

Item No.01 : - Excavation for foundation up-to 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff up to 50 Meter lead.(A) Loose or Soft soil.

General:

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

Clearing the site:

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 tree 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 deemed to be included in the rate of earth work for which no extra will be paid.

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 tractor 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.

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 leveled both longitudinally and transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any 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.

Disposal of the excavated stuff:

The excavated stuff of the selected type shall be used in filling the trenches and plinth or levelling 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.

Mode of measurement and payment:

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.

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

Item No. 03:- Providing and laying cement concrete work 1:1.5:3 (1- Cement : 1.5- Coarse sand : 3- graded stone aggregates 20 mm nominal size-M200) and curing complete including cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, Base or columns and Mass concrete. - Footing

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

2.0. General

2.1. The relevant specification of item No. 5.4.1. of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days work cube compressive strength of 150 mm. cubes of the mix expressed in Kg./Crnt.

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

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

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

3.0. Workmanship

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

3.2. In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean, and serviceable condition. Their accuracy shall be periodically checked.

3.3. It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates. I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg./M³ in plain concrete and not less than

250 kg/M-3 in reinforced concrete.the grading of concrete shall be controlled concrete M-250 grades for the works as specified in the item.

CENTERING & FORM WORK

9.1. (A) Providing form work 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 site reinforced concrete and plain concrete work in foundations, footing, bases of columns, and mass concrete.

1.0. Materials:

1.1. The shuttering to be provided shall be of ordinary timber planks and shall conform to M-26.

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

2.0. Workmanship : 2.1. The form work shall conform to the shapee lines and dimension as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding bracing etc. shall be as per design.

2.2. Cleaning & Treatment of forms: 2.2.1. All rubbish, particularly chippings shaving and saw dust shall be removed from the interior of the form before the concrete is placed and the form work in contact with concrete shall be cleaned and thoroughly weltd or treated. The surface shall be then coaled with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil or form oil of approved manufacture may be applied in case steel shuttering is used. Soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coaling does not gel on construction joint surface and reinforcement bars.

2.3. Stripping time : 2.3.1. In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.:

(a) Sikes of walls columns and vertical faces of beam - 24 to 48 hours.

(b) Beam soffits. (Props left under) - 7 days.

(c) Removal of props slabs

(i) Slabs spanning upto 4.5 m. - 7 days (ii) Spanning over 4.5 m. - 14 days.

(d) Removal of props to beams and Arches

(i) Spanning upto 6m.-14 days. (ii) Spanning over 6 m. - 2 days.

2.4. Procedure when removing the form work : 2.4.1. All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffit form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

2.5. Centering : 2.5.1. The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behaviour of centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

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

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

2.6. Scaffolding:

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

2.6.2. The scaffolding, hoisting arrangements and ladders shall allow easy approach to

the work spot and afford easy inspection.

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

- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering, strutting, propping bolting, nailing, wedging, easing, striking and removal.
- (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm. width to beams, columns and the like.
- (c) Temporary openings in the forms for pouring concrete, if required, removing rubbish etc.
- (d) Dressing with oil to prevent adhesion of concrete with shuttering and
- (e) Raking or circular culling.

2.7. Re-Use : 2.7.1. Before-re-use, all forms shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned, and joints gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.

1.0 Mode of measurements & payment:

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

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

3.5. The rate is for the completed item.

4.0. Mode of measurements & payment

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

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

Item No. 4:- Providing and laying cement concrete work 1:1.5:3 (1- Cement : 1.5- Coarse sand : 3- graded stone aggregates 20 mm nominal size-M200) and curing complete including cost of formwork and reinforcement for reinforced concrete work in (D) Columns, Pillars posts and struts up-to floor two level. - Column

RCC Workmanship Should Be Same as Concrete Work For Foundations, footings, Base of columns and Mass concrete.

CENTERING & FORM WORK

9.1. (G) (i) Providing form work of ordinary timber planking-so as to give a rough finish including centering, shuttering, uniting and propping etc. height or propping and centering below supporting floor to ceiling not exceeding 4 m. and removal of the same for in-situ reinforced and plain concrete work in columns, pillars posts, and struts, square rectangular, polygonal in plan.

1.0 Materials & Workmanship: 1.1. The relevant specifications of item No. 9.1. (A) shall be followed except that the works for columns, pillars, posts and struts square, rectangular, polygonal in plan.

Mode of measurements & payment

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

Item No. 5:- Providing and laying cement concrete work 1:1.5:3 (1- Cement : 1.5- Coarse sand : 3- graded stone aggregates 20 mm nominal size-M200) and curing complete including cost of formwork and reinforcement for reinforced concrete work in (B) Slabs, landing, shelves, Balconies , Lintels, Beams, Girders and Cantilever upto floor two level - Plinth Beam.

And

Item No. 6:- Providing and laying cement concrete work 1:1.5:3 (1- Cement : 1.5- Coarse sand : 3- graded stone aggregates 20 mm nominal size-M200) and curing complete including cost of formwork and reinforcement for reinforced concrete work in (B) Slabs, landing, shelves, Balconies , Lintels, Beams, Girders and Cantilever upto floor two level - Slab Beam.

RCC Workmanship Should Be Same as Concrete Work For Foundations, footings, Base of columns and Mass concrete.

CENTERING & FORM WORK

9.1.(H) (1) Providing form work 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 and plain concrete work in side and soffits of beams, beam haunching's, cantilevers, girders bressummers and lintels not exceeding 1 M. in depth.

Mode of measurements & payment

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

Item No. 07:- providing and laying cement concrete work 1:1.5:3 (1- Cement : 1.5- Coarse sand : 3- graded stone aggregates 20 mm nominal size-M200) and curing complete including cost of formwork , reinforcement for reinforced concrete work in (B) Slabs, landing, shelves, Balconis, Lintels, Beams, Girders and Cantilever upto floor two level - Sill Lintel.

And

Item No. 08:- Providing and laying cement concrete work 1:1.5:3 (1- Cement : 1.5- Coarse sand : 3- graded stone aggregates 20 mm nominal size-M200),curing complete including cost of formwork and reinforcement for reinforced concrete work in (B) Slabs, landing, shelves, Balconis , Lintels, Beams, Girders and Cantilever upto floor two level - Chajjah.

RCC Workmanship Should Be Same as Concrete Work For Foundations, footings, Base of columns and Mass concrete.

CENTERING & FORM WORK

9.1.(L) Providing form work 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 and plain concrete in chullah hoods, weather sheds, chhajas carbels etc. including edges.

Materials & Workmanship: 1.1. The relevant specifications of item No. 9.1. (A) shall be followed except that the work is for chullah hoops, weather-sheds, chhajas, carbels etc. including edges of the same.

Mode of measurements & payment

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

Item No. 09:- Providing and laying cement concrete work 1:1.5:3 (1- Cement : 1.5- Coarse sand : 3- graded stone aggregates 20 mm nominal size-M200) and curing complete including cost of formwork, reinforcement for reinforced concrete work in (B) Slabs, landing, shelves, Balconies , Lintels, Beams, Girders and Cantilever up-to floor two level - Slab.

RCC Workmanship Should Be Same as Concrete Work For Foundations, footings, Base of columns and Mass concrete.

CENTERING & FORM WORK

9.1. (B) (I) Providing form work of ordinary timber planking so as to give a rough finish including centering shuttering, of 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-site reinforced and plain concrete work in flat surface such as soffits of slabs, landing and the like floors etc. up to 200 mm. in thickness.

1.0 Materials & Workmanship: 1.1. The relevant specifications of item No. 9.1. (A) shall be followed except that the work is to be carried out for flat surface such as soffits of slabs, landings and the like for floors etc. up to 200 mm, in thickness.

Mode of measurements & payment

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

Item No. 10:- Uncoursed Rubble Masonry with hard stone of approved quality in foundations and plinth in Cement Mortar 1:6 (1-cement : 6-coarse sand including levelling up etc. complete.

Materials: The cement mortar shall conform to M-11. Stones shall conform to M-16.

Workmanship:

Dressing of stones: Stone used for uncoursed rubble masonry work shall be hammer dressed on the sides, and beds in such a way as to close up with the adjacent stone in the masonry work as strongly as possible. The face stones shall be dressed in such a manner as to give a specified Pattern such as polygonal facing etc. The face of the stones shall be so dressed that bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on the face to be plastered. It shall not project by more than 19 mm. nor shall have depressions more than 10 mm. from the average wall surface.

Lying: All the stones shall be sufficiently wetted before laying to prevent absorption of water from mortar. The wall shall be built true to plumb (or true to required batter when so specified). All connected walls in structures shall normally be raised up uniformly and regularly. However if for any specific reason, one part of masonry is required to be left behind, the wall shall be racked back at an angle not steeper than 45°. Vertical Toothed joints in masonry shall not be allowed. The work shall be carried out regularly and masonry of any day will not be raised by more than 1 metre in height.

The stones shall be laid in an uncoursed fashion or random facing etc. However, the masonry is required to be brought to level at various stages viz. plinth level, window sill level, roof level and any other level specifically shown in the drawings. This may be done by first by adjusting the laying of stones to one level and then by providing levelling course of cement concrete 1:6:12 (1 cement: 6 sand : 12 graded stone aggregate 20 mm. nominal size) or as otherwise specified.

Proper bonding shall be achieved by closely filling in adjacent stones as well as by using bond stones or through stones as described herein below. Face stones shall extend back sufficiently and bond well with the masonry. The stone shall be carefully set so as to break joints and avoid formation of vertical joints. The depth of stone from the face of

wall inwards shall not be less than weight or breadth at the face. The hearting or interior filling of the wall shall consist of rubble stones which may be of any shape. Neither the face stone nor the hearting stone shall be so small to pass through circular ring of 150 mm. Internal diameter in any direction nor shall any of them shall have minimum thickness 100 mm.

All stones shall be carefully laid, hammered down by a wooden mallet into position and solidly embedded in mortar, chips and sprawls of stones may be used wherever necessary to avoid thick mortar beds or joints at the same time ensuring that no hollow space is left anywhere in the masonry. The chips used shall not be more than 20% by volume of masonry. The hearting shall be laid nearly level with face stones except that at about one metre intervals vertical bond stone or plums projecting about 150 to 200 mm. shall be firmly embedded to form vertical bonding in masonry.

Bond stones: Bond stones or through stones running right across the thickness of the wall shall be provided in walls up to 600 mm. thick. In thicker walls two stones overlapping each other by at least 150 mm. shall be provided across the thickness of the wall to form bond stones. There shall be at least one bond stone for every 0.5 Sq.m. of wall surface. The bond stone shall be marked by a distinguishing letter during construction of subsequent verification and shall be laid staggered in subsequent layers.

Quoins: The quoins or corners stone shall be selected stone nearly dressed with hammer and /or chisel to form the required corner angle and laid header and stretcher alternatively. The bed and top surface of quoins shall be chiselled dressed to give horizontal joints. The quoins shall have a uniform chisel draft of at least 25 mm. width at four edges of each exposed face, all the edges of the same face being in one plane. No quoins stone shall be smaller than 0.025 Cum. in volume.

Jamb Stones: The jamb stone shall be made with stone specified for quoins, except that the stone provided on the jambs shall have their length equal to thickness of wall up to 600 mm. and a line of headers shall be provided for walls thicker than 600 mm. as specified for bond.

Joints: All the joints shall be completely filled with mortar and their width shall not exceed 25 mm. When plastering or pointing is not required to be done, the joints shall be struck flush and finished simultaneously while laying the stone. Otherwise, the joints shall be raked to a minimum depth of 20mm. by racking tools, during progress of laying while the mortar is still green.

Scaffolding: Single or double scaffolding shall be used. The scaffolding shall be strong and sound. The holes left in masonry for supporting scaffolding shall be filled and made good before plastering.

Curing: Green work shall be protected from rains by suitably covering the same. Masonry shall be kept constantly moist on all the faces for a period of atleast 7 days. The top of masonry shall be flooded at the close of the day.

Mode of Measurement & payment:

All work shall be measured on the basis of finished dimensions and measured net except where otherwise specified. Only specified dimensions shall be allowed. Anything extra shall be ignored. The masonry work in foundation and plinth shall be measured under this item. No deduction shall be made nor did extra payment make for the following:

- a) Ends of joints, beams, posts, girders, rafters, trusses, corbels, etc. each up to 500 sq.cm. in section.
- b) Opening each up to 0.1 sq.m.
- c) Wall plates and bed plates bearings of chajja and like up to 10 cm. depth (bearing of floor and roof slabs shall be deducted from masonry).
- d) Drain holes and recesses for cement concrete blocks to embed hole fasts for doors windows.
- e) Building in the masonry iron fixtures pipes up to 300 mm. dia. hold fasts of doors and windows.
- i) Forming theses in masonry up to section of 350 sq.cm.

tem No. 11:- Providing and laying cement concrete work 1:1.5:3 (1- Cement : 1.5- Coarse sand : 3- graded stone aggregates 20 mm nominal size-M200) and curing complete including cost of formwork, reinforcement for reinforced concrete work in (B) Slabs, landing, shelves, Balconies , Lintels, Beams, Girders and Cantilever up-to floor two level - Floor-Graded Slab

1.0. Material

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

2.0. General

2.1. The relevant specification of item No. 5.4.1. of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./Crnt.

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

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

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

3.0. Workmanship

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

3.2. In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to

check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean, and serviceable condition. Their accuracy shall be periodically checked.

3.3. It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates. I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg/M³ in plain concrete and not less than 250 kg/M³ in reinforced concrete. the grading of concrete shall be controlled concrete M-250 grades for the works as specified in the item. grading of concrete shall be controlled concrete M-200 grades for works 35 specified in item.

2.0. Mode of measurements & payment

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

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

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

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

Item No. 12:- Providing TMT Bar FE 500D reinforcement for R.C.C. work including bending, binding and placing in position complete up-to floor two level.

1.0 General

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

2.0 Material

2.1. TMT Bars

Reinforcements may be TMT/ or high strength deformed bars.

2.2. TMT bars reinforcement for RCC work shall conform to IS 1786-2008 FE-550D and shall be of tested quality. It shall also comply with relevant part of IS 456-2000.

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

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

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

3.0 Pitch

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

4.0 Binding wire

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

- 4.2.** The use of black wire will be permitted for binding reinforcement bars. It shall be free from free from dirt, paint, grease or oil, oil scale or loose or thick rust and any other undesirable coating which may prevent adhesion of cement mortar at the time of binding.
- 4.3.** Only new binding wire shall be delivered to the site all binding wire shall be inspected before binding to its position and defective brittle, rusted, used wire, shall be discarded. The detailing and scheduling of reinforcement shall be followed as outlined in SP 34-1987 of BIS.

5.0 Protection of Reinforcement

- 5.1.** Uncoated reinforcing steel shall be protected from rusting or chloride contamination.

Reinforcements shall be free from rust, mortar, loose mill scale, grease, oil or paints. This may be ensured either by using reinforcement fresh from the factory or thoroughly cleaning all reinforcement to remove rust using any suitable method such as sand blasting, mechanical wire brushing, a coat of cement wash/Fusion bonded epoxy coating etc. as directed by the Engineer. Reinforcements shall be stored on platforms with bricks, racks etc and above the ground in a clean and dry condition and shall be suitably marked to facilitate inspection and identification.

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

6.0 Workmanship

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

7.0 BENDING OF REINFORCEMENT

- 7.1.** Bar bending schedule shall be furnished by the Contractor and got approved by the Engineer before start of work.
- 7.2.** Reinforcing steel shall conform to the dimensions and shapes given in the approved bar bending Schedules.
- 7.3.** Bars shall be bent cold to the specified shape and dimensions or directed by the Engineer using a proper bar bender operated by hand power to obtain the correct radius of bends and shape. Bars, shall not be bent or straightened in a manner that will damage parent material or the coating bars bent during transport or handling shall, be straightened before being used on work and shall not be heated to facilitate straightening.

8.0 PLACING OF REINFORCEMENT

- 8.1.** The reinforcement cage should generally be fabricated in the yard at ground level, and then shifted and placed in position. The reinforcement shall be placed strictly, in accordance with the drawings and shall be assembled in position, only when structure is otherwise ready for placing of concrete. Prolonged time gap, between assembling of reinforcements and casting of concrete, which may result in rust formation on the surface, shall not be permitted.
- 8.2.** Reinforcement bars shall be placed accurately in position as shown on the drawings. The bars, crossing one another shall be tied together at every intersection with binding wire (annealed), conforming to 15:280 to make the skeleton of the reinforcement rigid such that the reinforcement does not get displaced during placing of concrete, or any other operation. The diameter of binding wire shall not be less than 1 mm.
- 8.3.** Bars shall be kept in position usually by the following methods:
In case of beam and slab construction, industrially produced polymer cover blocks of thickness equal to the specified cover shall be placed between the bars and formwork subject to satisfactory evidence that the polymer composition is not harmful to concrete and reinforcement. Cover blocks made of concrete may be permitted by the Engineer, provided they have the same strength and specification as those of the member.
- 8.4.** In case of dowels for Columns and walls the vertical reinforcement shall be kept in position by means of timber templates with slots in them accurately, or

with Cover blocks in cement mortar with strings planted for tying with the reinforcement (cover blocks tied to the Reinforcement) Timber templates shall be removed after the concreting has progressed up to a level just below their location.

- 8.5.** Layers of reinforcements shall be separated by spacer bars at approximately one metre intervals. The minimum diameter of spacer bars shall be 12 mm or equal to maximum size *of* main reinforcement or maximum size of coarse aggregate, whichever is greater. Horizontal reinforcement shall not be, allowed to sag between supports.
- 8.6.** Necessary stays, blocks, metal chairs, spacers, metal hangers, supporting wires etc, or other subsidiary, reinforcement shall be provided to fix the reinforcements firmly in its correct position.
- 8.7.** Use of pebbles, broken stone, metal pipe, brick, mortar or wooden blocks etc as devices for positioning reinforcement shall not be permitted.
- 8.8.** Bars coated with epoxy or any other approved protective coating shall be placed on supports that do not damage the coating. Supports shall be installed in a manner such that planes of weakness are not created in hardened concrete. The coated reinforcing steel shall be held in place by use of plastic or plastic coated binding wires especially manufactured for the purpose.
- 8.9.** Placing and fixing of reinforcement shall be inspected and approved by the Engineer before concrete is deposited.

9.0 Lapping

- 9.1.** All reinforcement shall be furnished in full lengths as indicated on the drawing. No splicing of bars, except where shown on the drawing; will be permitted without approval of the Engineer. The lengths of the splice shall be as indicated on drawing or as approved by the Engineer. Where practicable, overlapping bars shall not touch each other, and shall be kept apart by 25 mm or 1.25 times the maximum size of coarse aggregate, whichever is greater. If this is not feasible, overlapping bars shall be bound with annealed steel binding wire, not less than 1 mm diameter and twisted tight in such a manner as to maintain minimum clear cover to the reinforcement from the concrete surface. Lapped splices shall be staggered or located at points, along the span where stresses are low.

