

AHMEDABAD MUNICIPAL CORPORATION
(MAHANAGAR SEVA SADAN - NORTH ZONE)



Name of Work : Construction of Vegetable Market at T.P.No-123/C (Naroda)
F.P.No.- 39 in Thakkarbapanagar Ward of North Zone of AMC (Reinvite)

TENDER DOCUMENT

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Volume -1

Part – B Technical Specification

Client-

**DY.MUNICIPAL COMMISSIONER
1ST FLOOR RAJIV GANDHI BHAVAN,
NR; MEMCO ROAD
NORTH ZONE
AHMEDABAD MUNICIPAL CORPORATION
AHMEDABAD.**

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GENERAL TECHNICAL SPECIFICATIONS FOR BUILDING WORK

GENERAL

- In the specifications, "as directed"/"Approved" shall be taken to mean, "as directed"/"approved" by the Engineer-in-charge.
- 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.
- In "Mode of Measurement" in the specifications wherever a dispute arises in the absence of specific mention of a particular point or aspect, the provisions on these particular points, or aspects in the relevant Indian Standards shall be referred to.
- 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.
- The distance, which constitutes lead, shall be determined along the shortest practical route and not necessarily the route actually taken. The decision of the Engineer-in-charge in this regard shall be taken as final.
- Where no lead is specified, it shall mean "all leads"
- Lift shall be measured from plinth level.
- Upto "floor two level" means actual height of floor (Maxi. 4 M.) upto 3 Mt. above plinth level.
- Definite particulars covered in the items of work, though not mentioned or elucidated in it, specifications shall be deemed to be included there in.
- Reference to specifications of materials as made in the detailed specification of the items of work is in the form of a designation containing the number of the specification of the material and prefix 'M' e.g. 'M-5'.
- 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 contract rate of the item of work shall be for the work completed in all respects.
- No collection of materials shall be made before it is got approved from the Engineer-in-charge.
- Collection of approved materials shall be done at site of work in a systematic manner. 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.
- Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
- NO materials shall be stored prior to, during and after execution shall be kept in sufficient numbers and in good working condition on the site of the work.
- All works shall be carried out in a workmanlike manners per the best techniques for the particular item.
- 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.

- 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.
- 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.
- All installations pertaining to water supply and fixtures thereof as well as drainage lines and sanitary fittings shall be deemed to be completed only after giving satisfactory tests by the Contractor.
- The contractor shall be responsible for observing the rules and regulations imposed under "Minor Minerals Act", and such other laws and rules prescribed by Government from time to time.
- All necessary safety measures and precaution (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.
- The testing charges of all materials shall be borne by the Contractor unless recovery at one percent towards testing charges is separately made.
- Approval to any of the executed items for the work does not in any way relieve the contractor of his responsibility for the correctness, soundness and strength of the structure as per the drawings and specification.

SPECIFICATIONS OF MATERIALS

M-1. Water:

Water shall not be salty or 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 or 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 standards specified in I.S.456-1978.

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.

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 concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.

Hard and bitter water shall not be used for curing.

Portable water will be generally found suitable for curing mortar or concrete.

M-2. Lime:

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

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

A very rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure white colour, lime in form of porous lumps of dirty white colour indicates quick lime, and solid lumps are the unburnt lime stone.

Acid tests for determining the carbonate content in lime, Excessive amount of impurities and rough determination of class of lime.

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.

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

M-3. Cement :

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 :

The white cement shall conform to I.S. 80412-E 1978.

M-5. Coloured Cement:

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

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 shall be properly grounded to have a uniform colour and shade. The pigments shall have such properties to provide for durability under exposure to sunlight and weather.

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

M-6. Sand:

Sand shall be natural sand, clean, well graded, hard strong durable and gritty particle free from injurious amounts of dust clay, kankar nodules, soft or flaky particles shale, alkali, salts organic matter, loam, mica or another deleterious substance 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.

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	Percentage by weight	I.S.Sieve	Percentage by weight
Designation	Passing Sieve	Designation	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

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
Designation	Passing Sieve	Designation	Passing 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

M-7. Stone Dust :

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 with measuring cylinder. The method of determining silt contents by field test is given as under :

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 upto 100 mm. mark. The clean water shall be added upto 150 mm. mark. The mixture shall be stiffed vigorously and the content allowed to settle for 3 hours.

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 lowering the silt content within the allowable limit.

The fineness modulus of stone dust shall not be less than 1.80.

M-8. Stone Grit:

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 adhesion of mortar. Grit shall generally be cubical in shape and as far as possible flaky 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 reaction with cement.

The grit shall conform to the following gradation as per sieve analysis:

I.S.Sieve	Percentage by weight	I.S.Sieve	Percentage by weight
Designation	through Sieve	Designation	through Sieve
12.50 mm.	100%	4.75 mm.	0-20%
10.00 mm.	85-100%	2.36 mm.	0-25%

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

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

M-9. Cinder :

Cinder is well burnt furnace residue, which has been fused or sintered into lumps of varying sizes.

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

The average grading for cinder 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.	52

M-10. Lime Mortar :

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

Sand:Sand Shall conform to specification M-6.

Proportion of Mix : 10.2.1. Mortar shall consist of such proportions of slaked lime and sand as may be specified in the item. The slaked lime and sand be measured by volume.

Preparation of Mortar :

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 the 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.

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.

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 is prepared. But in no case mortar made earlier than 36 hours shall be permitted for use.

M-11. Cement Mortar:

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

Sand:Sand shall conform to M-6

Preparation of Mix :11.2.1 Cement and 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.

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 homogenous 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 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.

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 :

Coarse aggregate shall be 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 for mortar.

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 concrete 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	percentage passing for single sized aggregates of nominal size			I.S.Sieve Designation sized	Percentage passing for single aggregates of Nominal size		
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 mm.	2.35	--	--	--
15 mm.	--	--	85-100				

NOTE: This percentage may be carried somewhat by Engineer-in-charge when considered necessary for obtaining better density and strength of concrete.

The grading test shall be taken in the beginning and at the change of source of materials. The necessary test indicated in I.S. 383-1970 and I.S. 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 :

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.

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.

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.

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

M-14. Brick Bats Aggregate :

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

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

M-15 Bricks :

The bricks shall be hand or machine moulded and made from suitable soils and kiln-burnt. They shall be free from crack 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.

The size of modular bricks shall be 190 mm. X 90 mm. X 90 mm.

The size of the conventional bricks shall be as under: $(9'' \times 4\frac{3}{8}'' \times 2\frac{3}{4}'')$ 225x110x75 mm.

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 : $\frac{1}{6}''$ (1.51 mm.) Height : $\frac{1}{6}''$ 1.50 mm.)

The crushing strength of the bricks shall not be less than 35 Kg./Sq.Cm. The average water absorption shall not be more than 20 percent by weight. Necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3493 (Part-I to IV) 1976.

M-16 Stone :

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 obtained 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. 1134-1974. The minimum crushing strength of the stone shall be 200 kg./Sq. Cm. unless otherwise specified.

The samples of the stone to be used shall be got approved before the work is started. 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 stone shall be so dressed that the bushing on the exposed ace 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 :

Laterite stone shall be obtained from the approved quarry. It shall be compacted in texture, sound, durable and free from soft patches. It shall have a minimum crushing strength of 100 K.G/S.q. 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.

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

Those types of stone in which white clay occur, should not be used. special corner stones shall be provided where so directed.

M-18. Mild Steel Bars :

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

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

For the purpose of payment, the bar shall be measured correct upto 100 mm. length and weight payable worked out at the rate specified below :

1.	6mm. x 0.22 Kg./Rmt	8.	20mm. 2.47 Kg./Rmt
2.	8mm. x 0.39 Kg./Rmt.	9.	22mm. 2.98 Kg./Rmt
3.	10mm x 0.62 Kg./Rmt	10.	25mm. 3.85 Kg./Rmt
4.	12mm x 0.89 Kg./Rmt	11.	28mm. 4.83 Kg./Rmt
5.	14mm x 1.21 Kg./Rmt	12.	32mm. 6.31 Kg./Rmt
6.	16mm x 1.58 Kg./Rmt	13.	36mm. 7.99 Kg./Rmt
7.	18mm x 3.00 Kg./Rmt	14.	40mm 9.86 Kg./Rmt.

M-19. High yield Strength Steel Deformed Bars :

High yield strength steel deformed bars are either cold twisted or hot rolled, shall conform to I.S. 1739-1966 and I.S.1139-1966 respectively.

Other provision and requirements shall conform to specification NO. M-18 for Mild steel bars.

M-20. High Tensile Steel Wire:

The high tensile wires for the use in prestressed concrete work shall conform to I.S. 2090-1962.

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 I.S. 1785-1962. Testing shall be done as per I.S. requirements.

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. The high tensile wire shall be obtained from manufactures in coil having diameter not less than 350 times the diameter of wire itself so that wire springs back straight back straight on being uncoiled.

M-21. Mild Steel Binding Wire :

The mild steel wire shall be of 1.63 mm or 1.22 mm. (16 or 18 gauge) diameter and shall conform to I.S. 280-197.

The use of black wire be permitted for binding reinforcement bars. It shall be free from rust, Oil paint, grease, looser mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

M-22. Structural Steel :

All structural steel shall conform to I.S. 226-1965. The steel shall be free from the defects mentioned in I.S. 226-1975 and shall have a smooth finish. The material shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. Rivet bars shall conform to I.S. 1148-1973.

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

M-23. Galvanised Iron Sheets :

The galvanised iron sheets shall be plain or corrugated sheets of specified in item. The G.I. sheets shall conform it I.S. 217-1977. The sheets shall be undamaged in carriage and handling either by rubbing off of zinc coating or otherwise they shall have clean and bright surface and shall be as directed as per site condition.

The length and width of G.I. sheet shall be as directed as per site condition.

M-24 G.I Valleys gutter ridges :

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.

Valleys gutters and flashings shall also be 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-25. Manglore Pattern Roof Tiles :

The manglore 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 :

The shuttering shall be either of wide planking of 30 mm. minimum thickness with or without steel lining roof steel plates stiffened by steel angles. The shuttering shall be supported on battens and beams and props of vertical ballies properly cross braced together so as to make the centering rigid. In places of bulky props, brick pillar of adequate section built in mud mortar may be used.

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 not permit leakage of cement grout.

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.

The props shall consist of bullies having 100 mm. minimum diameter measured at mid length and 80 mm, at thin end and 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.

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.

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 surface coming in contact with concrete. Wooden form work with metal sheet lining or steel plates stiffened by steel angles shall be permitted.

As far as practicable, clamps shall be used to hold the forms together and use of nails and spikes avoided.

The surface of timber shuttering that would come in contact with concrete shall be well wetted and coated with soap solutions before the concreting is done. Alternatively coat of raw linseed oil or oil of approved manufacturer 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.

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

M-27. Expansion joints-Premoulded filter :

The item provides for expansion joints in R.C.C frame structures for internal joints, as well as exposed joints, with the use of premoulded bituminous joint filler.

Premoulded bituminous joint filler, i.e. performed strip of expansion joint filler shall not get deformed or broken by twisting, bending or other handling when exposed to atmospheric condition. Pieces of joint filler that have been damaged shall be rejected. Thickness of the pre-moulded joint filler shall otherwise specified.

Premoulded bituminous joint filler shall conform to I.S. 1838-1961.

M-28 Expansion joints-Copper strips & hold fasts :

The item provide for expansion joints in R.C.C frame structure for internal joints as well as for exposed joints with the use of necessary copper strip and hold fasts.

Copper sheet shall be of 1.25 mm. thick and of 1.25 mm. width when the 'U' shape in middle. Copper strips shall have hold fast 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 to be embedded in the concrete work shall be 25 mm. Depth of 'U' to be provide in the expansion joint, in the copper plate shall be of 25 mm.

M-29. Teak wood :

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.

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 fibres 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 of 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 or resins materials made to hide the defects shall render the pieces liable to rejection by the Engineer-in-charge.

All scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grains and of uniform thickness.

The tolerances in the dimensions shall be allowed at the rate of 1.5 m.m. per face to be planed.

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

Second Class Teak Wood : 29.6.1. No individual hard and sound knots shall be more than 15 Sq. cms. in size and aggregate area of such knots shall 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 IS 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, Kalali, Siras, Behda, Jamun, Sisoo will be used for door frames where as only Kalali, Siras, 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 defect. It shall be uniform in substance and of straight fibers as far as possible. It shall be free from decay, harmful fungi and other defects of nature which effect the strength, durability or its usefulness for the purpose for which it is required. The colour of wood shall be uniform as far as possible. The scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grain and uniform thickness.

