian Standards.
- 1.3. The cover shall be perforated cover shall be provided on the trap of appropriate size.

2.0 MODE OF MEASUREMENTS & PAYMENT

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

Item No. 104 :- Const. of brick masonry chamber for under ground inspection chambers & bends with brick having crushing strength not less than 35 Kg. / cm² in C.M. 1:5 precast S.F.R.C top cover foundation concrete 1:5:10 in side plaster 15 mm thick with C.M. 1:3 finished smooth with floating coat of neat cement on walls & bed concrete, inside dimension 455x 610 mm and 450 mm deep for single pipe line.

- 1.0. **Materials :** Water shall conform to M-1. Cement shall conform to M-3. Coarse sand shall conform to M-5. Brick shall conform to M-15. Stone aggregate shall conform to M-12. Brick bat shall conform to M-14. M.S. bar shall conform to M-18.
- 2.0. **Workmanship**
- 2.1. C.I. inspection chamber with provision of C.I. bends of specified size with bolts, nuts and felt washers for underground drain shall be enclosed in masonry chamber which shall be constructed as under:
- 2.2. The excavation shall be done true to dimensions and level shown in one the plans or as directed.
- 2.3. Bed concrete shall be 15 cms. thick C.C. 1:5:10 (1 cement :5 coarse sand : 10 graded brick bat aggregates. The projection of bed concrete beyond the masonry waifs shall be 7.5 cms.
- 2.4. **Wetting of bricks:**
- 2.4.1. The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water is as indication of through wetting of bricks.
- 2.5. **Laying:**
- 2.5.1. Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete to bond; closures in such case shall be cut to required size and used near the ends of walls.
- 2.5.2. A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be property bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.
- 2.5.3. The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept uniform.
- 2.5.4. The brick shall be laid with frog up wards. A set of tools comprising of wooden straight edges, man son's spirit level, square half meter rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.
- 2.5.5. Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one meter over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.
- 2.5.6. All futures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar

2.6. Joints:

- 2.6.1.** Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exposed 12 mm. The face joints shall be raked out as directed by raking tools daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done.
- 2.6.2.** The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.

2.7. Curing:

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

2.8. Preparation of foundation bed:

- 2.8.1.** If the foundation is to be laid directly on the excavated bed, the shall be leveled, cleared of all loose materials, cleaned and wetted before stating masonry, If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.
- 2.9.** The walls and the bed concrete of chamber shall be plastered inside with 12 mm. thick cement plaster 1 : 3 (1 cement : 3 coarse sand) finished smooth.
- 2.10.** The gully grating cover shall be hinged to frame to facilitate its opening for cleaning and repairs. The frames of the gully grating g shall be fixed on the top of masonry wall of the chamber in 15 cms. thick C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) laid over the full thickness of walls..
- 2.11.** The chamber shall have connection pipe, the length of which in meter between the road gully chamber and the manhole of the drain shall not be less than 1/40 times the nominal diameter of the pipe in MM. i.e. for 150 mm connection pipe the length shall not be cement plaster on the bed concrete.
- 2.12.** The cover slab of R.C.C. 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm. nominal size) 15 cms. thick reinforced with 10 mm. bars at 15 cms. C/C both ways, surface and edges finished fair. Full bearing equal to the width to the width of wall shall be given to the slab on all sides. The frame of manhole cover shall be embedded firmly in R.C.C. slab so that the top of the frame remains flush with the top of R.C.C. slab.

2.13. Testing:

- 2.13.1** Manhole shall be tested by filling with water to a depth not exceeding 1.2 M. as directed.
- 2.13.2** After completion of work, manhole cover shall be sealed by means of thick grease.

3.0. Mode of measurements and payment

- 3.1.** The earth work in excavation, providing and laying C.I. inspection chamber and bends shall be measured and paid for separately.
- 3.2.** The rate shall be for a unit of One number.

Item No105 :- Providing And Layling Vaccume Dewatering Process Ordinary cement Concrete M-200 & Curing Comp. Including Compaction and Finishing of Cement Concrete Road by Trimix process excluding reinforcement and Including all Material and labour chrages for trimix (Vaccum dewatering Services) Process on Cemnt Concrete road Surface by using Vaccume dewatering pump,floater surface vibrator incl.making groove 5 mm width and filling with polyminte polymer and rough finish to surface per instruction incl.levelling etc complete.