10.0 Welding

- 10.1.** Splicing by welding of reinforcement will be permitted only if detailed on the drawing or approved by the Engineer. Weld shall develop an ultimate strength equal to or greater than that of the bars connected.
- 10.2.** While welding may be permitted for TMT reinforcing bars conforming to IS: 432, welding of deformed bars conforming to IS: 1786-2008 shall in general be prohibited. Welding May be-permitted in case of bars of other than S 240 grade including special. Welding grade of Fe 550D grade bars conforming to IS: 1786-2008, for which necessary chemical analysis has been secured and the carbon equivalent (CE) calculated from the chemical composition using the formula: $CE = C + (Mn/6) + ((Cr + Mg + V)/5) + ((Ni + Cu)/15)$ 0.25 or less.
- 10.3.** The method of welding shall conform to IS: 2751 and IS: 9417 and to any supplemental specifications to the satisfaction of the Engineer
- 10.4.** Bars shall be bent cold to the specified shape and dimensions or as directed by Engineer in charge using the proper bender tool, operated by hand or power to attain proper radius of bends. Bars shall not be bend or straightened in a .manner that will injure the material. Bars bent during transport or handling shall be straightened before being used in the work. Bars shall not be heated to facilitate bending.
- 10.5.** Unless otherwise specified a 'U' type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bane shall not be less than twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times of the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area the hooks shall be suitably encased to prevent any spiting of the concrete.
- 10.6.** be securely held in position during placing of concrete by annealed binding wire not less than 1 mm in size and by using say blocks or metal chairs spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals, Bars shall not be allowed to sag between supports not displaced during concreting or any other operations of the work All devices used for positioning shall be of not corrodible material wooden and metal supports shall not extended to the surface of the concrete, except where shown

in drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, pre-cast mortar blocks or other approved devices. Reinforcement after bending placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cover shall be provided as indicated on drawings. All bars protruding from concrete and to which other bars are to be lapped and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.

- 10.7.** Bars crossing each other where required shall be secured by binding wire (annealed) of size not less than 1mm in such a manner that they do not slip over at the time of fixing and concreting.
- 10.8.** As far possible bars of full length shall be used. In case this is not possible, overlapping of bars shall be done as directed by the Engineer in charge. When practicable overlapping bars shall not touch each other, but be kept apart by 25 mm. Where no feasible overlapping bars shall be bound with annealed wires not less than 1 mm thick twisted tight. The overlaps shall be staggered for different bars and located at points along the span where neither shear nor bending moments is maximum.
- 10.9.** Whenever indicated on drawing or desired the Engineer in charge bars shall be joined by coupling which shall have a cross section sufficient to transmit the full stresses of bars. The end of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross section of the bar. Threads shall be standard threads. Steel for coupling shall conform to IS 226.
- 10.10.** 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 arc welding using a process which excludes air from the molten metal and conforms to any or other special provisions for the work shall be accepted.

Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, the previous surface shall be cleaned properly. Ends of bars shall be cleaned of all loose scale, rust, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M S electrodes used for welding shall conform IS 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of tests shall be as directed by the engineer in charge.

11.0 MODE OF MEASUREMENTS & PAYMENT

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

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

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

11.2. Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to, in place lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tones on the same basis *of* as per table given above even though steel is supplied to the contractor by the department on actual weight.

Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

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

(If Any Query or Confusion Please Refer Morth For Further Clarification)

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

Item No. 13:- Filling available excavated earth (excluding rock) in trenches. plinth, sides of foundations etc. in layers not exceeding 20 cm. in depth consolidating each deposited layer by ramming and watering.

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 cm. 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 cm. 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 & payment

The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids, if consolidated as instructed above.

The rate shall be for unit of one cubic meter

Item No. 14:- Filling in foundation and plinth with murrum or selected soil in layers of 20cm. thickness including watering, ramming and consolidating etc. complete.

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 brimming 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 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.

Item No. 15:- Filling in plinth with sand under floors including watering ramming consolidating and dressing etc. complete.

Materials:

Sand shall conform to M. 6.

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 brimming 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 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.

Item No. 16:- Applying general insecticide pest control treatment to floors, cupboards etc including labour materials etc. complete. Using Imidacloprid 30.5 SCas Per IS 6313 part -II((0.075% concentration by mass) is recommended 10.5ml chemical diluted with 5 liters of water application 0.5 litre chemical /Sqm of surface is recommended aser I.S.

This shall be provided to bottom of trenches sides, including treating the back fill, under floors and other locations as specified in IS-6313 Part II for preconstruction soil treatment with any of the following:-

Sr.No:	Chemical	
(i)	Chlorpyrifos emulsifiable concentrates to IS 8944-1978	1.00
(ii)	Heptachlor emulsifiable concentrates conforming to IS 6436 - 1978	0.50
(iii)	Chlordane emulsifiable concentrates conforming to IS 2682 - 1966	1.00

The work of antisemite treatment shall be got executed by a specialist firm which must be member of IPCA and approved by the Architect/Project Engineer and shall be carried out as per IS 6313 Part II of 1981 for preconstruction soil treatment. The firm shall render a five year guarantee to the employer through the contractor who will be the principal guarantor. The period of five year shall be reckoned from the date of virtual completion of the contract.

Such guarantee shall be directly given by the specialist agency to the employer in all form approved by the employer. In the event of reinfestation at any time during guarantee period, the specialist agency shall undertake to the employer through the contractor i.e. the principal guarantor to carry out such treatment as may be necessary to render the structure free from termite infestation including breaking and reinstalling any other work that may necessary for the treatment at no extra cost.

Prevention of termite is achieved by treating the soil beneath the building and around the foundation with a suitable insecticide approved by the Engineer:

Safety Precautions:

During application, precautionary measures recommended by the manufacturer shall be strictly followed. Care should be taken in the application of chemicals to see that they are not allowed to contaminate sources of water, which serve as source of drinking water

Chemical Treatment

Chloropyrifos Emulsifiable Concentrate 1%” shall be used for Anti Termite Treatment. The Anti Termite Treatment shall be applied to the soil beneath the building and around the foundation. Further, the treatment shall be applied on the sides of foundation and basement and to the top surface of the filled earth within the plinth walls. Treatment to soil is provided in accordance with IS 6313 (part II) and on sides of structures as per IS 6313 (Part III). The chemical shall be applied by spraying using hand operated pressure pumps.

Application on soil

Application to soil shall be done over the finished surfaces of excavation at the rate of 5 lit per sq. meter. On top surface of filled earth within the plinth walls shall also be treated at the rate of 5 lit per sq.meter. The chemical shall be applied when the surface is quite dry. Treatment should not be carried out when it is raining or soil is Wet.

Application on surface of foundation and basement

On the surface of masonry or concrete foundation and basement chemical shall be applied at the rate of 7.5 lit per sq.meter. If soil is used for backfilling with watering and compacting, after the ramming operation of each layer, chemical treatment shall be carried out by rodding the earth at 150 mm centers close to the structure surface and spraying the chemical at the rate of

7.5 lit per sq. meter. At junctions of walls and floor a small channel 30 mm x 30 mm shall be made at all junctions of walls and columns with the floor and before laying subgrade. Rod holes are made in the channel 150 mm apart and chemical applied at the rate of 7.5 lit per sq.meter.

At all expansion joints in contact with floor chemical shall be applied at the rate of 2 lit per linear meter of expansion joint. When pipes or conduits enter the building, treatment shall be provided on sides of the structure where the pipes or conduits are in touch with soil, protection shall be given for a length of 300 mm.

For all the above condition an average of 1.90 lit per sft shall be taken for overall plinth area.

Method of Measurement and Payment

Measurement shall be for supplying chemicals and application separate or as a single item. In case of supply and application measured separate, the supply of concentrated chemical in sealed containers shall be measured in liters. Chemicals of different type and/or concentration shall be measured separately. The application shall be measured in square meters correct to 0.01 square meter.

In the case of supply and application as a single item, the measurement shall be applied surface area in square meters correct to 0.01 sq.meter.

Or (Whichever Is Approved By Engineer In charge)

Chemicals

The below mention chemical to be used for the treatment with concentration shown against each in aqueous emulsion:

Chemicals (E.C.'s)	Concentration
Heptachlor	0.5 % (by weight)
Aldrin	0.5 % (by weight)
Chlordane	1.0 % (by weight)

Treatment for Masonry Foundation and Basements

The bottom surface and sides (up to a height of 300 mm from the bottom) of the excavations made for masonry foundations and basements shall be treated with the chemical emulsion mentioned above at 5 liters/m² of surface area.

Treatment of Backfill Earth

After the masonry foundations and retaining walls of the basement come up, the backfill in immediate contact with the foundation structure shall be treated with the chemical emulsion at the rate of 7.5 liters/m². of the vertical surface of the sub structure for each side. The earth is usually returned in layers and the treatment shall be carried out in similar stages. The chemical emulsion shall be directed towards the concrete or masonry surfaces of the columns and walls so that the earth in contact with these surfaces is well treated with the chemical.

Treatment for R.C.C. Foundations and Basements

The treatment shall start at a depth of 500 mm below the ground level except when

ground level is raised or lowered by filling or cutting after the foundations have been cast. In such cases the depth of 500 mm shall be determined from the new soil level resulting from filling or cutting mentioned above and soil in immediate contact with the vertical surface of RCC foundations. From this depth, the backfill around the columns, beams and RCC basement walls shall be treated at the rate of 7.5 liters/m². The other details of the treatment shall be as laid down in 4.2, 4.3 above.

Treatment of Top Surface of Plinth Filling

The top surface of the consolidated earth within the walls shall be treated with the chemical emulsion at the rate of 5 liters/m² of the surface before the sand bed or sub grade is laid. If the filled earth has been well rammed and the surface does not allow the emulsion to seep through, holes shall be made up to 50 to 75 mm deep at 150 mm centers both ways and may be made with 12 mm diameter mild steel rod on the surface to facilitate absorption of the emulsion.

Treatment at Junction of Walls and Floor

Special care shall be taken to establish continuity of the vertical chemical barrier on inner wall surfaces from the ground level (where it has stopped with the treatment described in 4.4 above) up to the level of the filled earth surface. To achieve this, a small channel 30 mm x 30 mm shall be made at all the junctions of wall and columns with the floor (before laying the sub grade) and rod holes made in the channel up to the ground level 150 mm apart and the rod moved backward and forward to break up the earth and chemical emulsion poured along with channel at the rate of 7.5 liters/m² of the vertical wall or column surface of the sub structure so as to soak the soil right to the bottom. The soil should be tamped back into place after this operation.

Treatment of Soil along External Perimeter of Building

After the building is complete, the earth along the external perimeter of the building should be rodded at intervals of 150 mm and to a depth of 300 mm. The rods should be moved backward and forward parallel to the wall to break up the earth and chemical emulsion poured along the wall at the rate of 7.5 liters/m² of vertical surfaces. After the treatment, the earth should be tamped back into place. Should the earth outside the building be graded on completion of building, this treatment should

be carried out on the completion of such grading. In the event of filling being more than 300 mm the external perimeter treatment shall extend to the full depth of filling up to the ground level so as to ensure continuity of the chemical barrier.

Treatment of Soil under Apron Along External Perimeter of Building

Top surface of the consolidated earth over which the apron is to be laid shall be treated with chemical emulsion at the rate of 5 liters/m² of the vertical surface before the apron is laid. If consolidated earth does not allow emulsion to seep through, holes up to 50 to 75 mm deep at 150 mm centers both ways may be made with 12 mm diameter mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion.

Treatment for Walls Retaining Soil above Floor Level

Retaining walls like the basement walls or outer walls above the floor level retaining soil need to be protected by providing chemical barrier by treatment of retained soil in the immediate vicinity of the wall, so as to prevent entry of termites through the voids in masonry, cracks and crevices etc., above the floor level. The soil retained by the walls shall be treated at the rate of 7.5 liters/m² of the vertical surface so as to affect a continuous outer chemical barrier in continuation of the one formed under 2.

Treatment of Soil Surrounding Pipes, Wastes and Conduits

When pipes, wastes and conduits enter the soil inside the area of the foundation, the soil surrounding the point of entry must be loosened around each such pipe, waste or conduits for a distance of 150 mm and up to a depth of 75 mm before the treatment is commenced. When they enter the soil, they shall be similarly treated unless they stand clear of the walls of the building by about 75 mm for a distance of over 300 mm.

Treatment to Expansion Joints

Expansion joints at ground floor level are one of the biggest hazards for termite infestation. The soil beneath these joints should receive special attention when the treatment under 4.5 is carried out. This treatment should be supplemented by treating through the expansion joint after the sub grade has been laid at the rate of 2 liters/m.

Spraying Equipment

A pressure pump shall be used to carry out spraying operations to facilitate proper penetration of chemicals into the earth.

Safety Precautions

These chemicals shall be brought to site in the form of emulsifiable concentrates. The containers should be clearly labeled and should be stored carefully so that children and pets cannot get at them. They should be kept securely closed.

Workers should wear clean clothing and should wash thoroughly with soap water, especially before eating and smoking. If chemicals splash into the eyes, they shall be flushed with plenty of soap, water and immediate medical attention should be sought. The concentrates are oil solutions and present a fire hazard owing to the use of petroleum solvents. Flames, sparks, etc. should not be allowed while mixing.

Care should be taken in the application of chemicals to see that they are not allowed to contaminate wells or springs which serve as sources of drinking water.

Measurements

The measurements shall be made in square meter on the basis of plinth area of the building at floor 1(GF) for all operations described above. Nothing extra shall be measured.

Rate

The rate shall include the cost of all materials and labor involved in all the operations described above including making holes and refilling and making good the same.

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

Item No. 17:- Precast concrete block masonry (including quoin blocks jamb blocks closer etc.) with solid concrete blocks of approved size made of cement concrete 1:3:6 mix (1- Cement : 3 coarse sand: 6- graded stone aggregates of 20 mm and down grade) in foundation and plinth cement mortar 1:6.

Materials: -

- (a) Aggregate shall conform to M-12.
- (b) Sand shall conform to M-6.
- (c) Cement shall conform to M-3.

- 1.1. The solid cement concrete blocks shall be precast with concrete of 1:3:6 mix (1 cement: 3 coarse sand : 6 graded stone aggregate)
- 1.2. A block shall be deemed to be solid if the solid materials is not less than 75% of the total volume of the blocks calculated from overall dimensions.
- 1.3. The concrete mix used for block shall be one of the following:
- 1.4. The actual size of the block shall be one of the following:
Size : **A.** 39 x 30 x 19 cms. Size **B** 39 x 20 x 19 cms. Size **C** 39 x 10 2 19 cms.
The size other than those specified above may be used with the approval of Engineer-in-charge.
- 1.5. The blocks may be either machine made or hand made. The concrete mix, the mixing of concrete the manufacture of blocks, curing and drying shall be in accordance with para-6 to 10 under I.S. : 2185-1967.
- 1.6. Faces of blocks shall be flat and rectangular Surface finish shall be rendered smooth or plastered with cement mortar 1:6 coarse sand)
- 1.7. The average compressive strength of eight blocks when determined in the manner described-in I.S. 2185 - 1967 shall not be less than 50 Kg/Sq. Cm. of gross area. The strength of lowest individual block shall not be less than 75 percent of average compressive strength of eight blocks.
- 1.8. Concrete blocks shall be stored and stacked properly in such a way as to avoid any contact with moisture at site. They shall be stock piled on planks or other supports free from contact with ground and covered to protect against wetting. Cement mortar of proportion 1:6 shall conform to M-11.

2.0. Workmanship

2.1. The blocks need not wetted before of during laying in the walls. In case climatic conditions so required, the top and the sides of block may only be slightly moistures so as to prevent absorption of water from the mortar and ensure the development of required bond with mortar.

2.2. Operations of laying precast cement concrete block masonry shall be carried out in accordance with instructions detailed in I.S. : 6042 -1952. The mortar shall not be spread so much ahead of the actual laying of the units that it tends to stiffen and loose, its plasticity, thereby resulting in poor bond. For most of the work, the joints, both horizontal and vertical shall be 10 mm. thick except in the case of extended joint, construction, the mortar joints shall be struck off flush with wall surface and when the mortar has stated stiffening, it shall be compressed with rounded or U-shaped tool. The mortar shall be pressed against the units with a jointing tool after the mortar has stiffened in effect intimate contract between the mortar and the masonry unit arid obtained a weather tight joint.

2.3. Quoins and closures:

Special quoins blocks (with a return face equal to half the length of normal face) shall be cast for ail building blocks and slabs for external work. Proper half closures shall be cast and not cut form full size blocks. The returned ends of blocks for door windows revels and quoins shall be finished with a fair face in the mould.

2.4. Only double scaffolding shall be used. The scaffolding be strong and sound. No holes in the masonry for supporting shall be allowed.

2.5. Curing : The curing of concrete block masonry shall be carried our for 7 days.

3.0. Mode of measurements & payment

3.1. All work shall be measured on the basis of finished dimensions and measured net except where otherwise specified. Only specified dimensions shall be allowed. Anything extra shall be ignored. The masonry work in foundation and plinth shall be measured under this item. No deduction shall be made, not extra payment made for the following:

- (a) Ends of joints, beams, spots, girders, rafters, purloins, trusses, corbles, etc. each up to 500 sq. cm. in section.
- (b) Opening each up to 0.1 sq.m.

- (c) Wall plates and bed plates, bearing of chhaja and like up to 10 cm. depth (bearing of floor and roof slabs shall be deducted from masonry).
 - (d) Drain holes and recesses for cement concrete blocks to embed hold fasts for doors windows.
 - (e) Building in the masonry iron fixtures pipes up to 300 mm. dia. hole fasts of doors and windows.
 - (f) Forming theses in masonry up to section of 350 sq.cm.
- 3.2. The work of concrete block masonry in foundation and plinth shall be measured under this item.

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

Item No. 18:- Precast concrete block masonry in partition walls 10 cm. thick with solid block of approved size (including quoin blocks Jamb blocks closer etc.) made of C.C.1:3:6 (1- Cement : 3- coarse sand : 6 graded stone aggregates 20 mm and down grade) (A) in C.M. 1:4.

Materials: -

- (a) Aggregate shall conform to M-12.
- (b) Sand shall conform to M-6.
- (c) Cement shall conform to M-3.

- 1.1. The solid cement concrete blocks shall be precast with concrete of 1:3:6 mix (1 cement: 3 coarse sand : 6 graded stone aggregate)
- 1.2. A block shall be deemed to be solid if the solid materials is not less than 75% of the total volume of the blocks calculated from overall dimensions.
- 1.3. The concrete mix used for block shall be one of the following:
- 1.4. The actual size of the block shall be one of the following:

Size : **A.** 39 x 30 x 19 cms. Size

B 39 x 20 x 19 cms. Size

C 39 x 10 x 19 cms.