The department will use the Agency to produce certificate from forest Department in event of disputes and the decision of the Department shall be final and binding to the contractor.

The tolerance in the dimension shall be allowed as 1.5 mm. per face to be planed.

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

The solid core type flush door shutters shall be 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.

The face panel of the shutters shall be formed by gluing by the hot press process on both faces of the core with either plywood or cross-bands and face veneers. The hopping, rebating, opening of glazing, Venetian etc. shall be provided if specified in the drawing.

All edges of the door shutters shall be square. The shutters shall be free twist or warp in its plane. Both faces of the shutters shall be sand papered to smooth even texture.

The shutters shall be tested for

- (1) **End immersion test :** The test shall be carried out as per I.S. 2202 (part-I) 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 delamination 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, knots holes and other permissible wood defects shall not be considered in assessing the sample.

The tolerance in size of solid core type flush door shall be as under :

In Normal thickness + 1.2 mm. In Normal height + 3 mm.

The thick of the shutters shall be uniform throughout with a permissible variation of not more than 0.8 mm. when measured at any two points.

M-31. Aluminum doors, Windows, Ventilators.

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

The hinges shall be cast or extruded aluminum hinges of same type as in windows but of large size.

The hinges shall normal 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 in the drawing and design. The fabrication shall be done as directed.

M-32. Rolling Shutters:

The rolling shutter 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 constructed with interlocking lath sections formed from cold rolled steel strips not less than 0.9 mm. thick and 80 mm. wide for shutters upto 3.5 mm., width not less than 1.25 mm. thick and 80 mm. wide for shutters 3.5 mm in width and above unless otherwise specified.

Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) jointures construction. The thickness of sheet used shall not be less than 3.15 mm.

Hood covers shall be made of M.S. Sheets not less that 0.92 mm. thickness 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.

The spring shall be of best quality and shall be manufactured from tested high tensile spring steel wire or strip of adequate strength to balance the shutters in all position. The spring pipe shaft etc. shall be supported on strong M.S. or malleable C.I. brackets. The brackets shall be fixed on or under the lintel as specified with raw plugs and screws bolts etc.

The rolling shutters shall be of self rolling type up to 8 Sq.m. clear area without ball bearing and p to 12 Sq.m. clear area with ball bearing. If the rolling shutters are larger, then gear operated type shutters shall be used.

The locking arrangement shall be provided at the bottom of shutter at both ends. The shutters shall be opened from outside.

The shutters shall be completed with door suspension shafts, locking arrangements pulling hooks, handles and other accessories.

M-33. Collapsible Steel Gate:

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 bearing 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 center to center of pickets shall be 12 cms. with an opening of 10 Cms.
- (b) Pivoted M.S. flats shall be 20 mm x 6 mm.
- (c) Top and bottom guides shall be from tee or flat iron of approved size.
- (d) The fittings like stoppers, fixing hold fasts, locking cleats, brass handles and cast iron rollers shall be of approved design and size.

M-34. Welded Steel Wire Fabric :

Welded steel wire fabric for general purpose shall be manufactures from cold drawn steel wire “as drawn” or galvanised steel conforming to I.S. 226-1975 with longitudinal and transverse wire securw4ely 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 size of wire for square as 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 size permit.

M-35. Expanded Metal Sheets :

The expanded metal sheets shall be free from flaws, joints, broken strands, laminations and other harmful surface Expanded metal steel sheet shall conform to I.S. 412-1975, Except that blank sheets need not be with guaranteed mechanical properties. The size of the diamond mesh of expended metal and dimensions of strands (width and thickness) shall be as specified. The tolerance in nominal weight of expended metal sheets shall be of + 10 percent.

Expanded metal in panels shall be in one whole piece panel each as far as stock size permit. The expanded metal sheets shall be coated with suitable protective coating to prevent corrosion.

M-36. Mild Steel Wire (Wire) :

Mild steel wire may be galvanised, 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 :

The plywood for general purpose shall conform I.S. 303-1975. Plywood is made by cementing together thin boards or sheets of wood into panels. There are always an odd number of layers 3,5,7,9 ply etc. The plies are placed so that grain of each layer is right angle to the grain in the adjacent layer.

The Chief advantages of plywood over a signal board of the same thickness is the more uniform strength of the plywood, along the length and width of the plywood and grater resistance to cracking and splitting with change in moisture content.

Usually synthetic resins are used for gluing, pherolic resins are usually cured in a hot press which compresses and simultaneously heats the plies between hot plates which maintain a temperature of 90 degrees C. to 140 degrees C. and a pressure of 11 to 14 kg/sq.cm. on the wood. The time of heating may be anything from 2 to 69 minutes depending upon thickness.

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 finished by plywood must be exposed to an atmosphere of controlled humidity until the proper amount of moisture has been absorbed.

According to I.S. 303-1975 the plywood for general purpose shall be of three grades **BWR**, **WWR** and **CWR**, depending upon the adhesives used for bonding and 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,B and C, After pressing, the finished plywood should be reconditioned to a moisture content not less than 8 percent and not more than 16 percent.

Thickness of plywood Boards :

TABLE

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.		22 mm.
							25 mm.

M-38. Glass :

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

Sheet Glass :

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 upto 600 mm x 600 mm.

For panes larger than 600 mm. x 600 mm. and upto 800 m. x 800 mm. the glass weighing not less than 8.75 Kg/Sq.m. shall be used. For bigger panes upto 900 mm. x 900 mm. glass weighing not less than 11.25 Kg/Sq.m. shall be used.

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.

Plate Glass.

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 and type of glass shall be as per details on drawings or as specified or as directed.

Obscured Glass :

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.

Wired Glass :

Glass shall be with wire netting embedded in a sheet of plate glass electrically welded 13 mm. Georgian square mesh may 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 :

Acrylic sheet 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 available in complete range of standard transparent, translucent and opaque colours. Sheets shall be of such quality that they can be cut bent and jointed as desired. Solution for the joints shall be used as per the requirement of manufacturer.

M-40. Particle board :

The particle boards used for face panels shall be of best quality free from any defects. The particle boards shall be made with phenolmaldehyde adhesive. 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.

M-41. Expanded polystyrene of framed stopper slabs :

The expanded polystyrene ceiling boards and tiles shall be approved make and shall be of size, 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 slab of Thermocol etc.

M-42. Resin bonded fiber glass :

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

For test of Minerrak wool thermal insulation Blanket I.S. : 3144?1965 shall be followed.

Insulation wool blanket shall be with following coverings on one or both sides as indicated.

- (1) Bituminised hessian Kraft paper for keeping out dust.
- (2) Hessian cloth or Kraft paper for keeping out dust.
- (3) G.I. wire netting, suitable for surface to be plastered over.

M-43. Fixtures and fastenings :

General

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 specifications.

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

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 operation.

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

Brass and anodised aluminum fixtures and fastenings shall be bright finished.

Holdfasts :

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.

Butt hinges :

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

The strap hinges shall be manufactured from M. S. Sheet.

Siding door bolt (Aldrops): 43 The Aldrops as specified in the item shall be used and shall be got approved.

Tower bolts (Barrel Type):43.5.1 : Tower bolts as specified in the item shall be used as shall be used and shall be got approved.

Door Latch:43.7.1 The size of door latch shall be taken as the length of latch.

Bathroom Latch :43.5.1 Bathroom latch shall be similar to tower bolt.

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 size of the handle.

Door Stopper: 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 as shall have rubber cushion.

Door Catch :43.10.1 Door catch shall be fixed as height of about 900 mm from the floor level so 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 fixate. The catch shall be fixed 20 mimesed the face of the door for easy operation of catch.

Wooden Door stop with highs :

wooden door stop of size 100mm X 60 mm X 40 mm shall be fixed on the door frame with a high of 75 mm size at high of 900 mm from the floor level the wooden door stop shall be provided with 3 coats of approve oil paint.

Case meant window fastener : Casement window fastener for single leaf window shutter shall be left or right handled as directed.

Casement stays (straight peg stay) :

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 as directed. size of the stay shall be 250 mm to 300 mm as directed.

Ventilator catch :

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

Pivot :

The base and socket plate shall be made form minimum 3 mm thick plate and projected pivot shall not be less than 12 mm length and shall be firmly riveted to the base plate in case of brass pivot.

M-44. Paints :

Oil Paints :

Oil Paints shall be of the specified colour and shade, and as approved. The ready mixed paints shall only be used. However, if ready mixed paint or specific 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. All the paints shall meet following general requirements :

Paint shall not show excessive setting in a freshly opened full can and shall easily be redispersed with a paddle to a smooth homogeneous state. The paint shall show no curing, livering, caking or colour separation and shall be free from lumps and skins.

The paint as received shall brush easily, possess good levelling properties and show no running or sagging tendencies.

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

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

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

Enamel Paints :

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

M-45 French polish :

The french polish of requirement and shape shall be prepared with the below mentioned ingredients and other necessary materials:

Denatured spirit of approved quality (ii) Chandras (iii) Shellac (iv) Pigment.

The French polish so prepared shall conform to I.S. : 348-1968.

M-46 Marble chips for marble mosaic terrazzo :

The marble chips shall be of approved quality and shades. It shall be hard, sound, dense and homogenous in texture with crystalline and coarse grains. It shall be uniform in colour and free from stains, cracks decay and weathering.

The size of various colours of 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.

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 :**Plain Cement tiles :**

The plain cement tiles shall be general purpose type. These are the tiles in the manufacturer of which no pigments are used Cement used in the manufacturer of tiles shall be as per Indian Standards.

The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture, the tiles shall be subjected to a 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 the marble chips aggregate in the wearing layer of the tiles shall be three parts of cement to one part chips by weight. The minimum thickness Of wearing layer shall be 3 mm. The colour and texture of wearing layer shall be uniform through out its face and thickness. On removal from mould, the tiles shall be kept in moist conditions 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.

The wearing face of the tiles shall be plain, free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right and all edges shall be sharp and true.

The size of tiles shall generally be square shape 24.85 Cm. x 24.85 Cm. or 25 Cm. x 25 Cm. The thickness of tiles shall be 20 mm.

Tolerance of length and breadth shall be plus or minus one millimeter, Tolerance or thickness shall be plus 5 mm.

The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S.:1237-1980.

Plain Coloured Tiles :

These tiles shall have the same specification as per plain cement tiles as per (A) above except that they shall have a plain wearing surface where in pigments are used. They shall conform to I.S. 1237-1980.

The pigment 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.

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

Marble mosaic tiles :

These tiles have the same specifications as per plain cement tiles except the requirements as stated below:

The marble mosaic tiles shall conform to I.S. 1237-1980. The wearing face of the tiles shall be mechanical 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.

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

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 prepared indicating roughly the particular sized chips to be more or less in the samples presented. The samples 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.

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.

Chequered Tiles:

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 :

The tiles shall be of nominal size of 250 mm. x 250 mm. or as specified. The center to center 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.

The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3 mm. The chequered 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.

Tiles shall conform to relevant I.S. 1237-1980.

Chequered Tiles for Stair cases :

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

- (1) The length of a tile including nose shall be 330 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 grooves running parallel to nosing and at center not exceeding 25 mm. Beyond that the tiles shall have normal chequer pattern.

M-48. Rough Kotah Stone :

The kotah stones shall be hard, even, sound, and regular in shape and generally be green. Brown colour stones shall not be allowed for use. They shall be without any soft veins, cracks or flows.

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.

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

The edges of stones shall be truly chiselled and table rubbed with coarse sand before paving. All angles and edges of the stone shall be true, Square and free from chipping and the surface shall be true and plain.

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

M-49. Polished Kotah Stones

Polished kotah stone shall has same specifications as per rough kotah stone except as mentioned below:

The stones shall have machine polished smooth 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, platforms, 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 :

Dholpur stone slab shall be of best quality as approved by the Engineer-in-charge. The stone slab shall be even, sound and durable, regular in shape and of uniform colour.

The size of the stone shall be specified in the item or detailed drawings 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 provisions 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 angle and edges of the stone slab shall be true and plane.

The sample of stone shall be got approved from the Engineer-in-charge for shade and tint for a particular work. It shall be ensured that stones to be used in a particular work shall not differ much in shade or tint from the approved sample.

M-51. Marble Slab :

Marble slab shall be white or of other colour and of best quality as approved by the Engineer-in-charge

Slabs shall be hard, uniform and homogeneous in texture. They shall have even crystalline grain and free from defects and cracks. The surface shall be machine polished to an even and perfectly plane surface and edges machine cut true and square. The rear face shall be rough to provide key for the mortar.