Materials:

This work shall consist of providing concrete pavement of 10 cm thick using M-200 grade ready mix concrete & reconstituted fibers etc. according to the following specifications

Design Mix Concrete

1. For controlled concrete, design of the mix shall be approved after preliminary tests and all necessary precautions shall be taken in its production to ensure that the required works cube strength is attained and maintained. The controlled concrete shall be in eight grades designated as M.100, M. 150, M. 200, M. 250, M.300, M. 350, M. 400 and M. 450 with the suffix 'controlled' added to it.
2. In the designation of a concrete mix, letter M refers to the mix and the number to the specified 28 days works cubes compressive strength of that mix on 150 mm. cubes, expressed in kg/cm² where ordinary Portland cement conforming to IS : 269 or Portland blast furnace cement Conforming to IS : 455 is used, the compressive strength requirements for various grades of concrete shall be as given below.

Grade of Concrete	Compressive works test strength in kg/cm ² on 150 mm. cubes, conducted in accordance with IS:516	
	Min.at7days	Min. at 28 days
M 100	70	100
M 150	100	150
M 200	135	200
M 250	170	250
M300	200	300
M350	235	350
M400	270	400
M450	300	450

NOTE - In all cases, the 28 days compressive strength specified in the above Table shall alone be the criterion for acceptance or rejection of the concrete.

Where the strength of a concrete mix, as indicated by tests, lies in between the strength for any two grades specified in the above Table such concrete shall be classified for all purposes as a concrete belonging to the lower of the two grades between which its strength lies.

3. Concrete mix shall be designed on the basis of preliminary tests so as to attain a strength at least 33 per cent higher than that required on work tests. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with the means available. Except where it can be shown to the satisfaction of the Engineer-in-charge that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate should be controlled by obtaining the coarse aggregates in different sizes and blending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. Required quantity of material shall be stock piled several hours, preferably a day, before use. Grading of coarse and fine aggregate shall be checked as frequently as possible, frequency for a given job being determined by the Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.
4. In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighed separately to check the net weight. Where cement is weighed from bulk stocks at site and not by bags, it shall be weighed separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in a clean, and serviceable condition. Their accuracy shall be periodically checked.
5. It is most important to keep the specified water-cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to

compensate for variations in the moisture cement. For the determination of moisture content in the aggregates, IS : 2386 (Part -III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates to allow for the variation in weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 210 Kg. per cubic meter in plain concrete and not less than 300 kg/per cubic meter in reinforced concrete structural members. The minimum quantity of cement for prestressed concrete work shall not less than 360 kg/per cubic meter of concrete nor shall it be more than 540 kg/per cubic meter of concrete.

6. Following shall be the maximum nominal size of coarse aggregate for the different items of work :

Sr. No.	Item of construction	Maximum nominal size of Coarse aggregate
(i)	R.C.C. well curb, R.C.C. well steining and R.C.C. piles.	40 mm
(ii)	P.C.C. well steining	63 mm.
(iii)	Well cap or pile cap; solid type piers, abutments and wing-walls, their pier caps.	40 mm.
(iv)	R.C.C. works in cross girders, deck slab, wearing coarse, kerb, light posts, blast walls approach slab etc., and hollow type piers, abutments, wing-walls and their pier caps.	20 mm.
(v)	R.C.C. bearings	20mm
(vi)	For any other item of construction not covered by items (i) to (v) above	As specified on the drawing or as desired by the Engineer-in-charge in case it is not specified on drawing.

For heavily reinforced concrete members as in the case of ribs of main beams, nominal maximum size of aggregate shall usually be restricted to 5 mm. less than the minimum lateral clear distance between the main bars or 5 mm. less than the minimum cover to the reinforcement whichever is the smaller.

7. Fine aggregate shall be clean, hard, coarse sand. It shall be free dust and such other substances. The sand be get approved by the Engineer-in-charge.

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

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

10. The water for mixing shall be potable water to satisfaction of the Engineer-in-charge. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the job.