The size other than those specified above may be used with the approval of Engineer-in-charge.

- 1.5. The blocks may be either machine made or hand made. The concrete mix, the mixing of concrete the manufacture of blocks, curing and drying shall be in accordance with para-6 to 10 under I.S. : 2185-1967.
- 1.6. Faces of blocks shall be flat and rectangular Surface finish shall be rendered smooth or plastered with cement mortar 1:6 coarse sand)
- 1.7. The average compressive strength of eight blocks when determined in the manner described-in I.S. 2185 - 1967 shall not be less than 50 Kg/Sq. Cm. of gross area. The strength of lowest individual block shall not be less than 75 percent of average compressive strength of eight blocks.
- 1.8. Concrete blocks shall be stored and stacked properly in such a way as to avoid any contact with moisture at site. They shall be stock piled on planks or other supports free from contact with ground and covered to protect against wetting. Cement mortar of proportion 1:6 shall conform to M-11.

2.0. Workmanship

2.1. The blocks need not wetted before of during laying in the walls. In case climatic conditions so required, the top and the sides of block may only be slightly moistures so as to prevent absorption of water from the mortar and ensure the development of required bond with mortar.

2.2. Operations of laying precast cement concrete block masonry shall be carried out in accordance with instructions detailed in I.S. : 6042 -1952. The mortar shall not be spread so much ahead of the actual laying of the units that it tends to stiffen and loose, its plasticity, thereby resulting in poor bond. For most of the work, the joints, both horizontal and vertical shall be 10 mm. thick except in the case of extended joint, construction, the mortar joints shall be struck off flush with wall surface and when the mortar has stated stiffening, it shall be compressed with rounded or U-shaped tool. The mortar shall be pressed against the units with a jointing tool after the mortar has stiffened in effect intimate contract between the mortar and the masonry unit arid obtained a weather tight joint.

2.3. Quoins and closures:

Special quoins blocks (with a return face equal to half the length of normal face) shall be cast for ail building blocks and slabs for external work. Proper half closures shall be cast and not cut form full size blocks. The returned ends of blocks for door windows revels and quoins shall be finished with a fair face in the mould.

2.4. Only double scaffolding shall be used. The scaffolding be strong and sound. No holes in the masonry for supporting shall be allowed.

2.5. Curing : The curing of concrete block masonry shall be carried our for 7 days.

3.0. Mode of measurements & payment

3.1. All work shall be measured on the basis of finished dimensions and measured net except where otherwise specified. Only specified dimensions shall be allowed. Anything extra shall be ignored. The masonry work in foundation and plinth shall be measured under this item. No deduction shall be made, not extra payment made for the following:

- (a) Ends of joints, beams, spots, girders, rafters, purloins, trusses, corbles, etc. each up to 500 sq. cm. in section.

- (b) Opening each up to 0.1 sq.m.
- (c) Wall plates and bed plates, bearing of chhaja and like up to 10 cm. depth (bearing of floor and roof slabs shall be deducted from masonry).
- (d) Drain holes and recesses for cement concrete blocks to embed hold fasts for doors windows.
- (e) Building in the masonry iron fixtures pipes up to 300 mm. dia. hole fasts of doors and windows.
- (f) Forming theses in masonry up to section of 350 sq.cm.3.2. The work of concrete block masonry in foundation and plinth shall be measured under this item.

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

Item No. 19:- Providing 10mm thick cement plaster in single coat on brick/concrete walls for interior plastering up to floor two level and finished even and smooth in (ii) Cement mortar 1:4 (1-cement :4-sand)

1.0. Materials

1.1. Water shall conform to M-1. The cement mortar of proportion 1:4 shall conform to M-13.

2.0. Workmanship

2.1. Scaffolding:

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

2.2. Preparation of back-ground :

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

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

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

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

2.3. Application of plaster:

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

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

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises.

It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises.

Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days.

Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather

shall be prevented by hanging matting or gunny bags on the outside of the plaster and keeping them wet.

3.0. Mode of measurements & payment

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimetre.

3.3. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10 mm. at any point on this surface.

3.4. This item includes plastering up to floor two level.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq. mt each in area and for openings exceeding 0.5. sq. mt and not exceeding 3.00 sq. mt. in each area deductions and additions shall be made in the following manners.

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

- (b) Deduction for openings exceeding 0.5 sq. mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings,
- (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only,
 - (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.

3.8. For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. In case of openings of area above 3 sq. mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.

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

Item No. 20:- Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering up to floor two level and finished even and smooth in (ii) Cement mortar 1:4 (1-cement :4-sand).

1.0. Materials

1.1. Water shall conform to M-1. The cement mortar of proportion 1:4 shall conform to M-13.

2.0. Workmanship

2.1. Scaffolding:

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

2.2. Preparation of back-ground :

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

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

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

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

2.3. Application of plaster:

2.3.1. The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive trowelling or overworking the float shall be avoided.

All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

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

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises.

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

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily

absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags on the outside of the plaster and keeping them wet.

3.0. Mode of measurements & payment

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimetre.

3.3. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 15 mm. at any point on this surface.

3.4. This item includes plastering up to floor two level.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq. mt each in area and for openings exceeding 0.5. sq. mt and not exceeding 3.00 sq. mt. in each area deductions and additions shall be made in the following manners.

- (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.
- (b) Deduction for openings exceeding 0.5 sq. mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings,

- (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only,
- (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.

3.8. For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. in case of openings of area above 3 sq. mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.

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

Item No. 21:- Providing 20mm thick cement plaster in single coat on single or half brick walls for interior plastering up-to floor two level and finished even and smooth in (i) Cement mortar 1:3 (1- cement:3-sand).

1.0. Materials

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

2.0. Workmanship

2.1. Scaffolding:

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

2.2. Preparation of back-ground :

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

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

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

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

2.3. Application of plaster:

2.3.1. The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive trowelling or overworking the float shall be avoided.

All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

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

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises.

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

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is

hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags on the outside of the plaster and keeping them wet. The rate shall be for a unit of one sq. metre.

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

3.0. Mode of measurements & payment

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimetre.

3.3. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 15 mm. at any point on this surface.

3.4. This item includes plastering up to floor two level.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq. mt each in area and for openings exceeding 0.5 sq. mt and not exceeding 3.00 sq. mt. in each area deductions and additions shall be made in the following manners.

- (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt each and no addition shall be made for

reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.

- (b) Deduction for openings exceeding 0.5 sq. mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings,
- (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only,
 - (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.

3.8. For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. in case of openings of area above 3 sq. mt. each, deduction shall be made for openings but jambs, soffits sand sills shall be measured.

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

Item No. 22:- Providing and Laying 24"x24" vitrified 8mm thick tile flooring over 20mm (average) base of cement mortar 1:6 (1-Cement 6-Coarse sand) on new surface or fixing on existing flooring by adhesive materials including dismantling of existing flooring and jointed with colour cement slurry including finished with flush pointing and cleaning the surface etc. complete for antiskit.

1.0. Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. 24" x 24" vitrified tiles 8mm thick (Kajeria, Asian, Bell Nitco, Somani or equivalent standard quality) shall conform to relevant Indian standard. The size & colour of vitrified tiles shall be approved by Engineer in charge. Tiles shall be of Dark/Light shade laid in pattern as approved with antiskid properties.

2.0. Workmanship

2.1. Bedding :

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

2.1.2. The vitrified flooring tiles shall be laid on cement mortar bedding of 20 mm. thick in C.M. 1:6. The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 8 mm. at any place and average 20 mm thickness. The proportion of the cement mortar shall be as specified in the item.

2.2. Fixing tiles :

2.2.1. The tiles before laying shall be soaked in water for at least two hours. Neat gray cement grout at 33 kg/Cement/Sq.mt. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles shall be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in straight line or as per pattern.

2.2.2. The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nahni trap coming in the flooring shall be so positioned that its grating shall

replace only one tile as far as possible. Where full size tiles cannot be fixed they shall be cut (Swan) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with grey cement grout with wire brush or trowel to a depth of 5 mm. and loose material removed. White cement shall be used for pointing the joints. After fixing the tiles finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days. The pattern shall be approved by Engineer in charge.

2.3. Cleaning :

2.3.1. The surplus cement grout that may have come out of the joints shall be cleaned off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precautions and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the construction.

Flooring Pattern

This shall be done in design pattern with different Shades, Size, and layout as according to the groove joints of 3mm/5mm with spacer and epoxy - Cement grout filling as directed by engineer in charge.

3.0. Mode of measurements and payment

3.1. The rate shall include the cost of all materials and labour required for various operations described above. Risers of steps: skirting and dado shall be measured in square meters, length and height shall be measured along the finished face of the skirting or dado including curves, where special such as covers, internal and external angles, etc., used. The length and height shall be measured correct to the centimetre except in case of risers and skirting where height shall be measured correct to 3 mm

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

Item No. 23:- Providing and laying Vitrified tiles 8 to 10 mm 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.

1.0. Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. 24" x 24" vitrified tiles 8mm thick (Kajeria, Asian, Bell Nitco, Somani or equivalent standard quality) shall conform to relevant Indian standard. The size & colour of vitrified tiles shall be approved by Engineer in charge. Tiles shall be of Dark/Light shade laid in pattern as approved with antiskid properties.

2.0. Workmanship

2.1. Bedding :

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

2.1.2. The vitrified flooring tiles shall be laid on cement mortar bedding of 20 mm. thick in C.M. 1:6. The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 8 mm. at any place and average 20 mm thickness. The proportion of the cement mortar shall be as specified in the item.

2.2. Fixing tiles :

2.2.1. The tiles before laying shall be soaked in water for at least two hours. Neat gray cement grout at 33 kg/Cement/Sq.mt. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles shall be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in straight line or as per pattern.

2.2.2. The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nahni trap coming in the flooring shall be so positioned that its grating shall replace only one tile as far as possible. Where full size tiles cannot be fixed they shall be cut (Swan) to the required size and the edges rubbed smooth to ensure straight and true

joints. The joints shall be filled with grey cement grout with wire brush or trowel to a depth of 5 mm. and loose material removed. White cement shall be used for pointing the joints. After fixing the tiles finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days. The pattern shall be approved by Engineer in charge.

2.3. Cleaning :

2.3.1. The surplus cement grout that may have come out of the joints shall be cleaned off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precautions and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the construction.

Flooring Pattern

This shall be done in design pattern with different Shades, Size, and layout as according to the groove joints of 3mm/5mm with spacer and epoxy - Cement grout filling as directed by engineer in charge.

3.0. Mode of measurements and payment

3.1. The rate shall include the cost of all materials and labour required for various operations described above. Risers of steps: skirting and dado shall be measured in square meters, length and height shall be measured along the finished face of the skirting or dado including curves, where special such as covers. internal and external angles, etc., used. The length and height shall be measured correct to the centimetre except in case of risers and skirting where height shall be measured correct to 3 mm

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

Item No.24 :- Providing and fixing cupboard shelves made of both-side machine polished Kota stone slabs, 20–25 mm thick, with exposed edges finished in half-round moulding, fixed in position with cement mortar 1:1 (1 cement : 1 coarse sand), including cutting, dressing, making necessary grooves in wall, proper levelling, jointing, and finishing with cement slurry, complete as directed by the Engineer-in-charge.

The work shall consist of providing, cutting, dressing, transporting, and fixing cupboard shelves made from machine-polished Kota stone slabs of approved quality, size, colour, and texture. The work shall include all labour, materials, tools, equipment, cutting, edge finishing, grooving in walls, bedding mortar, levelling, jointing, finishing, curing, and all incidental works required to complete the installation as per drawings and directions of the Engineer-in-Charge.

Materials

2.1 Kota Stone Slabs

- Kota stone shall be of approved quality, hard, sound, dense, durable, and free from cracks, flaws, cavities, and other defects.
- Slabs shall be machine polished on both exposed faces.
- Thickness of slab shall be 20 mm to 25 mm.
- Colour and shade shall be uniform throughout the work.
- Dimensions shall be as shown on drawings or as directed by the Engineer-in-Charge.

2.2 Cement

- Cement shall conform to IS:269, IS:8112, IS:12269 or latest relevant specifications. Cement shall be fresh and free from lumps.

2.3 Sand

- Coarse sand shall be clean, hard, durable, and free from organic impurities. Sand shall conform to IS:383.

2.4 Mortar

- Cement mortar shall be prepared in the proportion of 1:1 (1 cement : 1 coarse sand) by volume. Mortar shall be mixed in small quantities and used before initial setting.

Preparation

- The wall surfaces where shelves are to be fixed shall be cleaned thoroughly.
- Necessary grooves, pockets, or recesses shall be carefully cut in masonry walls to the required depth to receive the stone shelf.
- All loose particles, dust, and debris shall be removed before fixing.

Fixing

- Kota stone slabs shall be cut accurately to the required size and shape.
- The exposed front edge of the slab shall be finished with half-round moulding and polished smoothly.
- The slab shall be placed on a bed of cement mortar 1:1 and inserted into the wall grooves.
- The shelf shall be fixed truly level, properly aligned, and firmly supported.
- Joints between stone and wall shall be completely filled with cement mortar.
- Any gaps shall be neatly pointed and finished.

Finishing

- Top and bottom surfaces shall remain machine polished.
- Exposed moulded edges shall be uniformly dressed and polished.
- Cement slurry shall be applied at joints and contact surfaces wherever required to ensure proper bonding.
- Excess mortar and slurry shall be cleaned immediately after fixing.
- Finished surfaces shall be free from stains, scratches, chips, or defects.

Curing

- The fixed shelves shall be protected from disturbance until the mortar has sufficiently hardened.
- Mortar joints and bedding shall be cured adequately for a minimum period of 7 days.

Tolerances

- Level tolerance: ± 3 mm over the full shelf length.
- Alignment tolerance: ± 3 mm.
- Thickness variation shall not exceed permissible limits specified for the stone.

Rate

The rate shall include:

- Supply of machine-polished Kota stone slabs. Cutting, dressing, polishing, and half-round edge moulding. Cement, sand, mortar, and cement slurry.
- Making grooves/recesses in walls. Fixing, levelling, jointing, finishing, and curing. Labour, scaffolding, tools, tackles, transportation, wastage, and all incidental charges. Complete finished work as approved by the Engineer-in-Charge.
-

Measurement

- Length and width shall be measured net as fixed in position.
- No separate measurement shall be made for:
 - Half-round molding of exposed edges. Cutting and dressing. Grooves/recesses in walls. Mortar bedding. Cement slurry. Jointing and curing. All labour, tools, and incidental works.
- **Measurement shall be made in square metres (Sq.m.) of finished shelf area.**

Item No.25 :- Providing and laying Kota Stone Slab Both Side Edges Half Rounded Moulded 18-20 mm thick , in Door Window Sill, Jambs, Soffits on 10mm thick cement plaster 1:3 (1-cement : 3-coarse sand) With corner matched at 45° and jointed with cement slurry.

1.0 Materials:

Water shall conform to M-1. Lime mortar shall conform to M-10: Cement mortar shall conform to Stone slab 25mm. thick shall conform to M-52.

2.0 Workmanship:

2.1. Dressing of slabs: Every stone shall be cut to required size and fine chisel dressed to give a smooth and even surface on all sides to the full depth. A straight edge laid along the sides of the stone shall be fully in contact with it. Chisel dressing shall also be done on top surface to remove any waviness. The sides and top surface of marble slabs shall be machine rubbed or table rubbed with hoarse sand before using. All angles and edges of slabs shall be true, square and free from chippings.

2.2. The thickness of stone shall be 18-20-25 mm. The allowable tolerance shall be 2 mm. allowable. The tolerance shall be 15 mm. in length and breadth.

2.3 Bedding: Bedding of Stone slabs shall either be cement mortar 1 : 6 (1 cement: 6 coarse) sand of average thickness 20 mm. thick as given in description of item. Minimum thickness at any place shall not be less than 15 mm. for wall Rough Plaster of 10 to 12mm thick of CM 1:3 (1 cement: 3 coarse).

2.4. Laying : The surface of sub grade shall be cleared wetted and mopped. Mortar of specified mix and thickness shall then be spread on an area sufficient to receive one Stone slab. The slab shall be washed clean before laying. It shall be laid on top pressed and tapped gently to bring it in level with other slabs. It shall then be lifted and laid a side. The 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 it over this surface cement slurry of honey like consistency at 4.4 Kg. of cement per sq. metre. The edges of slabs already paved shall be buttered with grey cement. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joints shall be as fine as possible: Surplus cement on the surface of

the slabs shall be removed. The slab fixed in the floor adjoining the walls shall enter not less than 10 mm. under the plaster skirting or dado. The junction between the walls and floors shall be finished neatly. The finished surface shall be true to level and slopes as directed.

2.5. Curing : The floor shall be cured for a minimum period of seven days.

2.6. Polishing and finishing: Unevenness at the meeting edges of slab shall be removed by fine chiselling. Finishing etc. shall be done as per relevant specifications of item No. 14.21 (A) of terrazzo tiles flooring except that cement slurry with/or without pigments shall not be applied on the surface before each polishing.

2.7 moulding : If Granite/Marble/Stone Fixing on Wall Surface then Edges of Marble Shall be Half Round Moulding Including polishing shall be done and Completed as Instructed by Engineer in charge.

3.0 Mode of measurements & payment:

3.1. Granite/Marble/Different stones flooring with various kinds of marble shall be measured in sq. metre. The length and breadth shall be measured between the finished face of skirting or dado or wall plaster. No deduction shall be made nor extra shall be paid for any openings in the floor of area up-to 0.05 sq. mt. Nothing extra shall be paid for laying stone at different levels in the same room. Treads and steps of stairs paved with marble stone slabs shall also be measured under flooring.

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

Item No.26 :- Providing and fixing window having extruded aluminum Colour Powder Coated section frame main outer size 63.50 x 38.10 x 1.95 mm,@ Wt 1.094 Kg / Rmt, horizontal two track member size 61.85 mm x 31.75 mm x 1.20mm @ wt.of 0.695 Kg/mt, vertical member of size 61.85 mm x 31.75mm x 1.30 mm @ wt.of 0.0.659 Kg/mt with sliding shutters of horizontal member size 40mm x 18mm x 1.29mm @ wt.of 0.456Kg/mt, vertical member of size 40mm x 18mm x 1.29mm @ wt.of 0.456Kg/mt with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminum fittings and fixtures and transparent silicon sealant glass fixing to frame as per details etc complete for window.