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 450mm x 450mm. and preferable 300 mm x 600 mm. However, smaller sizes will be allowed to be used to the extent of maintaining required pattern.

The slab shall not be thinner than the specified thickness at its thinnest part. A few specimen of finished slab to be used shall be deposited by the Contractor in the office for reference.

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

M-52 Granite Stone Slab :

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

The thickness of the stone shall be as specified in items.

All exposed face shall be double polished to tender truly smooth and the 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 :

P.V.C sheets for P.V.C. floor covering shall be homogenous flexible type, conforming to I.S. 3452-1966. The P.V.C covering shall neither develop any toxic effect while put to use nor shall give off any disagreeable odor.

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

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

Thickness + 0.15 mm

Length or Width :

1.300 mm. square tiles + 0.20 mm.

39.00 mm.square tiles +0.30 mm.
2.600 mm. square tiles+ 0.40 mm.
4 Sheets ad rolls+0.10 percent

Adhesive :

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

M-54. Facing tiles :

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

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. 1077-1976.

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

Size Tolerance for		
	1 st class Brick	2 nd class Brick
19 cm.	+ 6 mm.	+ 10 mm.
9 cm.	+ 3 mm.	+ 7 mm.
4 cm.	+1.5 mm	+ 3 mm.

The tolerance for distortion or war page 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.

The average compressive strength obtained as 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.

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.

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 :

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

The tiles shall be nominal size of 150 mm x 150 mm. unless otherwise specified. The maximum variation from 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. 777-1970.

M-56. Galvanized iron pipes and fittings :

Galvanized iron pipe 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 galvanized iron fittings shall be of the standard 'R' or equivalent make.

M-57. Bib cock and stop cock :

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 for insertion in a pipe line for controlling or stopping the flow.

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.

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

Diameter	Bib cock	Stop cock	Diameter	Bibcock	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 :

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

M-59. White glazed porcelain wash basin :

Wash basin shall be of white porcelain first quality best Indian make and it shall conform it I.S. 2556 (Part-IV) 1972 and I.S. 771-1979.

The size of the wash basin shall be as specified in the item, Wash basin shall be of one piece construction with continued over-flow arrangements. All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole or two holes as specified. Each basin shall have a circular waste hole which is either rebated or beveled internally with 65 mm. diameter at top and 10 mm. depth to suit the waste fitting. The necessary stud slot to receive the bracket on the under side of the basin shall be provided. Basin shall have an internal soap holder recess which shall fully drain into the bowl.

White glazed pedestal of the quality and colour as that of 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 floor to top of basin 750mm. to 800 mm. as directed.

M-60. European type water closet :

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.

'S' trap shall be provided as required with water seal not less than 50 mm. The solid plastic seat and cover shall be of the best Indian make conforming to I.S. 2548-1980. They shall be made of moulded syntactic materials which shall be tough and hard with high resistance to solvents and shall be free from blisters and other surface defects and shall have chromium plated brass hinges and rubber buffer of suitable size.

M-61. Orissa type water closet :

The specification of Orissa type white glazed water closet of first quality shall conform to I.S. 2556 (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 440 mm. with raised footrest.

M-62. Indian type water closet :

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 ring of suitable type with adequate number of holes alround as directed to have satisfactory flushing. It shall also have inlet at back or front connecting flush pipe 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.

Foot Rests :A pair of white glazed earthen ware rectangular foot rests of minimum size 250 mm. x 130 mm 20 mm. shall be provided with water closet.

M-63. Glazed Earthen Ware Sink :

The glazed earthen-ware sink shall be specified size colour and quality. The sink shall conform to I.S. 771 Part-II-1979 waste coupling of standard pattern with brass chain and rubber plug shall be provided with sink.

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

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

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

M-65. Low level enamel flushing tank :

The low level flushing tank shall be of 15 liters capacity. It shall conform to I.S. 774-1971. The flushing vaster 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 lean pipe or P.V.C. pipe as specified. The flushing tank shall be provided with inlet and outlet for fixing G.I. inlet pies and over-flow pipes. The flushing castern shall be provided with chromium plated handle for flushing. The flushing tank shall be provided with brackets 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 :

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 outlets shall be connected to lead pipe 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. diameter. 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 :

Half turn flash 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 :

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

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

The sand 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. and 2 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.

Tolerances.

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

Sr. no.	Nominal	Thickness	Overall Weight of pipe excluding ears		
			1.5 m. long	1.8m. long	2.m. long
1.	75 mm.	50 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.

A tolerance upto minus 15 percent in thickness and 20 mm. in length will be allowed. For fittings tolerance in lengths shall be plus 15 mm. and minus 10 mm.

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 tolerances in weights and thickness shall be the same as for straight pipes.

M-69. Nahni Trap :

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, ships and other flaws or any other kind of defects which affect serviceability. The size of nahni trap shall be as specified and shall be of self cleaning design.

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

The Nahni trap provided shall be with deep seal, minimum 50 mm, except at places where trap with deep seal can not be accommodated. The cover shall be cast iron. Performed cover shall be provided on the trap of appropriate size.

M-70. Gully Trap :

Gully Trap shall conform to I.S. 651-1980. It shall be sound, free defects such as fire 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.

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

Each gully trap shall have one C.I. gratings 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 dimension, 300 mm. 300 mm., the cover 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. Glaze Stone Ware Pipe And Fitting :

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, shall be smooth and perfectly glazed. The pipe shall be capable to withstand pressure of 1.5 mm. 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 1 mm. around the pipe.

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

M-72. Wall Peg Rail :

The aluminum wall peg rail shall have three aluminum pegs of approved quality and size. It shall be fixed on teakwood plant 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 :

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.

The pipe shall have length as required for the thickness of wall in which it is fixed. and at the outside end tee and 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 drawings or as directed.

M-74. Asbestos Cement Pipe (A.C. Pipe):

The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. 1626-1980. Specials like bends, shoes cowl, etc. shall conform to relevant Indian Standards. The interior of pipe shall have a smooth finish, regular surface and regular, internal diameter. The tolerance in all dimensions shall be as per I.S. 1626-Part-I 1980.

M-75. Crydon Ball valve :

Ball valve of screwed type including polyethylene float and necessary lever 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 :

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

M-77 Selected Earth :

The selected earth shall be that obtained from excavated material or shall have to be brought from outside as indicated in the item. If item does not indicate anything, The selected earth shall have to be brought from outside.

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 suitable 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 as not to interfere with any constructional activities and in proper stacks.

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 :

The barbed wire shall be of galvanised steel and it shall generally conform to I.S. 278-1978. The barbed wire shall be of type-I whose nominal diameter for line wire shall be 2.5 mm. and point wire 2.24 mm. The nominal distance between two bars 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 spacings 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.

The barbs shall carry four points shall be formed by twisting two point wires each two turns, lightly round one line wire, making altogether four complete turns. The barbs shall be so finished that the four points are set and locked at right angles to each other. The barbs shall have a length of not less than 13 mm. and not more than 13 mm. and not more than 18 MM. The points shall be sharp and cut at an angle not greater than 35 degree of the axis of the wire forming the barbs.

The line and point wire shall be circular section free from scale and other defects and shall be uniformly galvanised. The line wire shall be in continuous length and shall not contain any weld other than those in the rod before it is drawn. The distance between two successive splices shall not be less than 15 meters.

The lengths per 100 Kg. of barbed wire I.S. type I shall be as under

Nominal 1000 meter Minimum 834 Meter Maximum 1066 Meter.

M-79. Tensile Structure Fabric:

When architects and designers approach us with a tensile fabric structure idea, sometimes they know what type of fabric they want, other times, they look to us for direction. This article provides an overview on the fabrics we design & build with. Today's fabrics are innovative, allowing you to create iconic spaces.

A coated structural fabric consists of a woven base cloth stabilised and protected by a coating on both sides. The base cloth consists of warp threads running the length of the roll and weft threads running across the width.

A mesh fabric is a coated cloth with spacing between the thread bundles. With some meshes for interiors use the threads are coated before weaving.

A typical structural fabric would have a tensile strength of 10 tonnes in the warp and weft direction. A factor of safety of 6 on a maximum design loads is used select a cloth although this may be reduced if the circumstances are well understood ie. if the maximum strength of the membrane is 10 tonnes/linear metre the maximum permissible load would be 1.7 tonnes/metre, and the typical pre-stress load would be 150-350kg/metre.

SECTION-4 DETAILED SPECIFICATIONS-EXCAVATION

1.0 Removing and scraping of old deteriorated plaster of any thickness from wall / R.C.C member including stacking of serviceable material and disposal of unserviceable from site of work with all lead and lift

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

2.0 Demolition of Brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift.(ii) In Cement Mortar.

The rate shall be for a unit of one cu.mt

3.0 (a) Excavation for foundation upto 1.5 M depth including sorting out and stacking useful materials disposing of the excavated stuff upto 50 meter lead in loose or soft soil.

1.0. General :

- 1.1. Any soil which generally yields to the application of axes and shovels, pickaxes, rakes or any such ordinary excavating implement or organic soil, gravel silt, sand, 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 removed as directed. The materials so obtained shall be property of the Government and be conveyed and stacked as directed. within 50 M. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.
- 2.2. The rate of site clearance is deemed to be included in the rate of earth work for which no extra will be paid.
- 2.0 **Setting Out :** After clearing the site, the center lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the work. Contractor shall supply laborers, materials, etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.
- 4.0 **Excavation :** The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own-cost. The payment for such precautionary measures shall be paid separately if not specified. The bottom of the excavated area shall be 1 m. evened both longitudinally and transversely. as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if mistake or any other reason excavation is made. deeper or wider than shown on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation up to 1.5 m. depth shall be measured under this item.
- 5.0 **Disposal of the excavated stuff :**
- 5.1 The excavated stuff of the selected type shall be used in filling the trenches and plinth or leveling the ground in layer including ramming and watering etc.
- 5.2 The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead up to 50 M. and all lift.
- 6.0. **Mode of measurement and payment :**
- 6.1 The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge. No payment shall be made for surplus excavation made in excess of above requirements or due to slopping and sloping back as found necessary on account of conditions of soil, and requirements of safety.
- 6.2 The rate shall be for a unit of one cubic meter.
- 4.0 **(A) : Excavation for foundation for depth from 1.50 M. to 3.0 M. including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 M. in lead-loose or soft soil.**
- 1.0. **Workmanship :**
- 1.1. The relevant specifications of item No. 4.0.0.(A) shall be followed except that the excavation work shall be carried out in loose or soft soil with lift 1.5 M. to 3.0 M.
- 2.0. **Mode of measurement and payment :**
- 2.1. The relevant specification of item No. 4.0.0. A() shall be followed.

- 2.2. The excavation work of lift 1.5 M. to 3.0.M. shall be measured under this item.
- 2.3. The rate shall be for a unit of one cubic meter.
- 5.0 *Conveyance charges of earth lime, murrum, building rubbish, manure, garbage, sludge, excavated rock, fly ash, aggregate of any kind etc. comp. upto 5 km lead*
Add Item No.5-A,5-B,5-C,5-D,5-E

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

6.0 Filling available excavated earth (excluding rock) in trenches. plinth, sides of foundations etc. in layers not exceeding 20 cm. in depth consolidating each disposed layer by ramming and watering.

Workmanship:

The earth to be used for filling shall be free from salts, organic or other foreign matter. All clods of earth shall be broken. As soon as the work in foundation has been completed and measured, the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc; and filled with earth in layers not exceeding 20 Cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the butt ends of crow-bars, where rammer cannot be used. 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. The finished level of filling shall be kept to shape intended to be given to floor. 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. The excavated stuff of the selected type shall be allowed to be used in filling the trenches and plinth. Under no circumstances black cotton soil be used for filling the plinth.

Mode of measurement and payment:

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

7.0 Filling in plinth with sand under floors including watering, ramming consolidated and dressing etc. complete.

1.0 Materials:

1.1 Sand shall conform to M. 6.

2.0 Workmanship:

2.1 The relevant specifications of item No. : 4.12 shall be followed except that sand shall be filled in under floors, including watering, ramming, consolidation and dressing etc. complete.

3.0 Mode of measurement and payment :

3.1 The relevant specifications of item NO. 4.12 shall be followed.

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

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

8.0 *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 shall be clean, of good binding quality, and of approved quality obtained from approved pots/quarries of disintegrated rocks which contain silicones materials and natural mixture of clay of calcareous origin. The size of murrum shall not be more than 20 mm.

2.0. Workmanship:

2.1. The relevant specifications of item No. 4.12 shall be followed except that the murrum or selected soil shall be filled in foundation and plinth in 20 cms. layers including consolidating, ramming, watering, dressing etc. complete.