11. For road pavement work concrete shall be mixed in R.M.C. plant and it shall be conveyed to the site of work . The grade of ready mix concrete shall be M250

12 Before starting concrete the base shall be cleared of all loose materials leveled watered and rammed as directed. And 200 micron thick LDPE membrane shall be laid over prepared sub base,

Water reducing concrete ad mixture at 100 ml per bag of cement and recron 3 S fiber (reliance Product) at 875 gram per one cum of concrete shall be used including making channel 75 mm x 75 mm required to level and slope and thickness of the concrete road leveling of placed concrete with surface vibrator and finishing with power floater shall be done. Floater and trowel light booming the surface shall be done Expansion joints shall be cut as directed

13. The method of transporting and placing concrete shall be approved by the Engineer-in-charge. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All form work and reinforcement contained in it shall be cleaned and made free from

standing water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

14. If concreting is not started within 24 hours of the approval being given. It shall have to be obtained again from the Engineer-in-charge. Concreting then shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer-unless carried in properly design agitators, operating continuously when this time shall be within 3 hours of the addition of cement to the mix and within 30 minutes of its discharge from the agitator Except where otherwise agreed to be the Engineer-in-charge. Concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrator are used not exceeding 0.30 meter in all other cases.

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

16. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of Vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators can not be used. Sufficient vibrator in serviceable condition shall be kept at site so that spare equipment is always available in the event of break downs,

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

18. Form work shall include all temporary or permanent forms required for forming the concrete, together with all temporary construction required for their support. Formwork shall however be of the following two distinct categories :-

(1) Shuttering i.e from work required for forming the concrete

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

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

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

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

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

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

23. Immediately after the removal of forms, all exposed bars or bolts passing through the Concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fins caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregated mixed in the proportions used in the grade of concrete that is being finished and of as dry a consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which have been pointed shall be kept moist for a period of twenty four hours. If rock pockets/honey-combs, in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel

reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

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

Type of work	Slumps	
	Where vibrators are used	Where vibrators are not used
(i) Mass concrete in R.C.C. foundations footings and retaining walls	10 mm to 25 mm.	80mm.
(ii) Beams, slabs and columns simply reinforced	25 mm. to 40mm	100 mm. to 120 mm
(iii) Thin R.C.C. section or section with congested steel	40 mm. to 50mm	125mm. to 150mm.

25. For controlled concrete preliminary tests shall consist of three sets of separate tests, and in each set, tests shall be conducted on six specimens. Not more than one set of six specimens shall be made on any particular day. Of the six specimen in each set, three shall be tested at seven days and the remaining three at 28 days. The preliminary tests at 27 days are intended only to indicate the strength likely to be attained at 28 days. Work strength tests shall be made in accordance with IS : 516. EACH test shall be conducted on ten specimens five of which shall be tested at seven days and the remaining five at 28 days. The samples of concrete shall be taken on each day of concreting and cubes shall be made at the rate of one for every 5 cubic meter of concrete or a part thereof. However, if concreting done in a day is than 15 cubic meter , the minimum number of cubes can be reduced to 6 with the specific permission of the Engineer-in- charge. Similar works tests shall be carried out when ever the quality and grading of materials is changed irrespective of the quantity of concrete poured. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure to tests given above reveals a poor quality of concrete and in other special cases.

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

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

28. In reinforced concrete the volume occupied by reinforcement shall not be deducted. The slab shall be measured as running continuously through and the beam as the portion below the slab.
29. All necessary labour, materials, equipment, etc., for sampling, preparing test cubes, curing etc., shall be provided by the Contractor. Testing of the materials and concrete may be arranged by the Engineer-in-charge in an approved laboratory at the cost of the contractor.
30. The payment will be made on square Meter basis of the finished work of road pavement.
31. The unit rate for concrete shall include the cost of all materials including admixtures and rebar etc. as required, labour, tools and plant required for mixing, placing in position, vibrating and compacting finishing as per directions of the Engineer-in-charge, curing and all other incidental expenses for producing concrete of specified strength to complete the structure or its components as shown on the drawings and according to these specifications. The rate shall also include the cost of making fixing and removing of all centering and forms required for the work.

Item No.106 :- Providing and fixing rubber dye pre-cast inter locking concrete block 60mm thick with grade of concrete M200 and pneumatic compressed by mechanically pressed and as per approved design including 75mm Sand layer for levelling and filling the joint with sand in proper line and level etc complete.

This work shall consist of furnishing and placing pre-cast cement paver blocks 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 Pre-cast cement paver blocks

pre-cast cement paver blocks shall be of approved brand and make as approved by Engineer in charge

1.1 The size shape and design of pre-cast cement paver blocks shall generally be as per manufacturers product or as directed by the Engineer in charge and Architect

1.2 The pre-cast cement paver blocks shall satisfy the tests as regards traverse strength resistance to wear and water absorption

1.3 The colour size shape and design of the pre-cast cement paver blocks shall be directed by Engineer Or Architect

1.4 The pre-cast cement paver blocks shall be of best quality as approved by the Engineer In charge. They shall be flat and true to shape. They shall be free from cracks, crazing spots, chipped edges and corners. The glazing shall be of uniform shade.