Aluminium standard section: Aluminium used in the manufacture of powder coated extruded Aluminium Window section shall confirm to IS designation HEA- WP- of IS 733-1975 and also designation W.V.G.- WP of IS 1285-1975 section shall be as specification in the drawing and design. All section shall be free from any scratches or any damage on surface. All section shall have finished lustre surface on wall sides. The powder coated extruded Aluminium Window having extruded aluminium anodized section frame with sliding shutters as directed by Engineer in charge.

For materials of the aluminum doors, windows, ventilators etc. the item No.M-31 / page No.10 of the general technical specification for building works booklet must be followed. The material shall be of aluminum-coloured anodized doors, windows and ventilators complete as per IS: 948-1961. The glass used shall be as per item no. M-38 /P-19 of the general technical specification booklet.

Glass: The transparent bronze colour tinted float glass panel of Modi Guard or equivalent make with powder coated having thickness of 5mm. The glass shall be clear and free from scratches and cracks. The glass shall be provided on wall panel and fixed with transparent silicon gasket.

Glazing clips: Glazing clips of size shall be as directed by Engineer of size around the acrylic sheet all over shall be free from any scratches or holes or any damage of on surface all section shall have finished lustre surface on all sides.

Silicon Gasket: Silicon gasket shall be approved make shall be free from any scratches or holes or any damage on surface and shall have finished lustre surface on all sides.

Fixtures

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

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

Workmanship:

The work of powder coated extruded Aluminium Window shall be done with extreme finishing. The partial board shall be fixed in the bottom panel and transparent bronze colour tinted float glass shall be fixed in bottom panel and glass shall be fitted on top panel as directed by engineer in charge using glazing clips and rubber gasket as required. All the fixtures and fastening shall be fitted at right place and as directed by Engineer in charge. Floor spring shall be fitted properly so as to align the window properly and shall be given trial of opening and closing properly.

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

Aluminium alloy and finished certificates,

We shall provided certificates from the extruded regarding alloy. We shall provided certificate of the anodized finishing indicating micron thickness from the anodized. Contractor shall submit shop drawing (showing a fabricating details) to the client / Architect for the approval in advance of commencement of work for which decision of Chief Engineer shall be final.

Conditions for Aluminum Works

- (a) The glazing shall be fixed with the External finished surface (either stone cladding external plaster) and hence all the necessary rubber strips, packing and polysulphide polymer (between the frame and concrete or other surface all around)

shall be provided within the rate quoted so as to make the junctions fully water tight/air tight.

- (b) Approved make selected glass of thickness as specified shall be used in door. Wired glass louvers shall be provided wherever shown on drawings.
- (c) Necessary locking arrangement of approved design (by Architect) shall be provided without any extra cost.
- (d) Wherever necessary, PVC lining (silver grey or white only) etc. shall be provided for air/water tightness.
- (e) Necessary operating device (as per design) for operation of louvers of windows, ventilators, sky lights, including necessary rods shall be provided without any extra cost.

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

Item No.27 :- Providing and fixing standard extruded of alluminium section of size 63mm x 38.10mm x 1.2mm @ Wt. 0.643 Kg/mt with colour anodized alluminium frame for ventilation with 5 mm thick frosted glass as details etc complete for Ventilation.

Materials:

Aluminium alloy used in the manufacturing of extruded section for windows shall confirm to HE9-Wp of I.S 733-1956 and also hollow aluminium section confirm to IS designation HV9-WP-IS-1285-1958. Aluminium section of approved weight shall be procured at site. Fabrication shall be done as per I.S. 1948-1961 & drawing or as directed.

Details of anodized powder coating section to be used are as 100 mm Wide powder coated aluminium louver in required width & numbers having dual controls i.e two right & two left handles. For materials of the aluminum doors, widows, ventilators etc. the item No.M-31 / page No.10 of the general technical specification for building works booklet must be followed.

The material shall be of aluminum-coloured anodized doors, windows and ventilators complete as per IS: 948-1961. The glass used shall be as per item no. M-38 /P-19 of the general technical specification booklet.

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

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

All members of frames shall straight without any warp or bow and shall have smooth surface well placed on the three sides exposed at right angles to each other. The surface touching the wall shall be planed within the tolerances specified. The frame of JINDAL section No. 2459 size 63mm x 38.10 mm X 1.2 mm (Jindal Section : 2434, @ Wt. 0.643 kg/mt) shall be used. Before erection of frame, hollow section of frame shall be filled with country wood. After erection of frame, frame shall be checked by manually whether the frame is filled with country wood or not.

Frame shall have screwed joints. When clerestory windows are included, it shall be provided by having full length 1 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. Slight adjustment or spacing as necessary shall be done to have the position of the screws in the joints of masonry course. The frame shall be erected in position and held plumb with strong support from both sides and built in masonry as it is being built.

Sufficient numbers of number of screws shall be used on each side of door and window frames. In case of windows and ventilators, frames whose height is less, 1 mts three screws, on each side shall be fixed at quarter points of the frames.

Powder quoting to aluminum louvers and rectangular tube section frames shall be carried out prior to erection of frame and fixing of louvers. The color and shade of powder coat shall be got approved from Engineer-in-Charge prior to execute the item. Aluminum louvers shall be fixed in the line and level to the satisfaction of Engineer-in-charge. Aluminum louvers shall be fixed with MS hollow section frame by means of screws. All glazing blades shall have thickness of 5 mm and shall be transparent float glass. The louver shall be operated through smooth side handles and louver shall be tilted at desired angles.

Placing and holding of blades shall be easy and smooth without any interruption of aluminum louvers. Edges of the transparent float glass blades shall be grounded one to avoid any accident in operations and in replacing, maintaining & in cleaning of blades.

Mode of Measurements & payments:

The rate for adjustable ventilator includes cost of aluminum rectangular tube section frame, cement mortar, aluminum louvers, 5 mm thick transparent float glass, powder coating to aluminum louvers & M.S frame, all labours, tools & plants , incidental expenses, taxes, vat etc. For completing the item of work.

The dimensions of adjustable ventilator shall be measured at the opening made for fixing of ventilator with frame.

The rate shall be for a unit of 1 square meter.

Item No.28 :- Providing and fixing alluminium doors having door frame of 63.0 x 38.10 x 2.95 mm size (1.516 Kg./Rmt) section No 14005 with wooden inserts for durable grip of door hinges, Single Shutter Pivoted 35mm tk Flush Door with floor spring solid core finished with 1 mm tk lamination on both side with S.S handle and S.S Fixtures and fastening including labour & material Equipments as directed.

1.0 Materials

For materials of the aluminum doors, windows, ventilators etc. the item No.M-31 / page No.10 of the general technical specification for building works booklet must be followed. The material shall be of aluminum colored anodized doors, windows and ventilators complete as per IS: 948-1961.

The 38mm thick wooden Flush door solid core (M-30) shall be as per item 10.30 /P-63 of the general technical specification booklet. The hardware used i.e. screw, rivets etc. shall be of brass C.P./ aluminum or any other rust proof metal as specification.

Aluminum doors having door frame of 63.5 x 38.00 x 2.5 mm size (1.1 Kg./Rmt) section No 19552 with wooden inserts for durable grip of door hinges, Single Shutter Pivoted 38mm tk Flush Door with floor spring solid core finished with 1 mm tk lamination on both side with S.S handle and S.S Fixtures and fastening including labour & material Equipments as directed.

2.0 Workmanship

supplying and fixing of aluminum color anodized Frame, Flush door shutter approved section as described above with all necessary accessories like door lick, window lock, beadings, handles, screws, 5 mm thick plain or tinted glass, floor spring, hydraulic door closer including cost of all materials and labor charges etc. complete.

The overall dimensions of window /door/ventilator units shall not differ from those given in drawing by more than 3mm or as per the site conditions.

Beading use for doors, widows shall be screw less sanp-on type.

Directed contact of metal and glass shall be avoided by providing new prene, PVC gasket for beadings.

3.0 Mode of Measurement and Payment

The Door unit shall be measured in “Square Meter” basis as specified.

Item No.29:- Providing and fixing FRP frame size 125x65 mm and 28mm thick FRP depress panel shutter having extra reinforcement on sides & edges in Gel coat finish. The core of the shutter & frame is to be filed up with injected fire retardant grade polyurethane foam done in situ along with embedded wooden pieces for stiffening & also taking hinges & fixtures. The whole FRP frame & shutter is to be water proof weather proof, termite proof & resistance to mild acid/alkali. Rates are to be inclusive of S.S hinges with necessary screws & aluminium fixtures & fastenings & fastener sleeve.

Material:

28mm thick shutter in depressed panel design shall be having 1.5 to 2.0 mm thickness fire extinguishing grade FRP skin, sandwich panel of 4mm plywood and embedded wooden pieces for stiffening as well holding hinges and fixtures all melded into a one piece shutter core material shall be injected fire extinguishing grade rigid polyurethane foam done in situ having density 32 to 36 Kg/m² compressive strength 1.8 to 2.0 Kg/cm² flexural strength 3.5 to 4.5 Kg/m² whole shutter shall be water proof , weather proof , termite proof and mild acid / alkali resistance.

Shutter:

28mm thick depressed panel FRP shutter shall be joint less. It shall be straight and smooth and of standard shape finished in gel coat. All necessary fixture and fastening shall be fixed where wooden pieces are provided.

Workmanship:

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

Fixtures and Fastening:

All other fixture like Aluminium aldrop tadi or baby – latch, stopper, handle shall be fixed with shutter in usual manner.

Tolerance:

± 1.5 tolerance will be allowed in thickness of shutter.

Mode of Measurement and Payment:

Rate of shutter includes the cost of aluminium fixtures & fastening with necessary screws for fixing in position and payment shall be made on a unit of Smt. Basis.

Item No.30 :- Providing and fixing M.S. grills of required pattern to wooden frames of windows etc. with M.S. flats at required spacings and frame around, square or round bars with round headed bolts and nuts or by screws (A) Plain Grill.

Materials & Workmanship: 1.1. The relevant specifications of item No. 10.100 (A) shall be followed except that the work is for ornamental grill.

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

Workmanship:

The M.S. Grill shall be prepared as per the drawings or as directed for fixing to wooden frames of windows etc.

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 / wall of the windows etc., before they are erected in position. The outside strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc. The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/screw per 30 cm. of the length of outer strip subject to a minimum of 2 Nos. on each side of the frame or as indicated in the drawings or as directed.

For all heights as shown in drawings. 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. Two coats of Approved shade of enamel paint

Providing and fixing M.S. grill of required pattern to wooden frames of windows etc. with M.S. plates, at required spacings and frame around, square or round bars with round headed bolts and nuts or by screws and with ornamental grill.

Mode of measurements & payment:

The relevant Specifications of item No. 10-100(A) shall be followed.

The rate shall be for unit of one Kg.

Item No.31:- Steel work, welded in built up sections framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint. (A)In beams and joists, channels angles Tees, flats, with connecting plates or angle cleats as in main and cross beams. Hip and jack rafters, purlins connected to common rafters and the like.

Steel work, welded in built up sections framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint. (A)In beams and joists, channels angles Tees, flats, with connecting plates or angle cleats as in main and cross beams. Hip and jack rafters, purlins conneted to common rafters and the like.

Materials

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

Workmanship

The steel sections as specified or required, shall be cut, square and to correct lengths, as per drawings and design. The .cut ends exposed to view shall be finished smooth. No two pieces shall be welded or otherwise jointed to make up the required length of member, except as indicated in the drawing or as directed. All straightening and shaping to form shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in suet] a manner as not to impair the strength of the metal. All operations shall be done in cold state unless otherwise directed/permitted.

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

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

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

Ail stiffeners shall be formed by pressure and where practicable the metal shall not to be cut and welded in making these. In major work', or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure including location, type, size, (origin and details of rivets, bolts or weld shall be prepared in advance of the actual fabrication and as distinctly marked or stencilled 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, stained, or forced into position and when built up, shall be true and free from twists, brinks, buckles, or open joints.

Before making holes in individual members for fabrication the steel work intended to be riveted or bolted together shall be as aligned or clamped properly and tightly so as to ensure close abutting or lapping of the surfaces of the different members. All stiffeners shall bear tightly both at top and bottom without being drawn or caulked. The abutting joints shall be cut or crossed true and straight and fitted close together. Web splice plates and fillers under stiffeners shall be cut to fit within 3 mm. of flange angles. Web plates of Girders shall have no cover. Plates, shall have their ends flush with the top of angles forming the flanges unless otherwise required. The web plates when spliced shall have clearance of not more than 6 mm. The erection, clearance for created ends of members connecting steel shall preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for a practical reason greater clearance is necessary, suitably designed seating shall be provided.

Plans and rollers shall be accurately tuned to gauge. These straight and smooth and free from flaws. The roller bearing shall be provided with adequate arrangements for holding the girders or truss resting on it. In columns caps and bases, the ends of shifts together with the attached gussets, angles, channels etc after riveting together shall be accurately mechanized so that the parts connected butt against each other over the entire surfaces of contact connecting angles or channels shall be fabricated and placed in position with greater accuracy so that they are not unduly reduced in thickness by

machining. The ends of bearing stiffeners shall be mechanized or ground to fit tightly both at the top and bottom, All holes shall generally be drilled to the required size and at required, position.

Sub punching shall be permitted provided it is done 3 mm. or less in diameter and reamer thereafter to the required size. The holes for rivets and bolts shall be larger by 0.4 to 6 mm. than the nominal diameter of rivets or black bolts depending upon the diameter of rivets, Holes shall have their axis perpendicular to the surface bored through. The drilling or reaming shall be free from burrs, and the holes should be clean and accurate holes for counter sunk bolts shall be made in such a manner that their heads fit flush with the surface after fixing.

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

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

Welding shall generally be done by electric process. Gas welding shall be resorted to, using oxyacetylene flame with specific prior approval. Gas welding shall not be permitted for structural steel work.

The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded, shop and site welded as well as type of electrodes to be used, symbol for welding on plans and shop drawings shall be according to I.S. 813-1961. As far as possible every effort shall be made to limit the welding that must be done after improper welding that is likely to be done due to heights and difficult positions on scaffoldings etc. The welding work shall conform to I.S. 816-1969.

Preparation of surfaces : Surfaces which are to be welled together shall be free from loose mill scale, rust, paint, grease or other foreign matter. A coating of boiled linseed oil shall be permitted.

Assembly for welding : Before welding is commenced, the plates shall first be brought together and firmly clamped or spot welded at specified distance. This temporary connection has to be strong enough to hold the plates accurately in place without displacement.

Precautions : All operations connected with welding and cutting equipment shall conform to safety requirement given in I.S. 818-1968.

The following points shall be borne in mind during the process of welding:

- (b) Are length voltage and amperage shall be suited to the thickness of material type of groove and other circumstances of the work.
- (c) The segments of welding shall be such that where possible the members which offer the greatest resistance to compression are welded first.

The defective welds which shall be considered harmful to the structural strength shall cut out and reworked. Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all slag has been removed. Welds and adjacent parts shall be painted after the same are approved.

All the members shall be thoroughly cleaned of rust-scales, dust etc. and given a priming coat of red lead paint before fixing them in position. Testing of welding to be added in the specification I.N. 12.2.2.12-(i) to (viii)

Mode of measurements & payment

The steel work shall be measured in general as under:

- (a) All work shall be measured on the basis of finished dimensions as fixed at site and measured net unless specified otherwise.
- (b) The weight of steel sections, steel rods, and steel strips in finished work shall be calculated from standard weight on the same basis on which steel is supplied to Contractor by department or those given in relevant I S : if steel is arranged by the contractor.

- (c) The weight of steel plates and strips shall be taken from relevant I.S. based on 7.35 kg./sq. meter for every millimeter sheet thickness if steel is supplied to the contractor by department.
- (d) Unless otherwise specified, weight of cleats, brackets, packing pieces, bolts, nuts, washer, distance pieces, separators, diaphragm gusset (taking overall square dimensions) fish plates etc. shall be added to the weight of respective items.
- (e) In riveted work allowance is to be made for weight of rivet 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 castings, weight shall be calculated on the basis of 7850 kg./cum.
- (g) Unless otherwise specified, no allowance shall be made for the weld metal in case of welded steel structure.
 - (i) Dimensions other than cross sections and thickness of plates shall be measured to nearest 0.001m
 - (ii) Mill tolerance shall be ignored when weight is determined by calculation.

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

The rate shall be for a unit of one quintal.

Item No.32 :- Painting two coats (including priming coat) on new steel and other metal surface with enamel paint, brushing, interior to give an even shade including cleaning the surface an even shade including cleaning the surface of all dirt, dust and other foreign matter.

Material:

The enamel paint and primer shall be of approved make and quality, suitable for application on new steel and other metal surfaces. Thinners, brushes and all auxiliary materials shall be of approved standard.

Workmanship:

All new steel and metal surfaces shall be thoroughly cleaned by removing dirt, dust, grease, oil, rust, scale and other foreign matter. A priming coat of approved primer shall be applied uniformly and allowed to dry completely. After proper drying of the primer, two coats of approved enamel paint shall be applied by brushing, ensuring a smooth, uniform and even shade, free from brush marks, patches or sagging. Each coat shall be applied only after the previous coat has dried, as per manufacturer's specifications.

Mode of Measurement & Payment:

The rate shall include the cost of all materials, primer, enamel paint, labour, tools and plants, surface preparation, cleaning and all incidental works required for the satisfactory completion of the item. Measurement shall be per square metre, complete in all respects, as directed by the Engineer-in-Charge.

Item No.33:- Providing and laying broken chine mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 with cement concrete flooring 1:2:4 laid in one layer and finished with a floating coat of neat cement. (B) 50mm thick. to plain or slope and to be tempered to bring mortar creme out up-to surface using white cement including rounding off junctions and extending them up-to 15 cm along the wall, clearing with water and oxalic acid etc. as directed.

1.0 MATERIAL:-

Water shall confirm to M-1, Cement mortar shall confirm to M-3, China mosaic tiles pieces random size shall confirm to M-55, Sand shall confirm to M-6 of General Technical Specification for Building Works book-let, Water proofing material shall be of approved quality. White cement shall be of approved make it shall confirm definition of I.S. 8042-E-1978 the sample of white cement shall be approved by Engineer in charge.

2.0 WORKMAN SHIP:-

Bedding: The Avg. 20 mm. thickness bedding shall be with line and level. After laying 20 mm. bedding, second coat of slurry shall be done.

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

The China Mosaic tiles shall be laid on cement mortar bedding 20 mm. thick in C.M. 1:3. The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of beading. The base shall than the spread in thickness not less than 20 mm. at any place and average 20 mm. thickness. The proportion of the cement mortar shall be as specified in the item

Fixing tiles :

The tiles before laying shall be soaked in water for at least two hours. Neat grey cement grout at 33 KG. Cement / 10 Sq.Mt. of honey like consistency shall be over the mortar

bedding as directed. Uneven size of the tiles shall be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedding and in level with the adjoining tiles. Then shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in as per pattern and work shall be carried out in true in line and level direction of Engineer-in-charge.