3.0. Mode of measurement and payment :

3.1. The relevant specifications of item No. 4.12 shall be followed.

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 cubic meter.

9.0 *Add extra for Disposing off the excavated stuff of above items for lead of (E) 400 to 500 m*

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

10 **Carring out plinth treatment to post construction / existing structure by sprayingchemical solution for termite control treatment including labour and material consistment with I.S.I specification. Using Chlordene and Chiorpurfiles 20 EC. As Per 6131_paret-II Consentration Weight one percent is recommended i.e one litre 20 EC chemical emulsion with 19 liter give 1 % concenteration\ inclusive of one litre chemical emulsion appication at the rate of 5 Litre chemical / Sqm of surface is recommended as per I.S**

Providing and injecting Chemical emulsion for pre constructional anti-termite treatment for all types of structure with / without basement with RCC foundation/RCC wall or with load bearing walled foundation or developing areas tree pits, water body etc. The chemical used shall be chloropyriphos (1:19) / Biflex TC / lindane or equivalent as per approved make as per latest IS code no 6313 (Part II) . Plinth area in plan at GF shall only be measured and paid. A guarantee bond of 10 years shall be furnished. Rate shall be inclusive of material required for Anti Termite Treatment and labour for applying.a) Bottom surface and the sides of the excavation made for masonry foundations at the rate of 4 liters/ of surface area (wherever applicable).b) At the rate of 7.5 liter/ Sq.m. of surface area to the backfill at the depth of 500mm below the original ground level. The soil in the immediate contact with the vertical surface of RCC column shall be treated.c) Top surface of the plinth filling at the rate of 5 liter/Sq.m. of internal plinth area etc. complete.d) Internal vertical surface from original Ground level to top of the earth filled in the plinth at the rate of 7.5 liter/Sq.m. of surface area in contact.e) at the rate of 7.5 liter/ Sq.m. to the external vertical surface below finished Ground level to the full depth of the filling complete by injecting chemical after drilling the holes of 12 to

15mm dia, with depths of approx. 300 to 600 mm and at 150mm centre to centre and as close to the wall as possible.f) All holes for electrical data, water supply, drainage etc. shall be treated.

Material:The material shall be same as per item

Workmanship:

The chemical barrier shall be complete and continuous under whole of the structure to be protected. The treatment shall be done as per the PCI specifications. Treatment for building shall start after the excavation is complete and before layingsoling and PCC the surface should be quite dry. The treatment shall be carried out in the following stages:

Treatment to soil below raft:

The soil in the raft shall be compacted and leveled with mechanical rollers.The procedure of the same is covered in the relevant item no. The surface of earth shall be treated with emulsion at the rate of 5 liters per sq. m. The treatment shall be done before laying rubble soling and PCC.

Treatment to soil along the retaining wall:

The soil along the retaining wall shall be treated at the rate of 5liter per sq. m. The treatment shall follow the backfilling which shall be done in layers of 30 cms. Rodding shall be carried out to facilitate the absorption of the chemical emulsion.

b) At the rate of 7.5 liter/ Sq.m. of surface area to the backfill at the depth of 500mm below the original ground level. The soil in the immediate contact with the vertical surface of RCC column shall be treated.

c) Top surface of the plinth filling at the rate of 5 liter/Sq.m. of internal plinth area etc. complete.

d) Internal vertical surface from original Ground level to top of the earth filled in the plinth at the rate of 7.5 liter/Sq.m. of surface area in contact.

e) at the rate of 7.5 liter/ Sq.m. to the external vertical surface below finished Ground level to the full depth of the filling complete by injecting chemical after drilling the holes of 12 to 15mm dia, with depths of approx. 300 to 600 mm and at 150mm centre to centre and as close to the wall as possible.

f) All holes for electrical data, water supply, drainage etc. shall be treated. Treatment of soil surrounding pipes, wastes and conduits etc. shall be treated.

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 is wet with rainwater or sub soil water. Once formed, treated soil barriers shall be not disturbed. If disturbed, immediate steps shall be taken to restore the continuity and compactness of the barrier system. Reconciliation of chemicals brought on site and used for treatment shall be submitted on completion of job. The treatment against termite infection shall remain effective for a period not less than 10 years, from date of issue of the final certificate of 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 rectify the concerned defects within 15 days on receipt of notice from Engineer-in-charge. On Contractor's failure to do so, the Engineer-in-charge may get the same rectified through any other agency at the Contractor's risk and cost, and the decision of Architect or Engineer-in-charge as to the cost payable by the Contractor for the same shall be final and binding to the Contractor. A guarantee bond on (Rs. 100/-)One Hundred Rupees/ as per instruction stamp paper shall be given by the Contractor to the Government, in the manner form described below

FORM OF GUARANTEE BOND

"I/We(Contractor) hereby guarantee that work will remain unaffected and will not be in any way damaged by termite or any other germs of similar types, for a period of 10 years after completion of the work of anti-termite, as per the terms and conditions of the contract and the Contractor hereby indemnifies and agrees to save the Government from any loss and or damage that might be caused on account of termite and or other similar type of germs and hereby guarantees to make good any loss or damages suffered by the Government and further guarantees to redo the affected work without claiming any extra cost."This guarantee shall remain 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. The deposit at the rate of 50% of the cost of this item from the running and final bills shall be recovered and retained for the first one year after virtual completion of the work.

Mode of Measurements and Payment:

The plan area at Plinth level / Ground floor shall be measured and paid. No deduction shall be made nor extra paid for any opening for pipes, etc., upto 0.1 m². The rate shall include the cost of all labour and materials required for the operation involved for satisfactory completion of this item. The rate shall be for a unit of one m².

11. **(A) Providing and laying cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregates 40 mm. nominal size) and curing complete excluding the cost of form work in foundations and plinth.**
 - 1.0. **Materials :**
 - 1.1. Water shall conform to M-1. Sand shall conform M-6. Cement shall conform to M-3. Stone aggregate 40 mm. nominal size shall conform to M-12.
 - 2.0. **Workmanship :**
 - 2.1. **General :**
 - 2.1.1. Before starting concrete bed of foundation treaches shall be cleared of all loose materials, leveled, watered, and rammed as directed.
 - 1.1. **Proportion of Mix :**
 - 1.1.1. The proportion of cement, sand and coarse aggregate shall be one part of cement, 3 parts of sand, 6 parts of stone aggregates and shall so measured by volume.
 - 1.2. **Mixing :**
 - 1.2.1. 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 incase of break-down of machinery's 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 cases 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period 1 to 2 minutes. The quantity of water shall be sufficient to produce a dense concrete of required workability for the purpose.

1.3. Transporting & Placing the concrete :

1.3.1. The concrete shall be handled 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.

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

1.4. Compacting :

1.4.1. 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.

1.5. Curing :

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

2.7. Mode of measurement and payment :

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

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

11 *Providing and laying controlled cement concrete M.250 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, Base of columns and Mass concrete..*

1.0 Materials & Workmanship:

2.0 The relevant specifications of item No. 5.8.3 shall be followed for controlled concrete work for the work as specified in the item for M-250 and the relevant R.C.C. *Foundations, footings, Base of columns and Mass concrete..*

3.0 Mode of measurement and payment:

3.1 The relevant specifications of item no. 5.8.3 shall be followed except that the cost of form work finishing and centering shall be included in the item. The rate shall be for a unit of one cubic meter.

13 *Providing and laying controlled cement concrete M.250 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in © Slabs ,landing ,shelves ,Balconies, Lintels, Beams, Girders and Cantilever up to floor two level.*

4.0 Materials & Workmanship:

The relevant specifications of item No. 5.8.3 shall be followed for controlled concrete work for the work as specified in the item for M-250 and the relevant *Slabs, landing, shelves, Balconies, Lintels, Beams, Girders and Cantilever up to floor two level*

5.0 Mode of measurement and payment:

- 5.1** The relevant specifications of item no. 5.8.3 shall be followed except that the cost of form work finishing and centering shall be included in the item.
The rate shall be for a unit of one cubic meter

- 14** *Providing and laying controlled cement concrete M.250 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in (D) Columns, Pillars posts and struts, upto floor two level.*

6.0 Materials & Workmanship:

The relevant specifications of item No. 5.8.3 shall be followed for controlled concrete work for the work as specified in the item for M-250 and the relevant *Columns, Pillars posts and struts, upto floor two level.*

7.0 Mode of measurement and payment:

- 7.1** The relevant specifications of item no. 5.8.3 shall be followed except that the cost of form work finishing and centering shall be included in the item.
The rate shall be for a unit of one cubic meter

- 14** *Providing and laying controlled cement concrete M.250 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in (B) Walls, from top of foundation level upto floor two level*

8.0 Materials & Workmanship:

The relevant specifications of item No. 5.8.3 shall be followed for controlled concrete work for the work as specified in the item for M-250 and the relevant *Columns, Pillars posts and struts, upto floor two level.*

9.0 Mode of measurement and payment:

- 9.1** The relevant specifications of item no. 5.8.3 shall be followed except that the cost of form work finishing and centering shall be included in the item.
The rate shall be for a unit of one cubic meter

16. Providing TMT Bar FE 500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level.

1.0 Materials :

- 1.1** Mild steel bars shall conform to M-18. Mild steel binding wires shall conform to M-21.

2.0 Workmanship:

- 2.1** The work shall consist of furnishing and placing reinforcement to the shape and dimensions shows as on the drawings or as directed.
- 2.2** Steel shall be clean and free from rust and loose mill scale at the time of fixing in position and subsequent concreting.
- 2.3** Reinforcing steel shall conform accurately to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed using a proper bar bender,

operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending. Unless otherwise specified, a 'U' type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the round bar and the length of straight part of the bar beyond the end of the curve shall be at least four times 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 splitting of the concrete.

- 2.4** All the reinforcement bars shall be accurately placed in exact position shown on the drawing and shall be securely held in position during, metal hangers, supporting wires or other approved devices at sufficiently close intervals,. Bars shall not be allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall no extend to the surface of concrete, except where shown on drawings. Placing of broken stone or brick and wooden blocks shall not be allowed. Pieces of broken stone or brick and wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices. reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cover shall be provided as indicated on drawings. All the bars producing from concrete and to which other bars are to be spliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.
- 2.5** Bars crossing each other where required shall be secured by binding wires (annealed) of size not less than 1 mm in such manner that they do not slip over each other at the time of fixing and concreting.
- 2.6** As far as possible, bars of full length shall be used. In case this is not possible, overlapping of bars shall be done directed. When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm or 1.25 mm times the maximum size of the coarse aggregate whichever is greater by concrete between them. Where not feasible, overlapping bars shall be bound with annealed wires not less than 1 mm thick twisted tight. The overlaps shall be staggered for different bears and located at points along the span where neither shear nor bending movement is maximum.
- 2.7** Whenever indicated on the drawings or desired by the Engineer-in-charge, bars shall be joined by couplings which shall have a cross-section sufficient to transpit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than normal cross-section of the bar. Threads shall be standard threads. Steel for coupling shall conform to I.S. 226
- 2.8** When permitted or specified on the drawings, joints of reinforcement bars shall be butt-welded so as to transmit their full stresses. Welded joints shall preferably be located at points 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 from the molten metal and conforms to any or all 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 the bars shall be cleaned of all loose scale, rust, grease, paint and other foreign matter before welding. Only competent welders shall be employed on the work. the M.S. electrodes used for welding shall conform to I.S. 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.

3.0 Mode of measurement and payment :

3.1 For the purpose of calculation consumption , wastage shall not be permitted beyond 5 percent . Excess consumption over 5 % will be charged at penal rate

1.1 Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the works. Where welding or coupling is resorted to in place of lap joints such joints shall be measured for a pimento 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 basic of as per M-18 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.

1.2 The rate shall be for a unit One Kg

16 *Providing formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc. Height of propping and centering below supporting floor to ceiling not exceeding 4 M. and removal of the same for in situ reinforced concrete and plain concrete work in. (A) Foundations Footings Bases of Columns etc. and Mass concrete*

10.0 Materials & Workmanship:

The relevant specifications of item No. 9.1 shall be followed for *formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc.*

11.0 Mode of measurement and payment:

11.1 The relevant specifications of item no. 9.1 shall be followed except that the cost of form work finishing and centering shall be included in the item.