2. WATER

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

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

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

2.4 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

2.5 Hard and bitter water and sea water shall not be permitted for curing

2.6 Potable water will generally be found suitable for curing mortar or concrete

2.7. Storage Water shall be stored in containers/ tanks covered at top and cleaned at regular intervals in order to prevent intrusion by foreign matter or growth of organic matter Water from shallow muddy or

marshy surface shall not be permitted The intake pipe shall be enclosed to exclude silt, mud grass and other solid materials and there shall be a minimum depth of 0.60 m on water below the intake at all times

2.8. As a guide following concentrations represent the maximum permissible values

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

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

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

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

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

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

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

3.0 CEMENT

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

a) Ordinary Portland Cement, 33 Grade, conforming. to *IS:269*.

b) Rapid Hardening Portland Cement, conforming to *IS:8041*.

c) Ordinary Portland Cement, 43 Grade, conforming to *IS:8112*.

d) Ordinary Portland Cement, 53 Grade, conforming to *IS:12269*.

e) Soleplate Resistant Portland Cement, conforming to *IS:12330*.

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

3.3. Cement conforming to *IS:8112* and *IS:12269* may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be achieved by finer grinding and higher constituent ratio of C₃S/C₂S, where C₃S is Tri-calcium Silicate and C₂S is Dicalcium Silicate In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

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

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

3.6. Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement also total sulfur content calculated as sulfuric anhydride (SO₃) shall in no case exceed 2.5 per cent and 3.0 percent when tri-calcium aluminate per cent by mass in up to 5 or grater than 5 respectively

3.3. Storage

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

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

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

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

4.0 SAND

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

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

4.3. For plain and reinforced cement concrete (PCC and RCC) or pre stressed concrete (PSC) works fine aggregates shall consist of clean, hard strong and durable prices of crushed stone, crushed gravel or suitable combination of natural sand crushed stone or gravel, They shall not contain dust lumps soft or flaky materials mica or other deleterious materials in such quantities as to reduce the strength and durability of concrete, or to attack the embedded steel. Motorized sand washing machines should be used to remove impurities from sand. Fine aggregate having positive alkali-silica reaction shall not be used. All fine aggregates shall conform to IS L 383 and tests for conformity shall be carried out as per IS : 2386 (Part I to VIII) The contractor shall submit to the Engineer in charge the entire information indicated in Appendix A of IS : 383. The fineness modulus of fine aggregate shall neither be less than 2.00 nor greater than 3.5.

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

4.5Fine Sand: The fineness module shall not exceed 1.0 the sieve analysis of fine sand be as under:

IS. Sieve Designation		% by wt. passing	
	Zone I	Zone II	Zone III
10 mm	100	100	100
4.75 mm	90-100	90-100	90-100
2.3 6mm	60-95	75-100	85-100
1.18 mm	30-70	55-90	75-100
600 MC	15-34	35-59	60-79
300 MC	5-20	8-30	12-40
150 MC	0-10	0-10	0-10

Coarse Sand: The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0.

The sieve analysis of coarse sand be as under:

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

5.0 WORKMANSHIP

5.1 The pre-cast cement paver blocks shall be laid on a bed of PCC 1:3:6 layer and layer of sand. The slope in the floors shall be provided in the sub grade. The earth below shall be properly watered, rammed and consolidated. Before laying the flooring, it shall be moisture. Plinth masonry offset shall be depressed so as to allow the sub grade concrete to rest on it.

5.2 Pre-cast cement paver blocks of approved quality shape and design and shall be laid evenly to level and slope as directed by Engineer in charge over a bed of a base layer consisting of PCC 1:3:6

5.3 Laying: The pre-cast cement paver blocks shall be laid in plain, diagonal or other pattern as directed. The concrete blocks shall be laid properly and set home by gentle tapping.

6.0 MODE OF MEASUREMENT AND PAYMENT

6.1 The unit rate pre-cast cement paver blocks 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, compacting, finishing, curing.

6.2 The length and breadth shall be measured correct to a Square meter correct to 2 places of decimal. Length and breadth shall be measured to correct to a centimeter and between the finished 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.

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

**Deputy Executive Engineer
PIU, Zone-6, Dahod**

**Executive Engineer
PIU, Zone-6, Dahod**