The joints shall be filled with grey cement grout with wire brush or trowel to a depth of 5 mm. and loose material removed. White cement shall be used for pointing the joints. After fixing the tiles finally in an even plane the flooring be kept wet and allowed to nature undisturbed for 7 days.

Cleaning :-

The surplus cement grout that may have come out the joints shall be cleaned off before its sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precautions and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the construction.

After finishing the whole terrace shall flooded with water after a painted of two walls.

- A First of all surface of the entire terrace shall be cleaned by thoroughly brooming and then by wire brushes. All the loose material, dust and debris shall be removed thoroughly from the entire surface of the terrace.

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

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

- B Cement concrete 1:5:10 (Using 50% of cement mortar 1:5, 1 part of cement and 5 parts of coarse sand by volume admixed with water proofing compound of approved make in specified proportion). Of specified thickness

shall be laid (Specification of C.C. 1:5:10 shall be followed for the execution of this layer) all over the surface of the terrace in true level and required slope including rounding of junctions of walls and slabs.

- C After two days of proper curing applying a second coat of cement slurry on entire surface of the terrace.
- D The entire surface shall be finished with 20 mm thick C.M. 1:4 and China mosaic tilling in true level and slope as directed by Engineer in charge and finally finishing the surface with trowel with white cement slurry (Specification of white glazed tiles flooring shall be followed for the execution of this item).
- E Finishing the surface with 20 mm thick C.M. 1:4 and China mosaic tilling and finally finishing the surface with trowel with white cement slurry.
- F After two days proper curing the terrace shall be flooded for 15 days.

MODE OF MEASUREMENT & PAYMENT :-

The work done shall be measured in Sqm. for visible area of work done. The length and width of the following shall be measured not between the faces of skirting to dados or plastered face of wall as the case may be.

The paving under dado or skirting shall not be measured. No deduction shall be dado nor extra paid for any opening in the floor of area to 0.1 Sqm. nothing extra shall be paid for laying the floors at different levels in the same rooms.

The rate shall be for a unit for a one Sqm.

The payment shall be for a unit for a one Sqm. of finished work.

Item No.34:- Providing and fixing GI Pipe hand railing 0.90 mt height by providing vertical support of 50 mm dia bars. pipe on top 50 mm dia GI pipe and 32x32 Pipe For Dessign horizontal & Vertical pipes rail with vertical post of 50 mm dia with round ball on top of post including bending welding and fixing Painting Two Coat With Primer as directed.

Materials

1. Vertical Posts:
 - G.I. Pipe of 50 mm nominal diameter, medium class conforming to IS:1239 (Part-I).
 - Posts spaced at a maximum of 1.20 m c/c or as shown in drawings.
2. Top Hand Rail:
 - G.I. Pipe of 50 mm nominal diameter, medium class conforming to IS:1239 (Part-I).
 - Continuous throughout the length with necessary bends, joints and fittings.
3. Intermediate Decorative Members:
 - 32 mm x 32 mm G.I. square pipe arranged horizontally and vertically as per approved design and pattern.
 - Complete with cutting, welding and grinding for smooth finish.
4. Decorative Ball Cap:
 - Approved MS/GI round ball fixed at the top of each vertical post.
 - Properly welded and finished smooth.

Fabrication & Installation

1. Cutting, bending, welding, drilling and fabricating the railing to the required shape, size and profile.
2. All welds shall be continuous, ground smooth and finished neatly.
3. Vertical posts shall be fixed in RCC/masonry through:
 - Base plate and anchor fasteners, or
 - Embedding in concrete pockets as directed by Engineer-in-Charge.
4. Alignment, level and plumb shall be maintained throughout the railing length.
5. All exposed sharp edges and burrs shall be removed.

Surface Preparation & Painting

1. Cleaning of all surfaces by wire brushing and removal of rust, oil, grease, welding slag and other foreign matter.
2. Applying one coat of approved metal primer over all exposed surfaces.
3. Applying two coats of approved synthetic enamel paint of specified shade and make over primer coat.
4. Each coat shall be applied only after the previous coat has dried thoroughly.

Rate Includes

- G.I. pipes (50 mm dia and 32 mm × 32 mm square pipe)
- Decorative ball caps
- Cutting, bending, welding and grinding
- Fixing with all accessories and anchors
- Primer and two coats of enamel paint
- Labour, tools & plants, transportation and all leads and lifts
- Complete finished work as directed by Engineer-in-Charge.

Measurement

- Measurement shall be made in Running Metres (Rmt.) of completed hand railing along the centre line of the railing.
- Rate shall include cost of all materials, labour, fabrication, welding, cutting, bending, fixing, fasteners, ball caps, primer, painting, scaffolding, transportation, loading/unloading and all incidental charges required for completion of the work.

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

Interlocking Concrete Block Pavement (ICBP) shall consist of a surface layer of appropriate sized concrete paving blocks paved and compacted over a thin bedding sand layer of specified grading, which is spread over a properly constructed and profiled base course and is bounded by properly installed edge restraints. The joints shall be filled by fine sand of specified grading. The work shall include supplying laying and paving of blocks including all materials, labour and equipment and performing all operations in connection with the laying of ICBP as per these Specifications.

Materials

The Concrete Paving Block shall conform to the relevant IS standard.

Bedding sand : Bedding sand shall conform to the grading given in Table 1500.6.

Joint filling sand : Joint filling sand shall conform to grading given in Table 1500.6.

Buffer

Buffer of specified quantity of paving blocks (of the same shape, size and thickness) required for normal maintenance of paved area as specified by the Engineer, shall be supplied and stored for replacement as and when needed. Normally this will be 5 per cent of the blocks used in the paved area.

TABLE 1500.6 : GRADINGS FOR BEDDING AND JOINT FILLING SAND

IS Sieve Size (mm)	Per cent Passing	
	For Bedding Sand	For Joint Filling Sand
10.00	100	100
4.75	90-100	90-100
2.36	60-95	75-100
1.18	15-34	55-90
0.60	25-60	35-59
0.30	5-20	8-30
0.15	0-10	0-10
0.075	0-5	0-5

Block Thickness

For rural roads catering to heavy vehicles, the minimum thickness of paving blocks shall be 60 mm for traffic up to 100 vehicles per day, and 80 mm for projected traffic from 100 to 200 vehicles per day.

Dimensions and Tolerances

The dimensions and tolerances of paving blocks shall conform to the Specifications given in Table 1500.7. Aspect ratio is the ratio of length to thickness of blocks. Chamfer is the bevelled edge, provided on the top surface of a block. Plan area is the horizontal area bounded by the vertical faces. Wearing surface area is the horizontal area bounded by the vertical faces, minus the area reduced due to the presence of chamfer.

TABLE 1500.7 : DIMENSIONS AND TOLERANCES FOR PAVING BLOCKS

S. No.	Dimension	Recommended Values	Tolerance Limit
(1)	Width W	To be specified by Manufacturer	±2 mm
(2)	Length L	To be specified by Manufacturer	±2 mm
(3)	Thickness T	60 to 80 mm	±3 mm
(4)	Aspect Ratio L/T	Maximum : 4.0	±0.2
(5)	Chamfer (Arris)	Maximum : 5 mm/7mm	±1 mm
(6)	Plan Area	Maximum : 0.03 m ²	+0.001 m ²
(7)	Wearing Face Area	Minimum 75% of Plan Area	-1%
(8)	Squareness	Nil	±2 mm

Compressive Strength

The average 28 days compressive strength of 8 blocks shall be 30 MPa and strength of individual block shall not be less than 26 MPa.

The 28 days compressive strength of paving blocks tested as per relevant IS specification shall be determined as explained hereinafter.

Compression testing machine of adequate capacity shall be used for testing of blocks. The steel bearing plates shall have a minimum thickness of 25 mm. The surface area of the bearing side of the plate should be such that no edge of the bearing plate is less than 10 mm from the outer edge of the paving block being tested.

In case the testing surface of the paving block departs from a plain surface by more than 0.05 mm, capping using suitable materials shall be adopted for testing as per IS:516.

The blocks shall be stored for 24 ± 4 hours in water maintained at a temperature of $(20 \pm 5)^{\circ}\text{C}$ before testing. The dimensions and plan areas of the block shall be determined. The bearing plates of the testing machine shall be wiped clean. The specimen shall be clamped between the plates in such a way that the axes of the specimen are vertically aligned with those of the bearing plates.

The load shall be applied without shock and increased continuously at a rate of 15 ± 3 N/mm²/minute until no greater load can be sustained by the specimen or delamination occurs. The maximum load applied to the specimen shall be noted.

The apparent compressive strength of individual block shall be calculated by dividing the maximum load (N) by the plan area (mm²). The corrected compressive strength shall be calculated by multiplying the apparent compressive strength by the appropriate correction factor from Table 1500.8. The strength shall be expressed to the nearest 0.1 N/mm².

TABLE 1500.8 : CORRECTION FACTORS FOR THICKNESS AND CHAMFER OF PAVING

BLOCK FOR CALCULATION OF COMPRESSIVE STRENGTH

Paving Block	Correction Factor for	
Thickness (mm)	Plain Block	Chamfered Block
60	1.00	1.06
80	1.12	1.18

Water Absorption:

The water absorption being the average of five blocks shall be not more than 6 per cent by mass.

Edge Blocks:

The edge blocks shall have equivalent cube compressive strength not less than 30 MPa. The road kerbs provided on the edges of the road also serve the purpose of edge blocks.

In case the end kerbs are not provided, 300 mm x 300 mm x 150 mm of M30 grade concrete edge blocks or other suitable size as per drawings or direction of the Engineer shall be provided.

Subgrade:

The Subgrade shall conform to Clause 1501.5.1 of these Specifications. The soaked CBR of subgrade soil shall not be less than 4 per cent.

Sub-base:

The sub-base shall be 100 mm thick granular layer conforming to Clause 341 or 100 mm thick WBM Gr.I conforming to Clause 345 of these Specifications. In case the subgrade soil is clayey, the sub-base shall be extended over the full formation width for proper drainage.

Base Course:

A minimum 100 mm thick layer of granular/stabilized base course shall be provided. The base course layer shall be extended at least 300 mm beyond the edge restraints. The material shall conform to Clause 342 of these Specifications.

Bedding Sand:

Bedding sand conforming to Table 1500.6 shall be uniformly laid to a compacted thickness of 25 mm for 60 mm thick blocks and 30 mm for 80 mm thick blocks. Bedding sand shall be unloaded in small piles regularly placed over the base course and shall preferably have a moisture content of about 6 per cent which will facilitate its spreading and compaction. Bedding sand shall be screeded in a uniform layer over the base course. The screed can be guided to level by tensioned string lines set above the base course. At the time of screeding, the thickness of sand must allow for the amount by which it will be subsequently compacted which is normally about 25 per cent more than the compacted thickness. Screeding shall not proceed beyond about 1 m ahead of the planned end of block paving for the day. Sand shall preferably be compacted with a manual, fabricated plate compactor and the level shall be readjusted using the screed. The surface profile of the screeded bedding sand shall match that required for the completed pavement.

Paving Pattern:

The pattern in which blocks are to be paved shall be decided in advance from the two choices or their derived forms available. These are the herringbone and stretcher patterns, as shown in Fig. 1500.3. By and large, these patterns are the same as adopted for brick paving. All shapes of blocks are not amenable to the above paving patterns. For paving in trafficked areas, herringbone pattern shall be adopted for ensuring better performance.

Paving shall commence and progress from one starting line only. Wherever possible, paving shall commence adjacent to or against edge restraint

Paving and Compaction of Blocks:

Blocks shall be placed at the correct angle to the start line to achieve the final orientation of the laying for curved or unfavourably oriented edge restrains, a string line shall be established to permit fast, easy laying blocks already paved. Control over alignment laying pattern and joint width can be assisted by the use of chalked string lines at intervals.

Nominal joint width of 2 to 4mm shall be maintained by holding the paving unit lightly against the face of the adjacent lock allowing it to slide into position. Cutting paving units for filling the having gap s occurring against edge restraints etc. shall be deferred until sufficient work has progressed to allow reasonably continuous operation. When space does not permit the u se of cut pieces of blocks, premixed or dry packed concrete shall be used. After a section has been paved, compaction shall be effected by using vibrating plate compactors in the following sequence of **operations:**

Vibrate the blocks with 3 passes o f the plate vibrator of adequate capacity. Spread a thin layer of fine joint filing sand o n top of t he paved blocks and sweep it In to the joints, using suitable brooms. Vibrate the sand into the joints by making 3 passes of the comp actor. Sweep off the excess s and from top of blocks As a guide to the characteristics of typical vibrating plate compactors, standard compactors have a weight of 90 kg, a plate area of 0.3 m² and apply a centrifugal force of 1500 kg. Heavy duty compactors weigh between 300 to 600 kg, have a plate area of about 0.5 to 0.6 m² and apply a centrifugal force in the range of 2000-3000 kg. Use of heavy duty compactors is desirable for trafficked pavements.

Trial length :

The contractor shall lay a trial length of 30 m and get it inspected and approved by the Engineer before proceeding with the regular paving work. The trial length shall be rectified/re-laid if found deficient in any respect. The procedure demonstrated in the laying of trial length shall be followed while executing the main construction work.

Opening to Traffic : The pavement can be opened to traffic as soon as the construction work is completed. Transverse profile : When measured by a camber template, the transverse profile shall not deviate by more than 10 mm from the design profile.

Longitudinal profile : When measured by a 3 m straight edge, the longitudinal profile shall not deviate by more than 12 mm from the design profile.

Acceptance Criteria

From each lot of 500 blocks, 5 blocks shall be selected at random for water absorption and compressive strength tests. In case the number of blocks in the lot is less than 500, a minimum 1 per cent of the blocks delivered to site shall be tested for water absorption and strength. The blocks shall be first tested for water absorption and these shall meet the requirement of Clause 34.5.2.6 of these Specifications. The same five blocks (or minimum 1 per cent) shall be tested for strength and shall conform to the strength as per Clause 34.5.1 of these Specifications.

The paved surface shall meet the tolerances for lines, levels, and grades etc. as given in Section 1800 of these Specifications.

Measurements for Payment

The measurement of the paved area shall be in square metres measured from the inner edge of edge restraints on one side of the pavement to the inner edge of the edge restraints on the transverse side of the pavement. The measurement of the edge restraints shall be in **number of units or in Sq.mt.**

Item No.36 :- Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30cm length,30cm height and 15cm thick of M250 grade concrete as per approved design and including excavation for fixing in proper line and level, filling the joint with C:M 1:3 (1cement:3fine sand) etc complete.

Providing & fixing rubber moulded pre-cast CC M-250 Kerb wall including curing and finishing and painting with 2 coats of cement paint of desired colours plain or in strip over a under coat of cement primer in 1 Rmt. pieces and fixed as per drawing keeping the space between 2 curb wall pieces for draining facility of water from the pavement surface.

Material: All material shall be meeting the requirements as laid down under materials specification in the tender.

Concrete: Concrete shall be M-250 meeting the requirements as laid down under concrete specification in the tender.

Formwork: Formwork shall be rubble moulded formwork providing very smooth and clean concrete faces. Size of Kerb Wall Blocks: The cross-section area shall be rectangular size as per detail drawing.

Curing: Curing to the pre cast curb wall shall be carried out to the general specification of curing of concrete. Care shall be taken after casting the curb walls and removal of the form work that the exposed surfaces are not damaged.

Transporting: The pre cast kerb wall pieces shall be transported to the site of fixing without causing any damage to the curb wall blocks and the surface.

Fixing: Each piece shall be fixed appropriately on the concrete surface as detailed out in drawing and keeping a clear distance as specified between 2 kerb wall blocks.

The final surface shall be having a uniform shade of colour and the top of the blocks shall be in line and level as directed.

Mode of Measurement: The measurement shall be per metre. of kerb wall constructed in concrete proportion of cross section as per drawing as directed with rubble moulded formwork and providing one coat of cement primer and 2 coats of cement paint and fixing the same in line and level.

Rate: **Rate for construction and fixing of kerb wall with necessary finishing per Rmt. bases**

Item No. 37:- Wall painting (two coats) with plastic emulsion paint of approved brand and manufacture on undecorated wall surface to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth. including two coats of putty & two coats of primer etc completed.

Material:

The wall putty and primer shall be of approved brand and manufacture, suitable for application on new wall surfaces. All auxiliary materials such as thinners, sand paper, brushes and tools shall be of approved quality.

Workmanship:

The new wall surface shall be thoroughly cleaned by brushing to remove mortar droppings, dust, dirt and other foreign matter. The surface shall be sand papered smooth and prepared properly before application. Two coats of approved wall putty shall be applied evenly to achieve a smooth and uniform surface, allowing adequate drying between coats. After proper drying of putty, two coats of approved primer shall be applied uniformly to give an even shade and suitable base for further finishing.

Materials :

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

Workmanship:

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

2.2. Preparation of Surface:

2.2.1. The surface shall be thoroughly cleaned of all dust, dirt, mortar cropping and other foreign matter before white wash is to be applied.

2.2.2. The surface spoiled by smoke soot shall be scraped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then boomed to remove all dust, dirt and shall be washed with clean water.

2.2.3. Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes.

2.2.4. 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 portion shall be wetted and allowed to dry. They shall then be given one coat of white wash.

2.2.5. All unnecessary nails shall be removed, the holes cracks patches etc. shall be made good with materials similar in composition to the surface to be prepared.

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

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 means 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 mouldings, 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 wafer. 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.

Mode of Measurements & Payment :

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

Dimensions shall be measured to nearest 0.01M.

Area in individual items shall be worked out to the nearest 0.01 Sq.mt.

Rates Including of Two Coats of Putty and Primer.

All the works shall be measured in Sq. m. Deductions for jambs, soffits, sills etc. for openings not exceeding 0.5 sq.m. each in area, for ends of joists, posts, beams, girders, steps etc. not exceeding 0.5 sq.m. each in area and for opening exceeding 0.5 sq.m. not exceeding 3.0 sq.m. each in are. Deduction and additions shall be made as under:

No deduction shall be made for ends of joists, beams, posts etc. and openings not exceeding 0.5 sq.m. each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings or for finish around ends, joists, beams, posts etc.

Deductions for openings exceeding 0.5 sq.m. but not exceeding 3 sq.m. 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 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.

When widths of reveals on both faces of wall are equal, deduction of 50 % of area of opening on each face shall be made from total area of finish. When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than on the untreated side neither deductions nor additions to be made for reveals, jambs, soffits, sills etc.