The rate shall be for a unit of Sq. meter

18 *Providing formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc. Height of propping and centering below supporting floor to ceiling not exceeding 4 M. and removal of the same for in situ reinforced concrete and plain concrete work in. (B) Flat surfaces such as soffits of supspened floors slabs Landings and the like. (1) Floors etc. upto 200 mm in thickness.*

12.0 Materials & Workmanship:

The relevant specifications of item No. 9.1 shall be followed for *formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc..*

13.0 Mode of measurement and payment:

- 13.1** The relevant specifications of item no. 9.1 shall be followed except that the cost of form work finishing and centering shall be included in the item.
The rate shall be for a unit of Sq. meter
- 19** *Providing formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 M. and removal of the same for in situ reinforced concrete and plain concrete work in. (G) Columns Pillars Posts and struts. (1) Square Rectangular Polygonal in plan.*
- 14.0 Materials & Workmanship:**
- The relevant specifications of item No. 9.1 shall be followed for *formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc.*
- 15.0 Mode of measurement and payment:**
- 15.1** The relevant specifications of item no. 9.1 shall be followed except that the cost of form work finishing and centering shall be included in the item.
The rate shall be for a unit of Sq. meter
- 19** *Providing formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 M. and removal of the same for in situ reinforced concrete and plain concrete work in. (H) (2) Sides and soffits of Beams Beam Haunchings cantilevers Girders Brackets and Lintels exceeding 1M.in Depth..*
- 16.0 Materials & Workmanship:**
- The relevant specifications of item No. 9.1 shall be followed for *formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc.*
- 17.0 Mode of measurement and payment:**
- 17.1** The relevant specifications of item no. 9.1 shall be followed except that the cost of form work finishing and centering shall be included in the item.
The rate shall be for a unit of Sq. meter
- 21** *Providing formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc. height of propping and centering below supporting floor to ceiling not exceeding 4 M. and removal of the same for in situ reinforced concrete and plain concrete work in. (C) Vertical surface such as walls (any thickness) partitions and the like including attached buttresses & string course & the like.*
- 18.0 Materials & Workmanship:**
- The relevant specifications of item No. 9.1 shall be followed for *formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc.*

19.0 Mode of measurement and payment:

- 19.1** The relevant specifications of item no. 9.1 shall be followed except that the cost of form work finishing and centering shall be included in the item.
The rate shall be for a unit of Sq. meter

22 *Brick work using common burnt clay building bricks having crushing strength not less than 35 Kg/Sq. Cm. in foundations and plinth in cement mortar 1:5 (1 cement : 5 fine sand) conventional bricks,*

- 1. Materials:** Cement mortar of proportion 1:5 shall conform to M-11. Conventional bricks shall conform to M-15
- 2. Workmanship:** The relevant specifications of item No. 6.12(A) shall be followed except that the masonry work shall be carried out by using conventional bricks.

3.0 Mode of measurements and payment:

- 3.1** The relevant specifications of item No 6.12 shall be followed.
- 3.2** The rate shall be for a unit of one cubic meter.

23. *Half brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg/Sq. Cm. in cement mortar 1:4 (1 cement : 4 coarse sand) or super structure above plinth level up to floor two level with conventional bricks.*

1.0 Materials & Workmanship:

- 1.1** The relevant specifications of item No. 6.30(A) shall be followed for bricks, wetting of bricks, joints, curing , except that the bricks to be used shall be conventional bricks instead of modular bricks.

2.0 Mode of measurements and payment :

- 2.1.** The limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over specified dimensions shall be ignored.

23 *Providing 15mm thick cement plaster in single coat on Rough (Similar) side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (ii) Cement mortar 1:4 (1-cement :4-sand)*

Materials & Workmanship :

- 1.1** The relevant specifications of item no. 17.84 (I) shall be followed except that the proportion of mortar is C.M. 1:4

2.0 Mode of measurements & payment :

- 2.1** The mode of measurements and payment shall be the same as for item no. 17.58 (I).
The rate shall be for a unit of one sq. metre

24 *10 mm. cement plaster in single coat on fair side of brick/concrete walls for interior plastering upto floor two level and finished even and smooth in C.M. 1:4.*

25 Materials & Workmanship :

- 25.1** The relevant specifications of item no. 17.84 (I) shall be followed except that the proportion of mortar is C.M. 1:4 instead of C.M. 1:3.

Mode of measurements & payment :

- 25.2** The mode of measurements and payment shall be the same as for item no. 17.58 (I).
- 25.3** The rate shall be for a unit of one sq. metre.

- 26** *20 mm. thick cement plaster in single coat on rough side of single or half brick wall for interior plastering upto floor two level, finished even and smooth in cement mortar 1:4 1 cement : 4 sand).*
- 1.0** **Materials & Workmanship :**
- 1.1** The relevant specifications of item no. 17.59 (II) shall be followed except that the thickness of plastering shall be 20 mm in C.M. 1:4.
- 2.0** **Mode of measurements & payment :**
- 2.1** The relevant specifications of item no. 17.59 (I) shall be followed.
- 2.2** The rate shall be for a unit of one sq. metre.
- 26** *Providing 20 mm thick water proof cement plaster using water proofing powder 1Kg/1bag of cement for all floors on brick / concrete wall work using water proofing materials in C M 1: 4 (1 cement 4 coarse sand) including finishing with a floating coat of neat cement slurry etc complete for all floor. and shall be guaranteed for minimum period of 10 years after handing over the completed building by the main contractor to be finished as directed. Stamp paper guarantee 10 years to be furnished before receiving any payment from the client.*
- 27** **Workmanship :**
- 27.1** **Curing :** The curing shall be started overnight after finishing of plaster. The plaster shall be kept for a period of 7 days. During this period, it shall be protected from all damages.
- 28** **Mode measurements & payment :**
- 28.1** The rate shall be for a unit of one sq. metre.
- 27** **Providing and applying approved coloured chips 20mm thick STONE CREAT PLASTER for exterior / interior side on wall up to full height from ground level consisting of 12mm thick backing coat of CM 1:3 (1 cement : 3 Bodeli sand) and 8mm thick finishing coat of CM 1:1 (1 cement (Grey / White / Colour : 1 stone grit (approved coloured chips)) including providing & fixing 300mm wide strip of chicken net at vertical and horizontal joints of RCC and masonry including 10mm aluminium channel for expansion joint / grooves, curing, necessary scaffolding in true line and level etc. complete as directed by EIC.**
- 3.0** **Materials & Workmanship :**
- 3.1** The relevant specifications of item no. 17.59 (II) shall be followed except that the thickness of plastering shall be 20 mm in C.M. 1:4.
- 4.0** **Mode of measurements & payment :**
- 4.1** The relevant specifications of item no. 17.59 (I) shall be followed.
The rate shall be for a unit of one sq. metre
- 28** *Providing and laying Ceramic tiles 6mm thick in flooring treads of steps and landing laid on a bed of 12mm thick cement mortar 1:3 (1-cement : 3- coarse sand) finishing with flush pointing in white cement.*
- 1.0** **Materials :** The ceramic Material is Confirme.
- 2.0** **Workmanship:**
- 2.1** The shall be prepared as per the drawings or as directed for fixing
- 3.0** **Made of measurement and payment:**
The rate shall be for unit of one Sq.mt

- 29 *Providing and laying Ceramic tiles 6mm thick in skirting risers of steps and dedo on 10mm thick cement plaster 1:3 (1 cement : 3-coarse sand) and jointed with white cement slurry*
- 4.0 **Materials :** The ceramic Material is Confirme.
- 5.0 **Workmanship:**
- 5.1 The shall be prepared as per the drawings or as directed for fixing
- 6.0 **Made of measurement and payment:**
The rate shall be for unit of one Sq.mt
- 31 *Providing and fixing cast iron steps of size 500mm x 150mm x 22.5mm and painting with two coats of Anti-corrosive paint etc. complete.*
- 7.0 **Made of measurement and payment:**
The rate shall be for unit of Each
- 32 *Providing upto floor two level precast cement concrete jali or grill 1:2:4 mix (1- Cement : 2- coarse sand : 4-graded stone aggregate 6mm nominal size) reinforced with 1.6 mm dia. Mild steel wire including roughening, cleaning, fixing and finishing in cement mortar 1:3 and curing complete. (A) 50mm thick*
- 8.0 **Made of measurement and payment:**
The rate shall be for unit of one Sq.mt
33. *P & L 24" x 24" vitrified 8 mm thick tile flooring over 20 mm (average) base of cement mortar 1:6 (1 cement: 6 coarse sand) on new surface or fixing on existing flooring by adhesive material including dismantling of existing flooring and jointed with color cement slurry including finised with flush pointing & cleaning the surface etc. complete for antiskit*
- 9.0 **Materials :** The 24" X 24" Material is Confirme.
- 10.0 **Workmanship:**
- 10.1 The Vitrified Tile shall be prepared as per the drawings or as directed for fixing
- 11.0 **Made of measurement and payment:**
The rate shall be for unit of one Sq.mt
- 33 *Providing and laying white glazed tiles 6mm thick in skirting risers of steps and dedo on 10 mm thick cement plaster 1:3(1-cement :3-coarse sand)and jointed with white cement slurry*
- 12.0 **Materials :** The 24" X 24" Material is Confirme.
- 13.0 **Workmanship:**
- 13.1 The Vitrified Tile shall be prepared as per the drawings or as directed for fixing
- 14.0 **Made of measurement and payment:**
- 14.1 The rate shall be for unit of one Sq.mt.
- 34 *Kota stone slab (Polished, Kota stone slab) flooring over 20 mm. (average) thick base of cement mortar 1:6 (1 cement : 6 coarse sand) or lime mortar 1:1.5 laid over and jointed with grey cement slurry including rubbing and polishing complete 25 mm. thick.*

35 Materials :

35.1 Water shall conform M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11 polished kota stone shall conform to M-49.

36 Workmanship :

36.1 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 plain surface. The thickness shall be 25 mm. (Average) as specified in the item but not less than 20 mm. at any place of the slab.

36.2 Bedding for the kota stone slabs shall be cement mortar 1:6 (1 cement : 6 coarse sand) or L.M. 1:1.5 of average thickness 20 mm. as given in the description of the item. Sub grade shall be cleaned, wetted and mopped. Mortar of the specified mix and thickness shall be then be spread on an area sufficient to receive one 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 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 place in position and tapped with wooden mallet till it is properly pedded 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 wall shall enter not less then 10 mm. under the plaster skirting or dado. The junction between the wall floor shall be finished neatly. The finished surface shall be true to levels and slopes as directed.

36.3 The floor shall be kept wet for a minimum period of 7 days. So that bedding and joints set properly.

36.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with ear borundum stones of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone of 220 of 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 polish machine fitted with bobs shall be run over it.

36.5 The holes required for Nahni traps, pipes any other fittings shall be made without any extra cost.

37 Mode of measurements & payment :

37.1 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 metres correct to two places of decimal, length and breadth shall be measured correct to a centimeter and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for any opening in floor of area upto 0.1 sq. mt.

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

36 Providing and fixing M. S. Grills of required pattern to wooden frames of windows frames of windows etc. with M. S. Flats at required spacing and frame alround, square or round bars with round headed bolts and nuts or by screws : Plain Grill.

15.0 Materials : The structural steel shall conform to M-22.

16.0 Workmanship:

- 16.1** The M. S. Grill shall be prepared as per the drawings or as directed for fixing to wooden frames of windows etc.
- 16.2** 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 riveted 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 of screws viz. bolt nut/screw per 30 cm. Of the length of outer strip subject to a minimum of 2 nos. on each side of the frame or as indicated in the drawings or as directed.
- 16.3** 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 frame strips.

17.0 Mode of measurement and payment:

- 17.1** No payment shall be made for weight of screws, bolts, nuts etc. Only weight of grill shall be paid.
- 17.2** The rate shall be for unit of one Kg.

37 Structural steel work (Confirming to IS 4923- 1997) riveted, bolted or welded in builtup for all type sections, in framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete as per the structural designs and directions of Engineer in charge.Column (122 x 61 x 3.6mm)

Materials:

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

Workmanship:

- a. 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 other wise jointed to make up the required length of member, except as indicated in the drawings 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.
- b. Steel riveted or bolted in built up sections, frame work.
 - i. The steel structure as shown in the drawings or as per direction of the Engineer-in-charge shall be laid out one level platform to full scale and to full size or in parts. A steel tape shall be used for measurements to ensure maximum accuracy.
 - ii. 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 template shall be laid on the steel members, and holes of the steel members shall also be marked for cutting. The base of steel columns and the position of Anchor bolts shall be carefully set out.
 - iii. All stiffeners shall be formed by pressure and where practicable, the metal shall not be cut and welded in making these. In major works 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, length and details of rivets, bolts, or weld shall be prepared in advance of the actual fabrication and as approved. The drawings shall indicate the shop and field rivets and bolts.

The steel member shall be 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 twist, knicks, buckles, or open joints. Before making holes individual members for fabrication, the steel work intended to be riveted or bolted together shall be assembled or clamped properly and tightly so as to ensure close abutting or lapping 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 dressed true and straight and fitted close together.

Web splice plates and flanges under stiffeners shall be cut to fit within 3 mm or flange angles, web plates of girders shall have not 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 more than 6 mm.

The erection, clearance for cleared ends of members connecting steel to steel shall preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall be more than 3 mm at each end but where for a practical reason greater clearance is necessary, suitably designed seating shall be provided.

Pins and rollers shall be accurately turned to gauge. These shall be straight and smooth and free from flaws. The roller bearing shall be provided with adequate arrangement 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 machined or ground to fit tightly both at the top and bottom. All holes shall generally be drilled to the required size and at the required position. Sub punching shall be permitted, provided it is done 3 mm or less in diameter and remade 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 up on the diameter of rivets.

Holes shall have their axis perpendicular to the surface bored through. The drilling or reamering shall be free from butts, 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 connection 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 of stresses.
- iv. **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 together 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 the hole thoroughly and from 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. Riveting 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 members firmly. In cutting out rivets, care shall be taken so as not to injure the assembled, members, caulking or recouping shall not be permitted.

For testing rivets, hammer weighing approximately 0.25 kg. shall be used 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.

- v. Bolting 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 the nuts, when fixed in position and these shall fit 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 they 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 bolts shall not be within the thickness of the parts bolted together. The faces of the bolt 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 steelwork shall be painted with a coat of priming coat of red lead, as per relevant specifications of painting.

Mode of measurement and payment:

- c. The steelwork 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 strips in finished work shall be calculated from standard weight on the same basis on which steel is supplied to the 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 7.85 kg/sq. meter for every millimeter sheet thickness if steel is supplied by the contractor, otherwise the weight shall be calculated on the basis on which steel is supplied to the contractor by department.
 - (d) Unless otherwise specified weight of clearest, brackets, packing pieces, bolts, nuts, washers, distance pieces, separators, diaphragm gusset (taking over all square dimensions) fish plates etc. shall be added to the weight of respective items.

- (e) In riveted work allowance to be made of weight of rivet heads. No deductions shall be made for rivet or bolt holes excluding holes for anchor or holding down bolts.
- (f) For forged steel and steel casting weight shall be calculated on the basis of 850 kg/cum.
- (g) Unless otherwise specified an additional of 2.5 percent of the weight of structure shall be made for shop and site rivet heads in riveted steel structure.
- (h) Unless otherwise specified no allowance shall be made for the weld metal in case of welded steel structure.
- (i) Dimensions other than cross sections and thickness of plates shall be measured to nearest 0.001 m
- (j) Mill tolerance shall be ignored when weight is determined by calculation.
- d. 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 included conveyance and delivery handling, loading, unloading and storing etc. required for completing the item described above including necessary wastage involved.
- e. The rate shall be for a unit of one Kg.

38 Providing and fixing of Self Supported Structure Less PROFLEX Roofing systems by M & B Engineering Ltd or equivalent with proper overlapping and seaming b/w different sheets without making holes or preventing the overturning the roof by wind addition made up from superior quality, structural grade steel. Base metal width 912 mm, Steel Grade : Grade D and Thickness 0.80 mm BMT, 0.85 mm APT with tolerance of +/- 0.04 mm, Regular Modified Polyester Imported Color Coated Galvalume Steel having Profiled width of 625 mm +/-10mm. Design, supply, & fabrication of self supported single span arch roof fabricated from mechanically seamed manufactured by American Hydraulic Machines to profiles of Imported Galvalume Cold Rolled Structural Steel coils as per standard ASTM A792, Steel Sheet, Aluminum-Zinc Alloy Coated by Hot-Dip Process, Alloy Coating AZ-150(Aluminium-55%, Zinc-43.5% & Silicon 1.5%), Yield strength: 350 MPa, Paint coating: Regular modified polyester, Top coat of painting: 25 micron minimum (colour 20 micron and primer 5 micron). Bottom coat of painting: 12 micron minimum (colour 7 micron and primer 5 micron) using make of ThyssenKrupps, Germany/Dongbu Steel Co. Limited, Korea/ Corus Steels, U.K./ Union steel(Dongkuk) Korea/ Yjeh phuf Enterprises Ltd. Taiwan roofing systems including corrugation from single piece raw material eliminating overlaps ridges & making leak proof water tight structure. The work should be carried out by specialize and approved agency only. The rate of item is including fitting as per standard specification.

1.0 Materials: Proflex. sheets shall conform to.

2.0 Mode of measurements & payment :
The rate shall be for a unit of one sq. metre.

43. Providing and fixing standard extruded of aluminium section of size 63mm x 38.10mm x 1.2mm @ Wt. 0.643 Kg/mt with colour anodized aluminium frame for ventilation with 5 mm thick frosted glass as details etc complete for Ventilation

3.0 Mode of measurements & payment :

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

- 45 Providing and fixing flush door both sides laminated and I.T.W. beading all around by using I.T.W. frame 120 m.m. x 80m.m.. 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 30m.m.x30m.m.etc. as per architectural detailed drawing and as directed by engineer in charge.

1.0 **Materials:** Wood in frames shall conform to M-29

2.0 **Workmanship:**

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

2.2 **Frames:**

2.2.1 All members of the frames shall be exactly at right angles. The right angle shall be checked from inside surface of the respective members.

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

2.2.3 Frame shall have dovetail joints. When clerestory windows are included, it shall be provided by having full length one piece post for door or windows and clerestory window extending the frame on top at the head to the required extent. Horns shall not be provided in the head of the frame. When No. still are provided the vertical posts of the frame in the ground floor shall be embedded in the sill masonry for 10 cm in upper floors, their vertical posts shall be fixed in the floor or masonry by forming notches 10 mm deep. Slight adjustment spacing as necessary shall be done to have the hold fasts in the joints of masonry course. The frame shall be created in position and held plumb with strong support from both sides and built in masonry as it is being built. The transom shall be through tenoned in to the mortices of the jamb post to the full width of the jamb post and the thickness of the tenon shall be not less than 15 mm.

2.3 **Tolerance:** Unless specially mentioned otherwise tolerance of ± 1.5 mm shall be allowed for each wrought face.

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

2.5 The contact surface of tenon and mortice shall be treated before putting together with an adhesive of approved make.

2.6 Minimum number of three hold fasts shall be fixed on each side of door and windows frames, one at the center point and the other two at 30 cm from the top and the bottom of the frames. In case of windows and ventilators frames whose height is less 1 M two hold fasts on each side shall be fixed at quarter points of the frames. The size of each hold fast shall be 300 x 25 x 6 mm and of mild steel with split end. The hold fast shall be fixed with screws to frames.

- 2.7 Mild steel hold fasts shall be protected with a coating of coal asphalt tar. The surface of frame abutting the masonry or concrete faces shall be properly treated by applying a coat of approved coating.
- 3.0 **Mode of measurements & payments:**
- 3.1 The linear dimensions shall be measured correct up to 1 cm. The quantity shall be worked out correct to 2 places of decimals of a Cu. m.
- 3.2 The rate shall be for a unit of 10 cu dia.
-
- 46 **Providing and fixing FRP frame size 125x65 mm and 35mm thick FRP shutter with wood grain raised paneled design finish shutter having extra reinforcement on sides & edges in Gel coat finish. The core of the shutter & frame is to be filled up with injected polyurethane foam done in situ alongwith embedded wooden pieces for stiffening & also taking hinges & finiturs. The whole FRP frame & shutter is to be water proof weather proof, termite proof & resistance to mild acid/alkali. Rates are to be inclusive of S.S hinge with fastener sleeve & alluminium fixtures & fastenings.**
-
- 5.0 **Mode of measurements & payment :**
The rate shall be for a unit of one sq. meter
- 47 **Providing & Laying M200 grade concrete trimix using P21 (water reducing concrete admixture at 100 ml per bag of cement & recon 3 s fiber at 125 gm per bag of cement including carrying out vaccum dewatering and power floater treatment in floors well compacted mechanically vibrated finish to require levels making C channel 75 x 75 mm required to maintain level slope and thickness of the concrete road leveling of placed concrete with surface vibrator and finishing with power floater & trowel light brooming the surface & including cutting & filling of expansion joint as directed by Engineer in charge**
-
- (iii) **Mode of measurements & payment :**
(a) The rate shall be for a unit of one sq. metre
-
- 48 **Providing and laying rubble soling, 23 cm thick, in a compact manner, foundation, road, footpath etc. using 200 to 230 mm. cut size stones, covering and levelling the surface with a layer of murrum after filling the voids with smaller sized stones or stone chips, including watering, ramming well and consolidating each layer, as directed**
- (iv) **Mode of measurements & payment :**
(a) The rate shall be for a unit of one Cubic metre
-
- 49 *Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30cm length,30cm height and 15cm thick of M250 grade concret as per approved design and including excavation for fixing in proper line and level,filling the joint with C:M 1:3 (1cement:3fine sand) etc complete*
-
- 6.0 **Materials:**
- 7.0 **Precast C.C. Block:** (1) Water shall confirm to toM-1, (2) Cement shall conform to M-3, (3) Sand shall conform to M-6, (4) Mortar shall conform to M-

11, (5) Aggregates shall conform to M-12, (6) Shuttering shall conform to M-26.

8.0 Construction of Precast C.C. Block:

9.0 Precast C.C blocks shall be made from M-250 grade of cement concrete. The concrete shall conform to relevant IS code and the size shall be as specified in drawing and the surface shall have fair finish. The strength of the C.C. Block shall have compressive strength of 25N/mm² after 28 days. It shall fix on road surface/on ground with necessary excavation and shall be joined in C.M.1:3 to required line and level. The shape of blocks shall be of any shape / shapes approved by Engineer-in-charge. Cement concrete block of approved design of size 300 x 300 x 150 mm of the make approved by engineer-in-charge.

10.0 Clearing the site:

11.0 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 removed as directed. The materials so obtained shall be property of the Government and be conveyed and stacked as directed within 50 M. lead. The roots of the trees coming in the sides shall be cut and coated with hot asphalt. The rate of site clearance is damaged be included in the rate of earthwork for which no extra will be paid.

12.0 Setting out:

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

14.0 Excavation:

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

16.0 Disposal of the excavated stuff

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

18.0 Fixing of Blocks:

19.0 Cement concrete blocks of approved shape shall be fixed in line & level. The alignment of C.C blocks shall be got approved before fixing at site of work. Blocks should be laid commencing from one end of the edge strip and proceed towards the other end. The blocks can be placed to different bonds or patterns as

directed by Engineer in Charge. With the help of gauges, the joint width specification (2 to 4mm) should be checked in the first few meters, where it should be ensured that the block alignment is correct. To start with, full blocks should be used; only subsequently, cutting and in filling at edges be permitted. Under no Circumstances should the blocks be forced or hammered into the bedding at this stage of lying. For cutting paving blocks, hydraulic or mechanical block cutters, or power saws are used. Cut units less than 50mm minimum dimension should not be used. Where space does not permit use of a larger segment, use premixed concrete or sand – cement mortar instead. The blocks shall be laid in line and level and to required gradient. The block shall be jointed with cement mortar 1:1 (1 cement: 1 coarse sand) as directed by Engineer-in-charge.

20.0 Mode of measurements and payment:

21.0 Measurement should be in Running Meter (Rmt) up to two decimal. The rate should be including all above activity and incidental activity to be carried out to complete the work in all respect. No extra payment for transportation, loading, unloading from stock yard should be paid.

50 Providing and fixing pre-cast Rubber Dye/steel dye inter locking concrete block 60 mm thick with grade of concrete M30 pneumatic compressed/vibrated mechanically and as per approved design conforming to IS 15658:2006 including 35mm sand layer for levelling and filling the joint with sand in proper line and level as per guidelines of IRC : SP 63-2018 etc. complete.

Providing and fixing High strength high finish on higher Vibropress Type machine inter locking concrete paving Blocks 60 mm thick with grade of concrete M-300 pneumatic compressed by automation mechanically pressed and as per approved design including 75 mm sand layer for leveling and filling the joint with sand in proper line and level.

Material:

High strength high finish on higher Vibropress Type machine inter locking concrete Block 60 mm thick with grade of concrete M-300 pneumatic compressed by automation mechanically pressed and as per approved design

Water shall conform to M-1, (2) Cement shall conform to M-3, (3) Sand shall conform to M-6, (4) Mortar shall conform to M-11, (5) Aggregates shall conform to M-12, (6) Shuttering shall conform to M-26.