In case of area of openings exceeding 3 sq.m. each, deduction shall be made for opening but jambs, soffits, sills shall be measured. No deduction shall be made for attachment such as casing, conduits, pipe, electric wiring and the like. Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas :

- | | |
|--|-----|
| a) Corrugated steel sheets | 14% |
| b) Corrugated A.C. sheets (With rolls) | 10% |
| c) Semi corrugated A.C. sheets | 10% |
| d) Nainital pattern roof (plain sheeting W.) | 20% |
| e) Nainital pattern roof (with corrugated sheet) | 25% |

Cornices and other wall features, when they are not picked out in a different finish / colour shall be girthed and included in the general area. The rate shall include the cost of all materials, labour, scaffolding, protective measures etc. involved in all the operations described above. No Additional Payment Should Not be Pay for Putty and Primer.

The rate shall be for a unit of one Sq. Mt.

Item No.38:- Finishing wall with weather proof exterior emulsion paint on wall surface (three coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt, and remains of loose powdered materials. etc complete Extra over Item for every subsequent coat of approved brand and manufacture.

Materials :

The water shall conform to M-I. Cement water proofing shall conform to IS 5410-1969.

Workmanship :

Scaffolding: Wherever scaffolding is necessary, it shall be erected in such a way that so far as possible no part of scaffolding shall rest on the surface to be coloured. A properly secured strong and well-tied suspended platform (Zoola) may be used for colour work. Where ladders are used pieces of old gunny bags shall be tied at top and to bottom to prevent scratches to the floors and wall. For colour work of ceilings, proper tag scaffolding shall be erected where necessary.

Preparation of surface: The relevant specifications except that the word white wash colour wash shall be substituted with water proofing cement paint. The surface shall be thoroughly wetted with clean water before cement water proofing paint is applied.

Preparation of paint: Portland cement shall be prepared by adding paint powder to water and stirring to obtain a thick paste, which shall then be diluted to a brushable consistency. Generally, equal volumes of paint powder and water make a satisfactory paint. In all cases, the manufacture's instructions shall be followed. The paint shall be mixed in such quantities as can be used up within an hour of mixing as otherwise the mixture will set and thicken, affecting flowing and finish. The lids of cement paint drums shall be kept tightly when not in use.

Application of Paint:

No painting shall be done when the paint is likely to be exposed to a temperature of below 7°C within 48 hours after application.

When weather conditions are such as to cause damage the work shall be carried out in the shadow as far as possible. This helps the proper hardening of the paint film by keeping the surface moist for a longer period.

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

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

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

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

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

Curing : Painted surfaces shall be sprinkled with water two or three times a day. This shall be done between coats and for atleast two days following the final coat. The curing shall be started as soon as the paint has hardened so as not to be damaged by me sprinkling of water say about 12 hours after the application.

Mode of measurements & payment:

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

Item No.39:- Providing and fixing in position PVC cowl vent to pipes (I) 75mm. dia.

Item referred for providing and fixing pvc cowl vent of 75mm dia. pvc cowl ventilator for 75mm dia shall confirm to IS & shall be of best quality pvc cowl ventilator shall be fixed to pipe with joints.

Item shall measure and paid on number basis.

Item No.40 :- Providing and fixing PVC SWR Nahni trap IS 14735 for drain - 100 mm diameter with jali of the following nominal diameter of self cleansing design with C.I screed down or hinged grating including the cost of cutting and making good the walls. [SOR 23068]

Material:

The PVC SWR Nahni trap IS 14735 shall be conform to M-69. The hinged of screwed down cover shall be of best quality.

Workmanship:

The Nahni trap with 100 mm. dia. inlet and 50 mm. rib outlet shall be fixed as per drawing or as directed.

The Nahni trap shall be jointed with Pipe, 75 mm. dia. with lead joints. The lead joints shall be done in conformation with I.S. 782-1976.

Mode of measurements & payment:

The rate includes cost of all Labour, materials, tools and plants etc. required for satisfactory completion of this item including lead jointing and testing.

The rate shall be for a unit of one number.

Item No.41:- Providing and fixing 600mm. x 450mm. Bevelled edge mirror of superior glass mounted on 6mm. thick A.C. sheet or plywood sheet and fixed to wooden; lugs with C.P. brass screws and washers.

Materials

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

Workmanship

The mirror of 600 mm. x 450 mm. size mounted on A.C. Sheet or hard board plywood 6 mm. thick with aluminium frame shall be fixed as directed, on wall. The work shall be carried out in best workman like manner.

Mode of measurements & payment

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

Item No.42:- Providing and fixing C.P. brass towel rail complete with C.P. Brass brackets fixed to wooden plugs with C.P. Brass screws.(B) 600mm. x 20mm. size.

Materials:

1.1 The C.P. brass towel rail shall be 600 X 20 mm. of best quality as approved by the Engineer-in-charge. The brackets shall be of C.P. brass. The rail shall conform to I.S. 1068-1958. 292

2.0 Workmanship:

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

3.0 Mode of measurement & payment:

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

3.2 The rate shall b for a unit of one number.

**Item No.43 :- Providing and fixing screw down bib taps of following size.(B) Gun metal
Screw Down bib tap . (I) 15mm dia.**

Materials

The brass screw down stop cock of specified dia. shall conform to I.S.: 781-1977. The stop cock shall be of tested quality.

Workmanship

The stop cock shall be fixed as directed the treated portions shall be smeared with white or red or lead and turned around with few turns of fine-spun yard threads. The cock shall than be screwed and fixed to the water tight position.

Mode of measurements and payment

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

The rate shall be for a unit of one number.

Item No.44 :- Providing and fixing Gun metal check or non-return fully wheel valve.(E)
40mm dia.

AND

Item No.45 :- Providing and fixing Gun metal check or non-return fully wheel valve.(C)
25mm dia.

Material

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

Workmanship

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

Mode of measurements and payment

The rat includes all labours, materials, tools and plants etc. required for satisfactory completion of this item.

The rate shall be for a unit on one number.

Item No.46 :- Providing, laying and jointing in true line and level 15 mm dia. U.P.V.C. Pipe (SCH-40) line including fittings make or equivalent as approved by Engineer in charge. Pipe shall be fixed on the wall with the help of clamp at every two meter C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.

Materials

1. UPVC Pipe

- 15 mm dia U.P.V.C. Pipe (Schedule-40).
- Pipes shall conform to relevant IS standards and be of approved make.
- Pipes shall be free from cracks, holes, deformities and manufacturing defects.

2. Fittings

- UPVC fittings of approved make including elbows, tees, reducers, couplers, unions, sockets, bends, adaptors, end caps and other specials as required.
- All fittings shall be compatible with the pipe system.

3. Jointing Material

- Approved UPVC solvent cement/adhesive suitable for pressure pipe systems.
- Solvent cement shall be applied strictly as per manufacturer's recommendations.

4. Pipe Clamps and Supports

- Suitable PVC/MS clamps with screws and rawl plugs.
- Clamps shall be provided at maximum 2.0 m centre-to-centre spacing or at closer intervals where required.

Installation

1. Pipes shall be laid in true line, level and alignment.
2. Pipes shall be fixed on walls using approved clamps at every 2.0 m c/c.
3. Where specified, pipes shall be concealed in walls, floors or chases as directed by the Engineer-in-Charge.
4. Chasing, cutting and making good damaged plaster/concrete due to pipe installation shall be carried out neatly.

5. All pipes and fittings shall be properly aligned and adequately supported to prevent sagging and movement.
6. Necessary bends, offsets and directional changes shall be achieved using approved fittings.

Jointing

1. Pipe ends shall be cut square and cleaned thoroughly before jointing.
2. Solvent cement shall be applied uniformly to both pipe and fitting surfaces.
3. Joints shall be assembled immediately and held firmly until proper bonding is achieved.
4. Excess adhesive shall be removed and joints allowed to cure as per manufacturer's recommendations.

Testing

1. The complete pipe network shall be tested after installation.
2. Pipes and joints shall be checked for leakage under specified pressure conditions.
3. Any defective joints or fittings shall be removed and replaced at the contractor's cost.
4. The system shall be deemed complete only after successful testing and approval by the Engineer-in-Charge.

Rate Includes

- Supply of 15 mm dia SCH-40 UPVC pipes. All fittings and accessories.
- Solvent cement/adhesive. Clamps, screws, rawl plugs and supports.
- Cutting, laying, fixing and jointing. Concealing work where directed.
- Testing and commissioning. Labour, tools and plants, transportation, loading/unloading and all incidental charges.

Measurement

- **Measurement shall be made in Running Metres (Rmt.)** of pipe actually laid and fixed along the centre line of the pipe.
- Fittings, clamps, solvent cement, cutting, threading (if required), testing and fixing shall be included in the rate unless otherwise specified.
- **Complete finished work as approved by the Engineer-in-Charge.**

Item No.47 :- Providing, laying and jointing in true line and level 25mm dia. U.P.V.C. Pipe (SCH-40) line including fittings make or equivalent as approved by Engineer in charge. Pipe shall be fixed on the wall with the help of clamp at every two meter C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.

AND

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

AND

Item No.49:- Providing, laying and jointing in true line and level 160mm diameter U.P.V.C. SWR Type B pipe confirming to IS 13592-1992 with one end plain and other end socketed with rubbering & fitting conforming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointed with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 160 mm diameter x 210 mm length x 196 mm high at every 2000 mm center to center or shall be concealed in walls as directed including necessary fittings such as bends, shoes etc. including testing of pipes and joints and jointed with adhesive solvent cement including cost of all materials.

AND

Item No.50:- Providing, laying and jointing in true line and level 110mm diameter U.P.V.C. SWR Type B pipe conforming to IS 13592-1992 with one end plain and other end socketed with rubbering, & fitting conforming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointed with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 110 mm diameter x 149 mm length x 145 mm high at every 2000 mm center to center or shall be concealed in walls as directed including necessary fittings such as bends, shoes etc. including testing of pies and joints and jointed with adhesive solvent cement including cost of all materials.

**Item Workmanship Should be Same as Above Item of 15mm Dia. U.P.V.C. Pipe
Item Use U.P.V.C Dia.25mm/40mm / 160mm / 110mm of Pipe mansion in this
Instead of UPVC 15mm Dia. Pipe.**

Providing, laying and jointing PVC SWR (Soil, Waste & Rain water) pipes conforming to IS: 13592, of 160 mm nominal diameter, in true line and level for drainage purposes, including all necessary approved fittings, as directed by the Engineer-in-Charge.

The pipes shall be fixed on wall using approved clamps at every 2.0 m centre-to-centre, or concealed / laid in trench with proper bedding and backfilling, as specified. Jointing shall be carried out using approved solvent cement / adhesive, ensuring leak-proof joints.

The item shall include cutting, making good, testing of pipes and joints, fixing in position, and all incidental works. The rate shall also include the cost of all materials, fittings, solvent cement, clamps, labour, tools and plants, transportation, loading, unloading, backfilling where required, curing, cleaning, all leads and lifts, complete in all respects, as directed by the Engineer-in-Charge.

The contract rate shall be for a unit of 1 Rmt. of complete item.

The payment shall be made on a unit of 1 Rmt. basis of finished work

Item No.51 :- Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35Kg/ Cm² in C.M. 1:5 C.I. cover with frame (Light duty) 455mm x 610mm internal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slab with 1:2:4 mix (1-cement :2- coarse sand :4-graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete.(i) Inside dimensions 455mm x 610 mm and 450mm deep for pipe lines with three or more inlets.

Materials:

water shall conform to M-1. Cement shall conform to M-6. Brick shall conform to M-15. C.I. grating of 500 x 450 mm size of standard make shall be approved quality. Stone aggregate 40 mm nominal size shall conform to M-12. Coal tar shall conform to relevant M-5

Workmanship:

The chamber shall be of size 455 mm x 610 mm internal clear dimensions between the masonry wall faces. The height of 450 mm shall be measured from the top of the bed concrete to the top of the C.I. frame. The size of the grating indicates the clear internal dimensions of the C.I. frame of the gratings.

The excavation shall be done to true dimensions and levels

The foundation concrete shall consist of 150 cms x 130 cms. 15 cm thick C.C. 1:5:10 (1cement: 5 sand: 10 graded stone aggregate 40 mm. nominal size) The wall of the chamber shall be constructed in brick work with C.M. 1:5 and 23 cms thick as per relevant specifications of item 6.12 (A) of specification booklet for building

The walls and the bed concrete of chamber shall be plastered inside with 12mm thick cement plaster 1:3 (1 cement: 3 coarse sand) finished smooth.

The gully grating cover shall be hinged to frame to facilitate its opening for leaning and repairs. The frame of the gully gratings shall be fixed on the top of masonry walls of the chamber in 15cm thick C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) laid over the full thickness of walls.

The chamber shall have connection pipe, the length of which in meter between the road gully chamber and manhole of the drain shall not be less than $\frac{1}{40}$ times the nominal diameter of the pipe in MM i.e. for 150 mm connection pipe, the length shall not be less than 3.75 meter. The invert of the pipe at the junction with the wall shall be flush with the top of the cement plaster on the bed concrete.

Painting: after the completion of the work the exposed surface of the grating and the frame shall be painted with a thick coat of coal tar

Mode of measurement & payment:

The cost of connection pipes is not included in the item and shall be paid separately. However fixing connection pipes in the walls of gully chambers is included in the rate for gully chambers and nothing extra shall be paid for this separately.

The rate includes all labours and materials required for satisfactory completion of this item as described above

The rate shall be for a unit of one number

Item No. 52 :- Constructing Manhole with R.C.C. top slab in 1:2:4 mix (1-cement :2-coarse sand : 4-graded stone aggregate 20mm nominal size) foundation concrete 1:3:6 mix (1-cement : 3- coarse sand :6-Brick bats 40 + 50mm size) inside plastering 15mm thick with Cement Mortar 1:3 (1-Cement : 3-coarse sand) finished with a floating coat of neat cement and making channels in cement concrete 1:2:4 mix (1-Cement :2-Coarse sand :4-stone aggregate 20mm nominal size) finished smooth complete including curing and festing (i) Inside size 900mm x 1200mm and 1.5M. deep including C.I. cover with frame size 560mm diameter total weight of cover and frame to be not less than 128 kgs. (Wt. of cover 64 Kg. and Wt. of frame 64 Kg.)(A) With 230mm thick walls of brick msonry using brick having crushing strength not less than 35Kg. /Sq.cm. in Cement Mortar 1:5 (1- Cement: 5-Coarse sand) (1) A type depth 0.90 Metre for 150mm diameter sewer.

Materials :

Water shall conform to M-1. Cement shall confirm to M-6. Burnt bricks shall conform to M-15. Prick bats of 40 to 50 mm. size shall conform to M-14. Stone coarse aggregate of 20 mm. nominal size shall conform to M-12. Grit shall conform to M-8. Cement mortar of specified proportion shall conform to M-11. The cast iron manhole cover of 560 mm. dia. with frame shall conform to I.S. 1726-1966.

Workmanship :

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

Bed Concrete:

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

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

Walls :

The walls or manhole shall be carried out with burnt bricks using bricks, having crushing strength not less than 35 Kg./Cm² in C.M. 1: 5 (1 cement: 5 coarse sand. The thickness of brick masonry wall shall be 230 mm. The jointing face of such brick shall be well buttered with cement mortar before laying so as to ensure full joints.

Plaster:

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

Channels & Benching:

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

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

Cover slab:

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

Slab so that the top of the frame remains flush with the top of R.C.C. slab.

Testing:

Manhole shall be tested by filling with water to a depth not exceeding 1.2. M. as directed. After completion of work, manhole covers shall be sealed by means of thick grease.

Mode of measurements & payment:

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

The rate shall be for a unit of one number.

Item No. 53 :- Providing erecting and fixing double coated . (ISI) water tank of required capacity each with all necessary fittings and connection etc. complete on terrace.

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

Material

PVC WATER TANK: PVC Water tank of specified capacity and of I.S.I. mark of approved in litres of approved make and quality equivalent to syntax product.

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

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

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

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

Workmanship

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

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

Mode of measurement and payment

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

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

The PVC water tank work shall be measured for its volume to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one litre basis.

The payment will be made on litre basis of the finished work

Item No.54:- Providing and fixing white / Color Europium/Indian Type WC Panwith seat and lid, CP brass hinges and rubber buffers, flushing Valve with fittings, Jet spray CI/MS brackets, 40mm dia flush bend with fittings and clamps, overflow, arrangement with specials and mosquito proof coupling of approved municipal design including painting of fittings and brackets, cutting and making good the walls and floors

The item should be include as Providing and fixing White Vitreous China Orissa pattern W.C. pan (Indian type W.C. pan) of size 445X585X260 mm with integral type foot rests with 100 mm sand cast Iron P or S trap, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required. Orissa Pan of Essco Make ECS-WHT-451 or Equivalent approved Make

2.0. Workmanship

2.1. The closet shall be fixed to the floor by means of 75 mm. long 6.5 mm. diameter counter sunk bolts and nuts embedded in the floor concrete using rubber or before washers so as not to allow any lateral displacement The joint between the trap of W.C. and soil pipe shall ho made with C M. 1:1 (1 cement : 1 fine sand).

3.0. Mode of measurements and payment

3.1. The rate shall includes the cost of all materials and labour involved in all the operations described under workmanship.

3.2. The rate includes cost of all labour for fixing pans and sent and cover, inlet, connections etc. complete including testing the same. The payment of seat and cover shall be made separately.

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

Item No.55:- Providing and fixing at the height of 600 mm from the ground level and Big size Color wash basin with single hole for pillar tap with CI or MS brackets painted. Including cutting holes and making good the same including providing & fixing CP brass waste coupling 32mm dia providing & fixing bottle trap, With Granite Size of 0.75x0.6 Double Side polished With Rounding Edge etc. PVC inlet connection 15mm brass screw down stop tap etc. complete..

The white glazed earthenware wash basin shall be 550 cm. x 400 mm. of 1st quality and make as approved by the Engineer-in-charge. The wash basin shall conform to M-59.

Workmanship:

The wash basin 500 mm X 400 MM shall be fixed on the granite platform as shown in drawing and directed.

Pillar tap 15 mm dia with capstan head fixed with screw shank and back nut.

Inlet connection pipe – 600 mm length with stop tap.

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

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

The necessary inlet, outlet connections and fittings such as pillar Taps. C.P. dress waste trap waste pipe, stop Tap, chain wish rubber plug etc. shall be fixed.

The payment of fittings shall be made separately under separate item.

Mode of measurements & payment:

The rate includes cost of all labour, materials; tools and plant etc. required for satisfactory completion of this item as specified in workmanship.

The rate shall be for a unit of one number.

Item No.56:- Construct Septic tank Including Excavation, B.B.C.C. 1:5:10, with brick masonry wall in C;M 1:6 finished with Cement plaster in C;M; 1:3 incl. partition with half brick masonry With Top RCC Slab 10Cm Thick. (Over All Size 2.5m x 2.0m. X 15.m O/O) Etc compt.

Materials : water shall conform to M-1. Cement shall conform to M-6. Brick shall conform to M-15. Stone aggregate 40 mm nominal size shall conform to M-12.

Workmanship

2.1. The excavation shall be carried out as. per relevant specifications of item. 4.G0.1 (A) except that the size of soak pit such that the cleat volume 'Shall* remain 2 cum. The diameter and depth shall be as directed.

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

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

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

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

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

The item shall include the following works:

1. Earthwork Excavation in all kinds of soil for septic tank foundation, including dressing of sides, ramming of bottom, dewatering if required, and disposal of surplus excavated material within specified lead and lift, complete.
2. Foundation Concrete Providing and laying cement concrete 1:3:6 in foundation bed, including proper compaction, finishing and curing, complete.
3. Brick Masonry Providing and constructing conventional brick masonry in foundation and plinth using first-class bricks in cement mortar 1:5, laid true to line, level and plumb, complete.

4. Internal Plaster Providing and applying 15 mm thick cement plaster on internal surfaces in cement mortar 1:3, finished smooth with floating coat and neat cement slurry, complete and cured.
5. External Plaster Providing and applying 25 mm thick sand-faced cement plaster on the external surface of septic tank walls in cement mortar 1:4, including base coat and finishing coat, complete.
6. Flooring
Providing and laying 50 mm thick cement concrete 1:2:4 I.P.S. flooring over cement concrete 1:3:6 bedding, properly compacted and finished smooth with slope as required, including curing, complete.
7. RCC Slab Providing and laying RCC slab of M-200 grade concrete for septic tank cover, including centering, shuttering, placing, compaction and curing, complete with required TMT reinforcement steel, properly cut, bent and placed as per design.
8. Manhole Cover Providing and fixing C.I. manhole cover of size 0.60 m × 0.60 m, seated on RCC slab, including proper fixing and finishing, complete.
9. Vent Pipe Providing and fixing 100 mm diameter C.I. air vent pipe with suitable C.I. cowl, fixed in position complete.
10. Backfilling and Finishing Refilling earth around the septic tank with available excavated material in layers, watering, ramming and compacting, and disposing surplus material, complete.
11. Rate Includes The rate shall include cost of all materials, labour, tools, plant, cantering, shuttering, reinforcement steel, curing, excavation, backfilling, transportation, leads and lifts, and all incidental charges necessary to complete the work.

Mode of measurements and payment

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

The rate shall be for a unit of one number

Item No.57 :- Providing Sock well of inside Dimension 3.00 mt. Deep & 2.00 mt. Dia. Incl. Excavation, honey comb masonry work in C.M. 1:6 incl. Covering the top with slab and providing manhole cover incl. Providing vatas and curing etc. complete.

Materials : water shall conform to M-1. Cement shall conform to M-6. Brick shall conform to M-15. Stone aggregate 40 mm nominal size shall conform to M-12.

Workmanship

2.1. The excavation for soak pit shall be carried out as. per relevant specifications of item. 4.G0.1 (A) except that the size of soak pit such that the cleat volume 'Shall* remain 2 cum. The diameter and depth shall be as directed.

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

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

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

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

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

Providing and constructing soak pit of 2.46 m internal diameter and 7.00 m depth, complete in all respects, as per approved detail drawings, specifications and directions of the Engineer-in-Charge.

The item shall include the following works:

1. Earthwork Excavation in all kinds of soil for soak pit of required diameter and depth, including shoring, strutting, dressing of sides, ramming of bottom, dewatering if required, and disposal of surplus excavated material within specified lead and lift, complete.
2. Masonry Work Providing and constructing brick masonry / rubble masonry in required height using approved quality bricks/stone in cement mortar 1:5, laid

true to line, level and plumb, including providing weep holes/open joints as required for percolation.

3. Filling with Brick Bats Filling the soak pit with broken brick bats / jelly stones, clean and free from dust, stacked loosely to ensure proper percolation, complete.
4. Top Covering and RCC Slab Providing and laying RCC cover slab of approved thickness in cement concrete M-200 grade, including centering, shuttering, compaction and curing, complete.
5. Vatas / Haunching Providing and forming vatas/haunching in cement mortar 1:3 at the top portion, neatly finished as per drawing.
6. Finishing and Curing All exposed masonry and RCC work shall be finished smooth and cured adequately as per specifications.
7. Backfilling
Refilling earth around the soak pit with available excavated material in layers, watering, ramming and compacting, complete.
8. Rate Includes The rate shall include cost of excavation, masonry, brick bats filling, RCC slab, centering and shuttering, curing, labour, materials, tools, plant, transportation, leads, lifts and all incidental charges required to complete the work.

Mode of measurements and payment

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

The rate shall be for a unit of one number

Item No.58:- Providing and laying, Jointing, Fixing in trenches PVC pipes IS 13592 for Drain - 75 mm dia, Including Sockets, Bends Reducers etc Completed (Earthwork in trenches to be Inclusive).

1. Material

Providing and laying 75 mm diameter unplasticized Polyvinyl Chloride (uPVC) drainage pipe conforming to IS 13592 (Part 1): 2016 – Unplasticized PVC Pipes for Soil and Waste Discharge Systems Inside Buildings, Type A or Type B as specified, complete with all matching fittings such as sockets, bends, tees, reducers, couplers, offsets, inspection pieces, door tees, end caps and specials of the same make and specification.

Pipes and fittings shall be free from cracks, blisters, pinholes and manufacturing defects and shall possess smooth internal and external surfaces. Jointing shall be carried out using approved solvent cement conforming to relevant standards and manufacturer's recommendations. Rubber ring joints, where specified, shall conform to **IS 5382**. All materials shall be obtained from approved manufacturers and shall bear the manufacturer's identification markings.

2. Workmanship

The work shall include excavation of trenches of required width and depth, dressing and levelling of bed, laying pipes to the required line, level and gradient, cutting pipes where necessary, fixing all fittings, making watertight joints, testing and commissioning complete. Pipes shall be laid on a firm and uniform bed and properly aligned to maintain the specified flow gradient. Jointing shall be executed by cleaning pipe ends and fittings, applying approved solvent cement uniformly and inserting fully into the socket to obtain leak-proof joints.

After laying and testing, trenches shall be backfilled with selected excavated material in layers not exceeding 150 mm thickness, watered and compacted. The completed pipeline shall be tested for leakage and proper flow. The rate shall include excavation, laying, jointing, fittings, testing, backfilling, disposal of surplus earth, labour, tools, plants, transportation and all incidental works required for satisfactory completion.

3. Unit of Measurement

The rate shall be for a unit of one number

Measurement shall be made along the centre line of the pipe actually laid and accepted, including sockets and jointing. The rate shall include excavation, laying, jointing, fittings, testing, backfilling and all labour, materials, tools and accessories required for complete installation.

Item No.59 :- Providing and laying KITCHEN PLAT FORM CONSIDERING HEIGHT = 0.75MT (sandwich type) with machine cut single side polished 18-20mm thick GRANITE STONE on Top and Side Patta With Half Round Moulding including Fixing resting on B.B. Masonry walls 23 cm.thick.in C.M.(1:6) with (i) Fixing or precast R.C.C.1:2:4) 8 cm. thick slab Making hole for gas piping ,and at top sandwich type including half round moulding and Side Toda fixing with tiles on 10mm plaster filling gap with joint Filler and cement mortar etc, complete in true line and level as per detail drawing and directed by E.I.C.

Material:

The kitchen platform shall be constructed at a finished height of 0.75 metre, using machine-cut granite stone slab of 18–20 mm thickness, single side polished, of approved quality, colour and shade, free from cracks and defects. Granite shall be provided on top surface and side patta, including half-round moulding. The base shall consist of precast R.C.C. slab of 8 cm thickness in cement concrete 1:2:4, resting on brick masonry walls of 23 cm thickness built in cement mortar 1:6. Tiles, joint filler, cement mortar and all other materials shall be of approved quality.

Workmanship:

The kitchen platform shall be provided and laid in true line and level as per detailed drawing and directions of the Engineer-in-Charge. Granite slab shall be properly fixed over the R.C.C. slab, forming a sandwich-type construction, including half-round moulding on exposed edges and side patta / side todra fixing. Necessary holes for gas piping and other services shall be made neatly without damaging the slab. Gaps between granite and walls shall be filled with 10 mm plaster, finished neatly using jointfiller and cement mortar. All edges, joints and surfaces shall be finished clean and smooth.

Mode of Measurement & Payment:

The rate shall include the cost of all materials, granite slab, R.C.C. slab, brick masonry, tiles, mortar, joint filler, labour, tools and plants, cutting, polishing, fixing, moulding, making holes for gas piping, and all incidental works required for the satisfactory completion of the item. Measurement shall be per running metre of kitchen platform, complete in all respects, as directed by the Engineer-in-Charge.

Item No.60:- Providing and executing BALA Concept Educational Wall Artwork. comprising design development, surface preparation, primer application, hand-painted educational graphics, learning charts, alphabets, numbers, shapes, fruits, animals, birds, local culture themes, environmental awareness graphics, storytelling panels, foundational literacy and numeracy (FLN) learning elements, interactive learning aids and child-friendly colourful illustrations on interior and exterior walls, complete with weather-resistant, non-toxic, washable acrylic paints of approved shades and designs. The work shall include all labour, materials, scaffolding, artist charges, layout marking, finishing, touch-up and protection of completed work as directed by the Engineer-in-Charge, complete in all respects.

1. Material

The artwork shall be executed using premium quality **water-based acrylic emulsion paints**, weather-resistant, UV-resistant, non-toxic, lead-free and washable, suitable for interior and exterior wall applications. Surface preparation materials shall include acrylic wall primer, crack filler, white cement putty, masking tape and protective clear acrylic sealer where required. Educational graphics shall consist of alphabets, numerals, FLN learning elements, geometric shapes, environmental awareness themes, local cultural motifs, storytelling panels, educational charts and child-friendly illustrations prepared using approved colours and designs. All materials shall be of approved make and conform to relevant IS standards.

2. Workmanship

The wall surface shall be thoroughly cleaned and prepared by removing dust, loose paint, grease and other foreign materials. Cracks and undulations shall be repaired using approved filler and putty. One coat of acrylic primer followed by minimum two coats of acrylic paint shall be applied. Artwork shall be laid out by skilled artists using approved drawings and educational themes under the BALA (Building as Learning Aid) concept. Painting shall be carried out with proper colour balance, accurate proportions, smooth finish, sharp outlines and uniform coverage. The work shall include design development, layout marking, sketching, hand painting, lettering, touch-up, protective coating,

scaffolding, cleaning and protection of adjacent surfaces. Finished artwork shall be free from peeling, fading, cracking and visible brush marks.

3. Unit of Measurement

The rate shall be for a unit of One Job

Measurement shall be based on the actual painted wall surface area covered with completed and approved BALA educational artwork, measured in complete job, including all preparation, painting, graphics, lettering, protective coatings, labour, materials, scaffolding and finishing complete in all respects.

Item No. 61: - Providing and fixing Kitchen sink with C.I. or M.S. brackets, painted white including cutting holes in walls and making good the same but excluding fittings. (C) Vitreous China Sink.(i) 600mm x 450mm x 150mm size (SOR 23019 It No 23.13) + SS Sink Glossy ASIS 304 Grade x 1mm thick with over all size 610x460 mm & bowl size With Chromium plated bottle trap Etch Competed as Instructed by Engineer In charge.

1.0. Materials

1.1. White glazed vitreous china sink.

2.0. Workmanship

2.1. The kitchen sink shall be supported on a pair of M.S. or C.I. brackets fixed in cement mortar 1:3 (1 cement : 3 coarse sand). The M.S. or C.I. brackets shall conform to I.S. 775-1962. The wall plaster on the rear shall be cut to rest over the top edge of the sink. After fixing the sink, plaster shall be made good and the surface finished to match with the existing one.

2.2. The C.P. brass trap and union shall be connected to 40 mm. nominal bore galvanised mild steel waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to gully-trap or direct into the gully-trap on the ground on floor and shall be connected to a waste pipe through a floor trap on the upper floors. C.P. brass trap and union may not be provided where surface drain or a floor trap is placed directly under the sink and the waste is discharged to it vertically.

2.3. The height of front edge of the wash basin from the floor, level shall be 80 cms.

3.0. Mode of measurements & payment

3.1. The rate includes cost of all labour, materials, tools and plant and other equipment required for satisfactory completion of this item as described in workmanship.

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

Item No.62:- Providing and Fixing of SS 304 Hanger for bag including using all necessary materials like SS rail, screw etc completed as directed by Engineer In charge.

- Material shall be Stainless Steel Grade SS 304, corrosion-resistant, satin/mirror finish as approved.
- Hanger shall be fabricated from SS flat/bar/pipe section of minimum 1.2 mm thick sheet equivalent or approved standard section.
- All exposed edges shall be rounded, smooth and free from burrs.
- Fixing shall be carried out using SS 304 screws, wall plugs, anchors and accessories.
- Hanger shall be capable of safely supporting a minimum load of 15 kg.
- Complete with drilling, alignment, fastening, cleaning and polishing.

Installation shall be as per approved drawing and Engineer-in-Charge instructions.

The rate shall be for a unit of One number.

Item No.63:- Providing and Fixing pin cushion display board having size 1.20 X 0.75 mt including using of alluminum section frame, 18mm thick WB plywood, nevy blue Cushion cloth pin etc completed as directed by Engineer In charge.

- Overall board size: **1200 mm × 750 mm.**
- Frame shall be made from anodized/powder-coated aluminium section of minimum 25 mm × 25 mm size.
- Backing shall consist of **18 mm thick Waterproof Boiling (WB) grade plywood** conforming to IS 303.
- Cushion layer shall be minimum 10 mm thick soft board/EVA foam suitable for repeated pin insertion.
- Covering shall be premium quality navy blue pin-up fabric/cushion cloth, wrinkle-free and tightly stretched.
- Corners shall be properly mitred and secured.
- Wall fixing shall be done using screws, nylon plugs and concealed brackets.
- Complete with all accessories, labour and installation.

The rate shall be for a unit of One number.

Item No.64:- Providing and fixing of hook of 10mm or 12mm dia including drilling hole, fixing of male- female thrade fastner sealing the same with appoxy compound, finishing the same etc complete as directed by Engineer in charge.

- Hook shall be manufactured from solid SS 304 rod of 10 mm or 12 mm diameter as specified.
- Surface finish shall be satin or mirror polished.
- Fixing shall include drilling holes in RCC, masonry or finished surface as required.
- Hook shall be anchored using male-female threaded fasteners, SS anchors and epoxy adhesive compound.
- Minimum embedment depth shall be 50 mm or as approved.
- Hook shall safely support minimum load of 20 kg.
- Exposed fixing points shall be neatly sealed and finished.

Complete installation including cleaning and testing.

The rate shall be for a unit of One number.

Item No.65:- Providing and fixing medical device & equipment standio meter height measuring scale 2.10mt long including fixing in wall with using of all heavy SS screw, rail etc complete as directed by Engineer in charge.

- Overall height: 2.10 m.
- Measuring scale shall be manufactured from aluminium alloy or powder-coated steel section.
- Graduations shall be permanently printed/engraved in centimetres and millimetres.
- Measurement range shall be minimum 0–210 cm.
- Sliding headpiece shall move smoothly and provide accurate reading.
- Accuracy shall be ± 1 mm.
- Unit shall be fixed firmly to wall using heavy-duty SS screws, anchors and brackets.
- All components shall be rust-resistant and suitable for hospital use.

Complete with installation, calibration and testing.

The rate shall be for a unit of One number.

Item No.66:- Providing and supplying standard PVC (Polyvinyl chloride) Chair with handle of approved design and make as directed by Engineer in charge.

- Chair shall be moulded from high-quality virgin UV-stabilized Polypropylene/PVC material.
- Chair shall have integrated armrests (handles).
- Minimum load carrying capacity shall be 120 kg.
- Surface shall be smooth, non-toxic, stain resistant and washable.
- Legs shall have anti-skid bottom supports.
- Colour and design shall be approved by Engineer-in-Charge.
- Product shall be from reputed approved manufacturer.

Complete supply and delivery at site.

The rate shall be for a unit of One number.

Item No.67:- Providing and supplying standard PVC (Polyvinyl chloride) Stool having size 3.75 X 0.60 X 0.45mtr of approved make as directed by Engineer in charge.

- Stool shall be manufactured from virgin moulded PVC/Polypropylene material.
- Approximate size: 375 mm × 600 mm × 450 mm height or as approved.
- Minimum load carrying capacity shall be 100 kg.
- Surface shall be smooth, washable and impact resistant.
- Legs shall be integrally moulded with anti-skid bottom support.
- Colour and design shall be approved by Engineer-in-Charge.
- Complete supply and placement at site.

The rate shall be for a unit of One number.

Item No.68:- STORAGE WITH WATER PROOF PLY

Providing and fixing side and back storage unit of overall size 450 mm × 450 mm × 450 mm, box type construction, fabricated from 19 mm thick BWP grade waterproof plywood conforming to IS:710, including cutting, grooving, edge banding with 2 mm PVC tape, necessary screws, adhesives, fixtures and fittings, finished with 1.0 mm decorative laminate on exposed surfaces and balancing laminate on internal surfaces, complete with all hardware, carpenter work, transportation, installation and finishing as directed by the Engineer-in-Charge, complete in all respects. as per drawing and direction of Architect/ Engineer in charge.

- Overall size: 450 mm × 450 mm × 450 mm or as shown in approved drawings.
- Framework and panels shall be fabricated from 19 mm thick BWP Grade Waterproof Plywood conforming to IS 710.
- Exposed edges shall be finished with 2 mm thick PVC edge banding applied through hot-melt edge banding machine.
- Exposed surfaces shall be finished with 1.0 mm thick decorative laminate of approved shade and make.
- Internal surfaces shall be provided with balancing laminate of minimum 0.8 mm thickness.
- Joinery shall be carried out using approved wood screws, dowels, adhesive and concealed fittings.
- Hardware shall include SS hinges, magnetic catches, handles, screws and accessories of approved make.
- All cut edges shall be sealed against moisture ingress.
- Unit shall be fixed rigidly to wall/floor wherever required.
- Work shall include cutting, grooving, fabrication, transportation, installation, alignment and finishing.
- Complete in all respects as per approved drawing and Architect/Engineer-in-Charge directions.

Item No.69:- Providing and Fixing ABC stored Fire Extinguisher 6 Kgs Capacity complete in all aspect confirming to IS 15683 with ISI mark multipurpose as per instruction of Engineer in charge.

Item including Supply, Filling and Fixing of approved make ABC type fire extinguisher -6 Kg. Capacity as per IS:15683 & IS : 14609 complete with powder and charged including with fixing brackets, fitted with gun metal ap and discharge hose and open grip nozzle.

The consolidated item shall be carried out as directed by Engineer in charge.

The payment shall be made on number basis.

Item No.70:- Providing and Fixing CO2 Fire Extinguisher 4.5 Kgs Capacity complete in all aspect confirming to IS 15683 with ISI mark (Especially for Electrical Fire) as per instruction of Engineer in charge.

Item including The CO2 type fire extinguisher shall be ISI mark with initial charge with high pressure cylinder, complete with wheel type valve, internal discharge tube, with high pressure discharge hose with horn and suspension brackets. The extinguisher shall have conforming to IS-15683 and Capacity shall be 4.5 kg.

The consolidated item shall be carried out as directed by Engineer in charge.

The payment shall be made on number basis.

Item No.71:- Providing and fixing AUTOGLOW Signages (0.30 Smt) in Block Letters of Specified Sizes on Both Faces of Panel With Hanging Facility with SS Chain or SS High tensile Wire etc Completed as per design and requirement as directed by EIC.

Providing & Fixing AUTOGLOW Signages in Block / Small Letters of Specified Sizes in BOQ. Signages shall be as per IS 12349-1988. The colour red, green and yellow, shall conform to Shade No. 536, 221 and 309 of IS: 5-1978. Colours for ready mixed paints and enamels (third revision) respectively. The paint shall conform to IS: 2932-1974 'Specification for enamel, synthetic, exterior (a) undercoating, (b) finishing (first revision).

The payment shall be made on number basis.

Item No.72:- Providing and casting in situ ordinary cement concrete M-150 for coping, over riding Wall including formwork curing and finishing complete.

The work shall consist of providing all labour, materials, equipment, tools, plant and machinery required for casting in-situ Ordinary Cement Concrete (OCC) of Grade M-150 for coping over riding/boundary walls, including centering, shuttering, mixing, placing, compacting, finishing, curing, and all incidental works complete as directed by the Engineer-in-Charge.

2. Materials

Cement

- Ordinary Portland Cement (OPC) Grade 53 conforming to IS 269/IS 8112, conforming to IS 1489 (Part-I) as approved.
- Cement shall be fresh, dry, and free from lumps.

Fine Aggregate

- Clean, hard, durable river sand or crushed sand conforming to IS 383.
- Free from clay, silt, organic matter, salts, and other deleterious materials.

Coarse Aggregate

- Crushed hard stone aggregate conforming to IS 383.
- Nominal maximum size shall be 20 mm, well graded, clean, and free from dust and organic impurities.

Water

- Clean potable water conforming to IS 456, free from harmful salts, oils, acids, alkalis, and organic matter.

3. Concrete Grade

- Ordinary Cement Concrete shall be Grade M-150 (Nominal Mix 1:2:4) or equivalent as specified.
- Concrete shall achieve a minimum characteristic compressive strength of 15 MPa at 28 days.

4. Preparation

- The top surface of the wall shall be cleaned thoroughly before concreting.
- Loose mortar, dust, debris, and foreign materials shall be removed.
- The masonry or concrete surface shall be wetted adequately before placing fresh concrete.

5. Formwork

- Formwork shall be made of steel or sound timber, rigid and watertight.
- It shall be properly aligned, levelled, supported, and braced to maintain the required dimensions and profile.
- Inside surfaces shall be coated with approved shuttering oil before concreting.
- Formwork shall be removed only after the concrete has gained sufficient strength in accordance with IS 456.

6. Mixing

- Concrete shall preferably be machine mixed.
- Hand mixing shall be permitted only with prior approval of the Engineer-in-Charge and with an additional 10% cement.
- Ingredients shall be accurately measured by weight or approved gauge boxes.

7. Placing

- Concrete shall be placed immediately after mixing without segregation.
- It shall be laid continuously to the required thickness and profile.
- Construction joints shall be avoided as far as possible.

8. Compaction

- Concrete shall be compacted thoroughly using needle vibrators or suitable hand tamping where vibration is not practicable.
- Proper care shall be taken to eliminate honeycombing and voids.

9. Finishing

- The exposed coping surface shall be finished smooth with a wooden float followed by a steel trowel where specified.
- The coping shall be given the required slope (generally 1 in 30 to 1 in 40) towards both sides for drainage unless otherwise shown on the drawings.
- All exposed edges shall be neatly finished and chamfered or rounded (typically 20–25 mm) if specified.
- Surface shall be free from cracks, laitance, depressions, and other defects.

10. Curing

- Curing shall commence as soon as the concrete has sufficiently hardened.
- Concrete shall be kept continuously moist for not less than 14 days by ponding, wet hessian, or other approved methods.

11. Workmanship

- Concrete shall be true to line, level, and profile.
- Finished coping shall have uniform thickness and width.

- Any defective work shall be removed and replaced by the contractor at no extra cost.

12. Rate

The rate shall include:

- Supply of cement, sand, coarse aggregate, water, and all other materials.
- Mixing, transportation, placing, compaction, and finishing of concrete.
- Centering, shuttering, staging, and removal of formwork.
- Surface preparation before concreting.
- Providing required slope, chamfers, and edge finishing.
- Curing for the specified period.
- All labour, tools, plants, equipment, scaffolding, loading, unloading, wastage, and incidental charges.
- Complete execution of the work as directed by the Engineer-in-Charge.

13. Measurement

- Measurement shall be made in Cubic Metres (m³) of finished concrete work.
- Dimensions shall be measured as executed, excluding unauthorized extra thickness or projections.
- Formwork shall not be measured separately unless specifically provided in the Schedule of Quantities.

Item No.73:- Additional Exterior Development:

(Play Area + Maze, Sensory Wall, Pavilion + Outdoor Classroom, Overall Soft scaping, Overall hardscaping, Overall landscaping, Outer Graphics Paintings).

1. Scope of Work

The work shall include the design (where specified), supply of all materials, fabrication, construction, installation, testing, finishing, planting, painting, and maintenance during the defect liability period for a complete outdoor children's play environment suitable for nursery and preschool children (2–6 years), conforming to applicable Indian Standards and child safety requirements.

The contractor shall provide all labour, materials, tools, equipment, transportation, scaffolding, excavation, disposal of surplus materials, finishing, and all incidental works necessary for complete execution.

2. Play Area with Maze

Scope

Providing and installing a safe children's play area comprising activity equipment, educational maze, interactive play elements, safety flooring, edging, and associated civil works.

Play Equipment

The play area may include:

- Mini slides
- Crawl tunnels
- Climbing frames
- Balance beams
- Stepping pods
- Spring riders
- Play panels
- Educational activity boards
- Interactive maze pathway
- Sensory stepping stones

Equipment shall be suitable for children aged 2–6 years.

Materials

Equipment shall be manufactured from one or more of the following:

- HDPE UV stabilized panels
- LLDPE rotational moulded components
- FRP components
- Powder-coated GI steel
- Stainless Steel (SS-304)
- Seasoned treated hardwood where specified

All exposed edges shall be rounded.

No sharp corners shall be permitted.

Or Play Area Made as per instructed by Engineer in Charge

Foundation

Equipment shall be fixed on PCC foundation blocks of suitable size.

Anchor bolts shall be galvanized.

Concrete shall be minimum M20.

Safety Surface

Play area shall be provided with:

- EPDM Rubber Flooring
- or
- Rubber Tiles
- or
- Artificial Grass with Shock Pad
- or
- Washed River Sand (where specified)

Minimum fall protection shall comply with equipment height.

Safety

Equipment shall conform to:

- IS 9873 (Safety requirements for toys)
- EN 1176 (Playground Equipment)
- EN 1177 (Impact Absorbing Surfacing)

3. Maze

Maze shall comprise:

- HDPE Panels
- Brick edging
- Landscape hedges
- Decorative paving

Height shall generally not exceed 1.20 m. Maze shall encourage cognitive development.

Corners shall have adequate visibility.

Or MAZE Area Made as per instructed by Engineer in Charge

4. Sensory Wall

The sensory wall shall consist of educational and tactile play elements.

It may include:

- Alphabet panels
- Number panels
- Musical chimes
- Rotating gears
- Shape matching games
- Texture panels
- Mirror panels
- Colour wheels
- Sand writing board
- Chalk board
- Magnetic board

Materials:

- HDPE
- Stainless Steel
- Acrylic
- Aluminium
- Weather-resistant wood

Panels shall be UV resistant. Fixing shall be vandal resistant.

Height shall suit nursery children.

Or Sensory Wall Made as per instructed by Engineer in Charge

5. Pavilion with Outdoor Classroom

The pavilion shall serve as an outdoor learning space.

Construction may consist of:

- RCC footing
- Steel structure
- Timber finish
- Tensile fabric roof
- Polycarbonate roofing
- Colour-coated roofing sheets

Flooring:

- Anti-skid tiles
- Rubber flooring
- Wooden deck
- Paver blocks

Furniture:

- Child-sized benches
- Teacher seating
- Activity tables
- Storytelling corner

Roof height shall provide adequate ventilation.

Or Pavilion Made as per instructed by Engineer in Charge

6. Overall Soft scaping

Soft scaping shall include:

- Lawn development
- Shrubs
- Flower beds
- Ground covers
- Native plants
- Butterfly garden
- Aroma plants
- Sensory plants
- Shade trees

Suitable species may include:

- Duranta
- Ixora
- Hibiscus
- Jasmine
- Murraya
- Wedelia
- Mexican Grass
- Doob Grass

All plants shall be healthy nursery-grown stock.

Topsoil shall be fertile.

Organic manure shall be incorporated.

Automatic or manual irrigation shall be provided.

Or Soft scaping Done as per instructed by Engineer in Charge

7. Overall Hardscaping

Hardscape works shall include:

- Concrete pathways
- Interlocking paver blocks
- Coloured concrete
- Kerb stones
- Seating blocks
- Planters
- Retaining edging
- Stepping stones
- Drainage channels

All walking surfaces shall be:

- Anti-skid
- Even
- Wheelchair accessible where required

Or Soft scaping Done as per instructed by Engineer in Charge

8. Overall Landscaping

The landscape shall integrate:

- Planting
- Mounds
- Children's garden
- Seating areas
- Shade trees
- Feature lighting
- Decorative rocks
- Pebble beds
- Mulching
- Water harvesting where applicable

Landscape shall encourage safe exploration.

Visibility throughout the site shall be maintained.

Or Landscaping Done as per instructed by Engineer in Charge

9. Outdoor Graphics Paintings

Providing weather-resistant outdoor educational graphics on:

- Boundary walls
- Pavement
- Play courts
- Walkways
- Learning zones

Graphics may include:

- Alphabet
- Numbers
- Shapes
- Animal figures
- Birds
- Solar System
- Maps
- Hopscotch

- Traffic symbols
- Nature themes
- Moral education graphics
- Educational games

Paint shall be:

- Exterior acrylic
- UV resistant
- Anti-fungal
- Washable
- Non-toxic
- Lead free

Surface preparation shall include:

- Cleaning
- Primer
- Putty
- Base coat
- Two finishing coats

Or Outdoor Graphics Paintings Done as per instructed by Engineer in Charge

10. General Safety Requirements

Entire play area shall provide:

- Rounded corners
- Slip-resistant flooring
- No toxic materials
- No pinch points
- No protruding bolts
- Adequate drainage
- Safe clearances around equipment
- Secure fencing where required
- Child-safe gates
- Shade over play areas where possible

11. Workmanship

- All work shall be true to line and level.
- All exposed steel shall be powder coated.
- Welds shall be smooth.
- Fasteners shall be stainless steel or galvanized.
- Paint finish shall be uniform.
- Surfaces shall be free from defects.

12. Inspection

The Engineer-in-Charge shall inspect:

- Foundations
- Equipment installation
- Surface finish
- Safety compliance
- Landscaping
- Plant health
- Painting quality

Defective items shall be replaced by the contractor at no extra cost.

13. Measurement

Measurement shall be Measured per Job

Item No.74:- Providing and fixing of Ridge flashing for roof panel shall be made out of 0.5 mm thick pre coated GI sheet . The Precoated sheet shall be of minimum 240 Mpa steel grade confirming to IS 14246:1995 and shall have zinc coating of minimum 120 gsm as per IS: 277:1992, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 micron. The PPGI Sheet shall have plastic protective guard film of minimum 25 microns to avoid scratches during transportation. The ridge shall be fixed to the steel members by pop rivet or self-drilling/self-stitching fasteners @ maximum 450 mm c/c along length of capping/flashing etc complete.

The work shall consist of providing, fabricating, and fixing ridge flashing at the roof ridge using factory-manufactured pre-coated Galvanized Iron (PPGI) sheets, including cutting, bending, overlapping, fixing with self-drilling fasteners or pop rivets, sealing, and all accessories required to make the ridge completely weatherproof, in accordance with the approved drawings and as directed by the Engineer-in-Charge.

2. Materials

Pre-coated Galvanized Iron (PPGI) Sheet

The ridge flashing shall be manufactured from 0.50 mm Base Metal Thickness (BMT) pre-coated galvanized steel sheet conforming to IS 14246:1995 or the latest revision.

The sheet shall have:

- Minimum steel yield strength: 240 MPa
- Minimum zinc coating: 120 GSM conforming to IS 277:1992
- Epoxy primer coating: 5–7 microns on both sides
- Polyester top coat: 15–18 microns on the exposed side
- Suitable back coat on the reverse side as per manufacturer's standard
- Protective plastic guard film of minimum 25 microns during transportation and installation.
- The colour shall match the roofing sheets unless otherwise specified.

3. Fabrication

- Ridge flashing shall be factory-formed using a press brake to the required profile and dimensions shown in the approved drawings.
- Bending shall be smooth without cracks, wrinkles, or damage to the protective coating.

- The standard effective cover width shall be as per the roof profile and design requirements.
- All exposed edges shall be neatly cut and free from burrs.

4. Installation

Before installation:

- Roof panels shall be properly aligned and securely fixed.
- Ridge line shall be checked for straightness and level.

The ridge flashing shall:

- Be fixed centrally over the roof ridge.
- Provide a minimum overlap of 150 mm between adjacent flashing pieces unless otherwise specified.
- Be properly aligned to ensure a neat appearance and complete weather protection.
- Be installed with approved profile fillers wherever required to close gaps between roof sheets and ridge flashing.
- Be installed without causing distortion or damage to the roof sheets.

5. Fasteners

The ridge flashing shall be fixed to the supporting steel members or roof sheets using:

- Corrosion-resistant self-drilling/self-tapping screws or self-stitching screws with EPDM sealing washers, or
- Aluminium/stainless steel pop rivets where specified.

Fasteners shall be:

- Installed at maximum 450 mm centre-to-centre along the length of the ridge flashing.
- Fixed in straight alignment.
- Properly tightened without damaging the sheet or compressing the sealing washer excessively.

6. Sealing

- All overlaps, joints, and junctions shall be sealed with approved neutral-cure silicone sealant or butyl sealant tape wherever required to prevent water leakage.
- Sealant shall be compatible with the PPGI coating and shall remain flexible under varying weather conditions.

7. Protective Film

- The protective plastic film shall remain on the sheets during handling and installation.

- The film shall be removed immediately after completion of installation without leaving adhesive residue.

8. Workmanship

- Flashing shall be installed true to line, level, and slope.
- No visible waviness, dents, scratches, oil-canning, or coating damage shall be accepted.
- Any damaged sheets or accessories shall be replaced at the contractor's cost.
- All exposed fasteners shall be properly sealed to prevent water ingress.

9. Rate

The quoted rate shall include:

- Supply of 0.50 mm thick pre-coated GI ridge flashing.
- Cutting, bending, profiling, and fabrication.
- Providing all self-drilling screws, self-stitching screws, pop rivets, EPDM washers, sealants, closure fillers, and accessories.
- Fixing at maximum 450 mm c/c.
- Transportation, loading, unloading, handling, lifting, and storage.
- Removal of protective film after installation.
- Labour, tools, plants, scaffolding, safety measures, wastage, and all incidental charges.
- Complete installation in all respects as directed by the Engineer-in-Charge.

10. Measurement

The ridge flashing shall be measured in Running Metres (Rm) along the centre line of the ridge as installed.

The measurement shall include:

- All bends and overlaps.
- Cutting, fabrication, and fixing.
- Fasteners, sealants, fillers, and all accessories required for complete installation.

Item No.89 :- Providing, supplying, installing, testing and commissioning LED Smart Television 32-inch (80 cm) display, Full HD as approved, slim bezel design, LED backlit panel, smart operating system (Android TV / Google TV / WebOS / Tizen), built-in Wi-Fi and Ethernet connectivity, minimum 2 HDMI ports, 2 USB ports, Bluetooth enabled, screen mirroring/casting facility, inbuilt speakers minimum 20W output with Dolby Audio support, preloaded OTT app support (YouTube, Netflix etc.), wall mount bracket with all fixing accessories, remote control with batteries, power cord, necessary connection hardware complete. complete as directed by Engineer-in-Charge.

Item Specifications for 32-inch Smart TV:

- **Type/Category/Class of TV set:** Smart TV(2)
- **Display Type/Technology:** LED (Light Emitting Diode)
- **Nominal Screen Size Range (Inches):** 27-32 inch
- **Actual Screen Size (inches):** 32
- **Audio Power (minimum):** 10W x 2
- **Maximum Resolution (Pixels) supported:** HD (High Definition): 1280x720
- **Typical Brightness (Nits):** 200-299
- **Comprehensive Standard Warranty (Years):** 1
- **Operating System:** Android
- **Static contrast Ratio:** 1900:1
- **Actual Brightness (Nits):** 280
- **Minimum Number of Television Channels supported (at RF input):** 96
- **Salient Feature:** Inbuilt Speakers, Table mount(legs)
- **Optional Feature:** HDR (High Dynamic Range), Screen Mirroring, Built-in Wi-fi, Wi-fi Direct, Bluetooth
- **Input Power Rated Voltage:** 230 (+-10%), 50Hz
- **Input port:** RF Input Composite Input, 1-HDMI Port, 1-USB Port 1-Ethernet Port
- **Output Port:** AUDIO OUTPUT NA

- **RF Tuner Band:** UHF & VHF
- **Accessories (included in the scope of supply):** Remote Control, Wall Mounting Bracket, Stand
- **Optional Accessories:** Connecting cables (AV)
- **Minimum Operating Temperature (Degree C):** 0
- **Maximum Operating Temperature (Degree C):** 45
- **Max Power Consumption (Watts):** 55
- **Power Consumption in standby Mode (Watts):** 0.5
- **Overall Dimensions (Length x Breadth x Depth) (mm x mm x mm):** 72 x 43 x 7.74
- **Gross Weight (Kg):** 4,74
- **Warranty on Display only (Years):** 1
- **Installation & Commissioning:** Yes

Mode of Measurement:

1. Measurement Unit:

The unit of measurement shall be based on Each Smart TV.

Deputy Executive Engineer

R & B Sub-Division (P),

- Kachchh

Executive Engineer

R & B Division (P),

Bhuj - Kachchh