Workmanship:

Laying should be done on 75 mm Thick Sand completed Bed. This work shall be carried out in the central median and/or along the footpaths in conformity with the lines, levels and dimensions as specified in the drawings.

Paver Block:

The paver blocks should be High strength high finish on higher Vibropress Type machine inter locking concrete Block 60 mm thick with grade of concrete M-250 pneumatic compressed by automation mechanically pressed and as per approved design at appropriate plant having facility for applying high pressure and controlled vibration.

Sr.	Parameters	Minimum Requirements
1	Percentage water Absorption	Average not over 6%
2	Compressive Strength	Average not less than 450 kg/cm ²
3	Tensile Splitting Strength (as per EN 1338)	Average not less than 3.6 Mpa
4	Sverage wear in thickness – Abrasion	Confirming to Grade ‘H’ of EN 1338
5	Tolerance in size (Length + Breadth)	± 1.5 mm
6	Thickness of wearing layer	Not less than 5 mm
7	48 Tolerance in thickness of Block	± 3 mm
8	49 Colour	UV Light resistant fast colours

Necessary testing shall be carried out to maintain the required compressive strength. To ensure durability, the average water absorption in a block should not exceed 5%. In situations, where parts of blocks are to be used e.g. around manholes, the block should be purpose cut at site.

Bedding Sand:

The Bedding sand should be free of deleterious materials. The thickness of the bedding layer should be as shown in the drawing and should be of uniform thickness. The grading of the bedding sand should be as under:

IS Sieve Size	Percent Passing
9.52 mm	100
4.75 mm	95-100
2.36 mm	80-100
1.18 mm	50-95
600 micron	25-60
300 micron	10-30
150 micron	0-15
75 micron	0-10

Joint Filling Sand:

The gaps in between two paving blocks (not more than 3mm) shall be filled relatively finer than the bedding sand. The joint filling sand should be as dry as possible. The gradation for the joint filling sand is as under.

IS Sieve Size	Percent Passing
2.36 mm	100
1.18 mm	90-100
600 micron	60-90
300 micron	30-60
150 micron	15-30
75 micron	0-10

Construction: General

The construction of block pavement involves preparation of subgrade, sub base and base course layers, bedding sand and finally the laying of blocks.

Preparation of Sub grade:

This is the foundation layer on which the block pavement is constructed. The water table should be at a minimum depth of 600mm below the sub-grade. Sub-grade should be compacted in layers of 150 or 100 mm thickness as per IRC: 36-1970. The prepared sub grade should be graded and trimmed to a tolerance of ± 20 mm of the design levels, and its surface evenness should have a tolerance of within 15 mm under a 3 m straight edge.

Base and Sub base Course:

Base and Sub base courses are constructed in accordance with standard procedure contained in the relevant IRC specifications like IRC: 37-2001. The material shall be evenly laid in required thickness as specified in drawing and shall be watered, and consolidated to provide proper level and grade.

Placing and Screening of Bedding Sand:

The thickness of the sand bed after compaction should not be more than 75 mm. Bedding sand should not be used to fill up local depressions on the surface of a base or sub base. The depressions should be repaired in advance before placing sand. Sand to be used should have uniform moisture content of 6 to 8%. The processed sand is spread with the help of screed boards to the required thickness. The Screed boards are provided with nails at 2-3m apart which when dragged gives the desired thickness. The sand is subsequently compacted with plate vibrators weighing 0.6 tons or more. Level checks shall be carried out on a grid pattern to establish that the desired level is achieved. Local correction can be done either by removing or adding extra sand followed by leveling and compacting the layer.

Laying of Blocks:

Blocks should be laid commencing from the edge strip and proceed towards the inner side. The blocks can be placed to different bonds or patterns as directed by Engineer in Charge. With the help of gauges, the joint width specification (2 to 4mm) should be checked in the first few square meters, where it should be ensured that the block alignment is correct. To start with, full blocks should be used; only subsequently, cutting and in filling at edges be permitted. Under no Circumstances should the blocks be forced or hammered into the bedding at this stage of lying. For cutting paving blocks, hydraulic or mechanical block cutters, or power saws are used. Cut units less than 50mm minimum dimension should not be used. Where space does not permit use of a larger segment, use premixed concrete or sand – cement mortar instead. The blocks shall be laid in line and level and to required camber.

Compaction:

For compaction of the bedding sand and the blocks laid over it, vibratory plate compactors are used over the laid paving units; at least two passes of the vibratory plate compactor are needed. Such vibratory compaction should be continued till the top of each paving blocks is level with its adjacent blocks.

Joints filling: The joints should be completely filled with dry sand. The operation of joint filling comprises of spreading a thin layer of the joint filling sand on the block surface and working the sand into each joint by brooming. Following this, passes of

heavy plate compactor are applied to facilitate fine sand to fill the joints. The sand should be broomed or spread over the surface with a small surcharge.

Opening for use:

Until all the joints are completely filled, no usage should be permitted over the block pavement. The block pavement should be inspected frequently, to ensure that any incompletely filled joints, exposed by usage and/or weather are promptly filled. Such frequent inspection should be continued till dust and detritus from the roadway tightens the surface of the joints.

Measurements for payments:

The work of Paver block shall be measured as finished work in Square Meter. Fixing paver blocks in required shape and pattern and filling joints and compacting using all tools, equipment materials and labour. The contract rate shall include carrying out all required operations to complete this item of work, including cost of labour, materials, tools & plants etc.

- 51 Providing, laying, spreading and compacting Wet Mix Macadam (as per table 400 - 10 and 400 - 11) of well graded stone aggregate to specification including premixing the Material with water at OMC in mechanical mix plant as per approved design mix, carriage of mixed material by Tipper to site, laying in uniform layers with motor grade/Front end Loader/paver finisher, in sub base/base course on a well prepared under base and compacting with vibratory roller to achieve the desired density including lighting, guarding, barricating and maintenance of diversion etc. (MoRTH specification : Clause 406) by mechanical means.**

Providing, laying, spreading and compacting Wet Mix Macadam (as per table 400 - 10 and 400 - 11) of well graded stone aggregate to specification including premixing the Material with water at OMC in mechanical mix plant as per approved design mix, carriage of mixed material by Tipper to site, laying in uniform layers with motor grade/Front end Loader/paver finisher, in sub base/base course on a well prepared under base and compacting with vibratory roller to achieve the desired density including lighting, guarding, barricating and maintenance of diversion etc. (MoRTH specification : Clause 406) by mechanical means.

WET MIX MACADAM:

BASE Scope:

This work shall consist of laying and compacting clean, crushed, graded aggregate and granular material, premixed with water, to a dense mass on a prepared sub grade/subbase/base or existing pavement as the case may be in accordance with the requirements of the these Specifications. The material shall be laid in one or more layers as necessary to lines, grades and cross-sections shown on the approved drawings or as directed by the Engineer. The thickness of a single compacted Wet Mix Macadam layer shall not be less than 75 mm. When vibrating or other approved types of compacting equipment are used, the compacted depth of a single layer of the sub-base course may be increased to 200 mm upon approval of the Engineer.

Materials:

Aggregates Physical requirements:

Course aggregates shall be crushed stone. If crushed gravel/shingle is used, not less than 90 percent by weight of the gravel/shingle pieces retained on 4.75 mm sieve shall have at least two fractured faces.

Grading requirements:

The aggregates shall conform to the grading given in Table below

TABLE 7.6: Grading Requirements of Aggregates for Wet Mix Macadam

IS Sieve Designation	Per cent by weight passing the IS sieve
53.0 m	100
45.0 m	95-100
26.50 m	-
22.40 m	60-80
11.20 m	40-60
4.75 mm	25-40
2.36 mm	15-30
600.00 micron	8-22
75.00 micron	0-8

Materials finer than 425 micron shall have Plastically Index (PI) not exceeding 6. The final gradation approved within these limits shall be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa.

Construction Operations Preparation of base:

Prior to laying of the wet mix macadam base the granular sub-base already laid should be prepared by removing of extraneous material, lightly sprinkled with water and rolled with two passes of 80 – 100 kN smooth wheeled roller.

Provision of lateral confinement of aggregates:

While constructing wet mix macadam, arrangement shall be made for the lateral confinement of wet mix. This shall be done by lying materials in adjoining shoulders along with that of wet mix macadam layer and constructing the adjoining shoulder with approved material along with that of the wet Mix Macadam layer.

Preparation of mix:

Wet Mix Macadam shall be prepared in an approved mixing plant of suitable capacity having provision for controlled addition of water and forced/positive mixing arrangement like pug mill or pan type mixer of concrete batching plant. For small quantity of wet mix work, the Engineer may permit the mixing to be done in concrete mixers.

Optimum moisture for mixing shall be determined in accordance with IS: 2720 (Part-8) after replacing the aggregate fraction retained on 22.4 mm sieve with material of 4.75 mm to 22.4 mm size. While adding water, due Allowance should be made for evaporation losses. However, at the time of Compaction, water in the wet mix should not vary from the optimum value by more than agreed limits. The mixed material should be uniformly wet and no segregation should be permitted.

Spreading of mix:

Immediately after mixing, the aggregates shall be spread uniformly and evenly upon the prepared sub grade/sub-base/base in required quantities. In no case should these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a partly completed stretch be permitted.

The mix may be spread either by a paver finisher or motor grader. For portions where mechanical means cannot be used, manual means as approved by the Engineer shall be used. The motor grader shall be capable of spreading the material uniformly all over the surface. Its blade shall have hydraulic control suitable for initial adjustments and maintaining the same so as to achieve the specified slope and grade.

The paver finisher shall be self-propelled, having the following features:

- i. Loading hoppers and suitable distribution mechanism
- ii. The screed shall have tamping and vibrating arrangement for initial compaction
 - a. to the layer as it is spread without rutting or otherwise marring the surface
 - b. profile.
- iii. The paver shall be equipped with necessary control mechanism so as to ensure that the finished surface is free from surface blemishes.

The surface of the aggregate shall be carefully checked with templates and all high or low spots remedied by removing or adding aggregate as may be required. The layer may be tested by depth blocks during construction. No segregation of larger and fine particles should be allowed. The aggregates as Spread should be of uniform gradation with no pockets of fine materials.

Compaction:

After the mix has been laid to the required thickness, grade and cross fall/camber the same shall be uniformly compacted, to the full depth with suitable roller. If the thickness of single compacted layer does not exceed 100 mm, a smooth wheel roller of 80 to 100 Kn weight may be used. For a compacted single layer upto 200 mm, the compaction shall be done with the help of vibratory roller of minimum static weight of 80 to 100 kN or equivalent capacity roller. The speed of the roller shall not exceed 5 km/h In portions having unidirectional cross fall/super elevation, rolling shall commence from the lower edge and progress gradually towards the upper edge. Thereafter, roller should progress parallel to the center line of the road, uniformly over-lapping each preceding track by at least one third width until the entire surface has been rolled. Alternate trips of the roller shall be terminated in stops at least 1 m away from any preceding stop. In portions in camber, rolling should begin at the edge with the roller running forward and backward until the edges have been firmly compacted. The roller shall then progress gradually towards the center parallel to the center line of the road uniformly overlapping each of the preceding track by at least one-third width until the entire surface has been rolled.

Any displacement occurring as a result of reversing of the direction of a roller or from any other cause shall be corrected at once as specified and/or removed and made good. Along forms, Krebs, walls or other places not accessible to the roller, the mixture shall be thoroughly compacted with mechanical tampers or a plate compactor. Skin patching of an area without scarifying the surface to permit proper bonding of the added material shall not be permitted.

Rolling should not be done when the sub grade is soft or yielding or when it causes a wave-like motion in the sub-base/base course or sub grade. If irregularities develop during rolling which exceed 12 mm when tested with a 3 meter straight edge, the surface should be loosened and premixed material added or removed as required before rolling again so as to achieve a uniform surface conforming to the desired grade and cross fall. In no case should the use of unmixed material be permitted to make up the depressions. Rolling shall be continued till the density achieved is at least 98 per cent of the maximum dry density for the material as determined by the method outlined in IS: 2720 (Part-8). After completion, the surface of any finished layer shall be well-closed, free from movement of compaction equipment or any compaction planes, ridges, cracks and loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of the layer and re compacted.

Setting and drying:

After final compaction of wet mix macadam course, the road shall be allowed to dry for 24 hours.

Opening to Traffic:

Preferably no vehicular traffic of any kind should be allowed on the finished wet mix macadam surface till it has dried and the wearing course laid.

Surface Finish and Quality Control of Work

Surface evenness:

The surface finish of construction shall conform to the requirements of Clause 7.15.

Quality control:

Control on the quality of materials and works shall be exercised by the Engineer in accordance with Section 7.15

Rectification of Surface Irregularity :

Where the surface irregularity of the wet mix macadam course exceeds the permissible tolerances or where the course is otherwise defective due to sub grade soil getting mixed with the aggregates, the full thickness of the layer shall be scarified over the affected area, re-shaped with added premixed material or removed and replaced with fresh premixed material as applicable and re compacted in accordance with Clause 7.4.3. The area treated in the aforesaid manner shall not be less than 5 m long and 2 m wide. In no case shall depressions be filled up with unmixed and ungraded material or fines.

Arrangement for Traffic :

During the period of construction, arrangement of traffic diversion shall be done as per the direction of Engineer.

Measurements for Payment :

Wet Mix Macadam shall be measured as finished work in position in cubic meters. The protection of edges of Wet Mix Macadam extended over the full formation as shown in the

Drawing shall be considered incidental to the work of providing Wet Mix Macadam and as such no extra payment shall be made for the same.

Rate :

The Contract unit rate for Wet Mix Macadam shall be payment in full for carrying out the required operations in One Cubic. Meter, including full compensation for:

- (i) Making arrangements for traffic diversions. Except for initial treatment to verges, shoulders and construction of diversions;
- (ii) Furnishing all materials to be incorporated in the work including all inclusions, royalties, fees, rents where necessary and all leads and lifts;
- (iii) All labor, tools, equipment and incidentals to complete the work to the Specifications;
- (iv) Carrying out the work in part widths of road where directed; and Carrying out the required tests for quality control

43.1. Providing corrugated G.I. sheets Class-3 roofing fixed with galvanized iron 'J' or 'L' hook bolts, and nuts 8 mm. dia with bitumen and G.I. limpet washers filled with white lead complete excluding the cost of purlins, rafters and trusses. (1) 0.8 mm. thick sheet.

4.0 Materials: Corrugated G.I. sheets shall conform to M-24.

5.0 Workmanship :

5.1 Spacing of purlins: One purlin shall be provided at the ridge and one at the eaves. The spacing of other purlins for 0.8 mm. thick G.I. sheet not exceed 1.80 meters. The purlin shall coincide with the center line of the end lap. The ridge purlin 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.

5.2 The top surface of the purlins shall be painted before the sheets are fixed over them. Embedded portions of purlins shall be finished with two coats of coat-tar.

5.3 Laying of Sheets :

5.3.1 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 gable parapets. They shall be bent up along their side edges close to the wall, and the junction shall be protected by suitable flashing or by projecting drip course.

5.3.2 The laps at end shall be provided 150 mm. minimum for roof slopes 1 in 2 (1 vertical: 2 horizontal) and steeper but 200 mm. shall be provided for flatter slopes than those shall above. The side lap shall be provided two ridges of corrugations at each side.

5.3.3 The sheets shall be cut to the dimensions of 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 a straight finish. The sheets shall be laid such that the laps are turned away from the usual direction of local heavy rain.

5.3.4 Fixing of Sheets :

5.3.4.1 Sheets shall be fixed to the purlins or other roof members such as hips of valley rafter etc. with 'J' or 'L' galvanized hook bolts, and galvanized nuts 8 mm. die, 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' hook bolts on the side of purlins shall not be less than 25 mm. There shall be minimum of three hooks bolts places at the ridge of corrugations in each sheets in every purlin, and their spacing shall not exceed 300 mm. coach screw shall not be used for fixing the sheets to purlins, where the slopes of roof are not less than $2\frac{1}{2}$ horizontal). (1

vertical: $2\frac{1}{2}$ 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 places zigzag over the two overlapping corrugations, so that the end 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.

5.3.5 Holes for all bolts shall be drilled and not punched in the ridges of the corrugations from the underside, 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 hook, bolts or the scam bolts. The nuts shall be tightened from above to give a leak proof roof.

5.3.6 The roof when complete shall be trues to lines and slopes and shall be lead-proof.

6.0 Mode of measurements & payment :

6.1 The measurements of the C.G.I. sheet roof shall be taken for finished work in superficial area in general plane (not girthed on the roof). The laps between the C.G.I. sheets both at their ends and along the side edges shall not be measured. The overlaps of C.G.I. sheets over the valley piece underlap under the ridge, hip and flashing piece shall be included in the measurements.

6.2 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 extra labor in cutting and for wastage etc., in forming such openings.

6.3 The rate of roof shall include the cost of all materials and labor 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 erection and completion of the work. The rate includes the cost of purlins, rafters and trusses.

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

17. .Providing cement vata (10 cms x 10 cms) size quarter round in cement mortar 1:1 including near cement finishing, watering etc. complete.

1.0 Materials :

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

2.0 Workmanship :

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

3.0 Mode of measurements & payment :

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

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

52 Applying two coats of putty & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand papered smooth.

Materials:

Water shall conform to M-1 and Asian acrylic Putty and Primer or as equivalent make approved by Engineer In charge.

Workmanship:

Preparation of surface:

The surface shall be thoroughly cleaned of all dust, dirt, mortar dropping and other foreign matter before white wash is to be applied. The surface spoiled by smoke soot shall be scrapped with steel wire brushes or steel scrapers or shall be rubbed with over burnt surkhi or brick bats. The surface shall be then broomed to remove all dust and dirt and shall be washed with clean water. Oil or grease spots shall be removed by suitable chemical. Smooth surfaces shall be rubbed with wire brushes all unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such portions shall be wetted and allowed to dry. Any crevices, at any level shall be cleaned and filled with the plaster mortar and cured as above. They shall then be given one coat of white wash. All unnecessary nails shall be removed, the holes, cracks, patches etc. shall be made good with material similar in composition to the surface to be prepared.

Scaffolding:

Wherever scaffolding is necessary, it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be white or color 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. Also, while painting the ceiling, the floor area shall be covered properly with plastic so that the flooring is not spoiled.

Application:

The primer shall be applied with a brush on the clean, dry and smooth surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. A coat of putty (lapi) shall be applied to the entire surface. Putty shall be used of readymade or brought of the company like Asian as directed by the Engineer-in-charge and Architect. The second coat of primer and putty shall then be applied, and it shall thereafter be allowed to dry for at least 48 hours before oil bound distemper or paint is applied.

Mode of Measurements and Payment:

The rate shall be for a Unit of Sq.mt.

- 53 Finishing wall with weather proof exterior emulsion paint on wall surface (two coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt, and remains of loose powdered materials. etc complete.**

Materials: Water shall conform to M-1 and acrylic paint shall conform to its supplier's specification Apex or equivalent as make approved by the Engineer In Charge.

Workmanship:**General**

The materials required for work of painting work shall be obtained directly from approved manufacturers or approved dealer and brought to the site in maker's drums, cage etc. with seal unbroken. All materials not in actual use shall be kept properly protected, lid of containers shall be kept closed and surface of paint in open or partially open containers covered with a thin layer of water to prevent formation of skin. The materials, which have become stale 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 paint shall be stirred thoroughly in its container before pouring into small containers. If for any reasons, thinning is necessary, water shall be added as per supplier's instructions. 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 parts of 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.

Scaffolding:

Wherever scaffolding is necessary, it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be white or color 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. Also, while painting the ceiling, the floor area shall be covered properly with plastic so that the flooring is not spoiled.

Preparation of surface:

All unnecessary nails, hooks etc. shall be removed. Pitting in plaster shall be made good with plaster again and papered with a fine grade sand paper and made smooth. The surface affected by molds, moss, fungi, algae lichens, efflorescence etc. shall be treated in accordance with IS : 2395 (Part-1)-1966.

Preparation of Mix:

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

Application:

Before pouring into small containers for use of applying, the paint shall be stirred thoroughly in its container. Also, the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform. The paint shall be laid on 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 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. 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. On the newly plastered surface, the first coat shall be applied with 100% dilution and second and third coat shall be applied with 40 % dilution or as per the supplier's instructions the second or subsequent coat shall not be started until the preceding coat has become sufficiently hard to resist marking of the brush being used.

Precautions:

- (a) Old brushes if they are to be used with 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 shall be kept immersed in water during break periods to prevent the paint from hardening on the brush.
- (b) In the preparation of walls for plastic emulsion painting, no oil base putties 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 of surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application.

Protective measure:

The surface of doors, windows, ventilators, floors, of furniture etc. and such other parts of the building not to be white/color washed shall be protected from being splashed upon. Such surfaces shall be cleaned of white/color wash splashed, if any, immediately after completing the painting, at no extra cost.

Mode of Measurements and Payment:

For mode of measurement latest version of IS 1200 shall be followed. All the work shall be measured in the decimal system as under:

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

(b) Area in individual items shall be worked out to the nearest 0.01 m².

All works shall be measured in sq.mt. In jambs, soffits, sills etc. and for openings not exceeding 0.5 m² each in area, for ends of joists, posts, beams, girders, steps etc. not exceeding 0.5 m² each in area and for openings exceeding 0.5 m² and not exceeding 3.0 m² each in area, deductions and additions shall be made as under :-

1) No deductions shall be made for ends of joists, beams, posts, etc. and for openings not exceeding 0.5 m² each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finish around ends of joists, beams, posts etc.

2) Deductions for openings exceeding 0.5 m² but not exceeding 3.0 m² each shall be made as follows and no addition shall be made for reveals, jambs, soffits etc. of these openings:

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

When each face of wall is provided with a 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 is equal, deduction of 50% of area of opening on each face shall be made from total area of finish.

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

3) In case of area of openings exceeding 3.0 m² each, deduction shall be made for openings but jambs, soffits shall be measured.

4) No deductions shall be made for attachment such as casing, conduits, pipe, electric wiring and the like. 3.2 Corrugated surfaces shall be measured flat as fixed and not girth. The quantities measured shall be increased by the following percentage and the resultant shall be included with the general areas:

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

(b) Corrugated A.C. Sheets ----- 20%

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

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

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

Cornices and other wall features, when they are picked out in a different finish/color shall be girthed and included in the general area. The rate shall include the cost of all materials, labor, scaffolding, protective measures etc. required for the above specified operation, at all floors, at any height, in any position. Priming and Alkali resistant treatments, scrapping of surface washing etc. surface spoiled by smoke soot, removal of oil and grease spots, treatment for infection with efflorescence molds, moss, fungi, algae and lichen and patch repairs to plaster wherever done shall not be paid extra. This shall also include conveyance, delivery, handling, unloading, storing work etc. The rate shall be for a unit of one sqmt.

Mode of Measurement& Payment:

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

53 *Wall painting (two coats) with plastic emulsion paint of approved brand and manufacture on undecorated wall surfaces to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand paper smooth.*

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

2.0 **Workmanship :**

2.1 Scaffolding: The relevant specifications of item No. 18.11 para 2.1. shall be followed.

2.2 Preparation of Surface: The relevant specifications of item No. 18.44 para 2.2 shall be followed.

2.3 Preparation of Mix: This shall be done as per manufacturer'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 **Applications :**

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

2.4.2 The paint shall be laid on evenly and smoothly by meant of crossing and laying off the crossing and laying off consist of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction two or three times and then finally brushing lightly in a

direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of 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 preceding coat has become sufficiently hard to resist marking by brush being used.

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

2.5 Precautions :

(a) Old brushes if they are to be used with emulsion paints, shall be completely dried of turpentine oil paint by washing in warm soap water.

Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

(b) In the preparation of wall for plastic emulsion painting, no oil base putties 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 of surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application.

2.6 Protective measures:

2.1.1 The relevant specifications of item No. 18.17 para 2.3 shall be followed.

3.0 Mode of measurements & payment :

3.1 The relevant specifications of item No. 18.11 shall be followed.

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

Note:- I HAVE ALSO GONE THROUGH TECHNICAL SPECIFICATIONS FOR THE ITEMS (AS PER STANDARD P.W.D. TECHNICAL SPECIFICATION FOR THE ITEMS AND ALSO I HAVE THE BOOK OF THE SAME) AND AGREE TO ABIDE BY THEM. IN CASE OF WHERE THERE IS NO TECNICAL SPECIFICATION FOR THE ANY ITEMS AVAILABLE, SPECIFICATION GIVEN BY THE ENGINEER-IN –CHARGE / MANUFACTURER STANDARD SPECIFICATION SHALL BE FOLLOWED AND FOR THE SAME I AGREE TO ABIDE BY THEM

Contractor Sign:

Date: